PRODUCT MANUAL

U-2 Spyplane

81 articles · Complete website edition

Includes all article text, tables and available illustrations. Videos and interactive resources are linked. Printed page numbers restart with each article. Use the clickable contents or PDF bookmarks to navigate.

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Miltech Simulations U-2

Welcome to the U-2

> Caution
> **CONSUMER SIMULATION USE ONLY - DO NOT USE THIS DOCUMENTATION ON A REAL AIRCRAFT**

Thank you for purchasing the Miltech U-2S for Microsoft Flight Simulator 2024. This aircraft is the result of more than three years of research and development, drawing on public sources, archive footage and videos, and conversations with subject matter experts who know the real aircraft first-hand. We hope you enjoy flying it as much as we enjoyed building it.

This documentation is designed to help simulation enthusiasts get the most out of the U-2S. Whether you are new to high-altitude flying or a seasoned virtual pilot, this guide will walk you through everything you need to start the aircraft, fly it and, above all, land it with confidence.

Overview



The Miltech U-2S in its default fit: ASARS-2 nose radar and Type A superpods, parked on its pogos.

The U-2 "Spyplane" is a single-engine, single-seat, high-altitude reconnaissance aircraft. Its glider-like 103 ft wing lets it cruise above 70,000 ft for many hours - and makes it one of the most demanding aircraft in the world to land. It sits on a bicycle landing gear, balances on detachable "pogo" wheels, and requires a chase car with a second pilot for landing. Our U-2S for Microsoft Flight Simulator 2024 is built from public data records. Some claim the U-2 is the hardest airplane in the world to fly. U2 101 - The Basics explains why, and the short history below shows where the aircraft came from.

A Short History

The U-2 first flew in 1955 from Groom Lake, a remote test site in the Nevada desert. Its job was simple to describe and hard to do: photograph the Soviet Union from an altitude no fighter or missile could reach. That held until 1960, when a U-2 was shot down over Sverdlovsk. Two years later, U-2 photographs revealed the Soviet missile sites in Cuba. NASA later took the aircraft on as a research platform, and in 1994 the fleet was re-engined with the GE F118 turbofan. That is the U-2S the U.S. Air Force still flies today. For the full timeline, and the places you can fly it in the simulator, see Introduction.

Variants and Availability

Buy the U-2 once and you get all three variants. The U-2S is in the box on release day, 13 November 2026. The U-2R and ER-2 follow as a free update a few weeks later, together with 5 to 10 more missions and period chase cars.

Available 13 Nov 2026**U-2S**Digital cockpitGlass cockpit with three Multi-Function Displays, Up-Front Control Display, Backup Control Display Unit, INS and Standby Flight Display.EngineGE F118Liveries19

Free update**U-2R**Analog cockpitThe classic round-dial cockpit with a drift sight.EngineP&W J75Liveries15

Free update**ER-2**NASA analog cockpitNASA's high-altitude research aircraft, with the analog cockpit.OperatorNASALiveries3

Sceneries

Four airfields come with the U-2, each with a parking spot made for the U-2 and room for the ground equipment. See Sceneries.

Airfield	ICAO	Where	U-2 parking
RAF Akrotiri	LCRA	Cyprus	Gate U 2
RAF Fairford	EGVA	Gloucestershire, England	Gate U 2
CIA Nordic Base	CIA1	Finnish Lapland	Gate U 1 or Gate U 2
Groom Lake	KXTA	Nevada, USA	Any of the 17 ramp spots

Missions

Seven missions come with the U-2 in the U-2 Spyplane Mission Pack, played in Miltech Mission Hub. New to the U-2? Start with the Familiarization mission. See Missions.

Mission	Base	Duration
U-2 Familiarization - Groom Lake Start here	Groom Lake (KXTA)	1 h 36 min
NASA Terrain Study - Groom Lake	Groom Lake (KXTA)	2 h 8 min
NASA Grand Canyon Survey	Palmdale (KPMD)	2 h 16 min
UFO Investigation - Roswell	Groom Lake (KXTA)	1 h 52 min
Operation Dark Skies - North Korea	Osan Air Base (RKSO)	2 h 24 min

Mission	Base	Duration
Chinese Surveillance Balloon - Observation	Patrick SFB (KCOF)	2 h 32 min
Iran Reconnaissance - Akrotiri	RAF Akrotiri (LCRA)	2 h 48 min

Note
This guide covers the U-2S.

Get Started

These four steps get you set up and flying quickly.

1. Read the Important Need-to-Knows. The U-2 does several things differently from other aircraft.
2. New to the U-2? U2 101 - The Basics explains how it flies and what to expect.
3. Bind the necessary keybind controls - see Keybinds Guide.
4. Follow the Quick Start Guide. If you prefer, refer to the full Checklists section.

Requirements

- Microsoft Flight Simulator 2024 - latest version available. The package is built for MSFS 2024 only.
- A valid product license.
- Joystick Controller (Recommended) or Xbox controller. Two spare buttons are needed for the speedbrakes and the lift spoilers.
- CPU: Quad-core processor or better.
- GPU: At least 8GB of dedicated memory, Nvidia 2070 or better. For graphics cards with less video memory, see Low VRAM Version.
- RAM: 8GB Minimum.
- Hard Disk: At least 8GB Recommended.
- An internet connection is optional. Without it the aircraft flies normally; only the camera and radar pages, custom chart pages, SimBrief loading and the EFB datalink need it.

How to read this documentation

You see	It means
BATTERY, ARM	A switch, knob or switch position in the cockpit
ENT L4	A key you press on a display or keypad
FUEL XFER ON FUEL SUMP LOW	Text exactly as it appears on a cockpit screen, in its color
FUEL SUMP	A lamp on the warning panel
INOP	The control or page is present in the cockpit but has no function in the simulator

Installation and Updates

How to install the U-2 on your PC, find it in the simulator, update it and remove it.

Where to Buy?

You can buy the Miltech Simulations U-2 from the iniBuilds store, from the Miltech Simulations Webstore, or in the MS Marketplace. Each option is set out below.

Installation - iniBuilds

Products bought from the iniBuilds store are downloaded and updated via iniManager. Download iniManager from inibuilds.com.

1. Download and launch iniManager.
2. Log in with your iniBuilds account.
3. Select the Miltech Simulations U-2 in your products and click **"Install"**. The product will download and install automatically.

Installation - Miltech Simulations Webstore

Products distributed via Miltechsimulations.com are downloaded and updated via Contrail. Download the Contrail App here: https://cdn-eu.29palms.de/contrail/releases/ContrailSetup.exe

1. Download and launch Contrail.
2. Click on **"Accounts"** in the bottom left corner and "Connect" your Miltech Simulations account (log in with your Miltech Simulations credentials).
3. Click on **"Downloads"**. Your products will download and install automatically.

Installation - MS Marketplace

1. Launch Microsoft Flight Simulator.
2. Open the Marketplace.
3. Search for the Miltech Simulations U-2.
4. Click **"Install"** and wait for the product to install successfully.

Note
After installing, activate your license: see Activating the Aircraft. An internet connection is required for the first activation.

Uninstall

Delete the miltech-u2 folder from the Community folder (or remove it in the MS Marketplace, Contrail or iniManager).

Report Manual Errors

If a page in this manual is wrong or unclear, send a report through the bug report form. Name the page and the sentence that needs changing.

Report Aircraft Bugs

If the aircraft does not work as this manual says, send a report through the bug report form. Include the aircraft variant, the product version and how you started the flight. See Contact Us.

How This Manual Is Organized

The manual has four parts. Read the Product Guides first. Use the other parts when you need them.

1 Product Information	2 Product Guides	3 Aircraft and Systems	4 Operations
What comes with the product, how to set it up, and where to get help. Introduction Variants Sceneries Missions Activating the Aircraft	How to start the aircraft and how to fly it. Important Need-to-Knows Quick Start Guide U2 101 - The Basics Flying the U-2S	One page for each system and each display. Use it as a reference. Cockpit Panels Multi-Function Displays (MFDs) Inertial Navigation System (INS) Sensors Warnings and Alerts	The procedures for each flight, and the world around the aircraft. Checklists Emergency Procedures Chase Car and Ground Support Equipment INSPlanner Datalink Portal

An abbreviation with a dotted underline, such as INS, links to its entry in the Glossary. Each page ends with a **Related pages** line.

Miltech Simulations U-2. SIMULATION USE ONLY. This documentation describes the simulated aircraft as delivered in the add-on and must not be used for real-world aviation.

Miltech Simulations U-2

Introduction

The story of the real U-2, what comes with the Miltech U-2S, and the main facts about the aircraft.

Note
Sim values. Performance values are measured in the sim. They may not accurately represent (nor do they intend to accurately represent) the performance of the real aircraft.

The U-2 Story

The U-2 is a single-engine, single-seat, high-altitude reconnaissance aircraft. It was designed in 1954 for one task: to photograph the Soviet Union from higher than any fighter or missile could reach. The result is a jet engine on the long, thin wing of a glider.

The first U-2 flew in 1955, and the type has stayed in service since then: over the Soviet Union and Cuba in the Cold War, as a science aircraft with NASA, and today with the U.S. Air Force as the U-2S. The timeline shows the main events and where you find them in the simulator.

1. The Cold War

2. 1955

No. 01 · Nevada

A secret first flight

The U-2 flies for the first time at Groom Lake, a test site in the Nevada desert built for the program.

In the sim: Groom Lake, 1960s era

3. 1956

No. 02 · Soviet Union

Over the Soviet Union

The CIA starts flights over the Soviet Union. The photographs show far fewer Soviet bombers than Washington feared.

4. 1960

No. 03 · Sverdlovsk

Shot down

On 1 May, a missile hits the U-2 of Francis Gary Powers over Sverdlovsk. Two weeks later, a summit between Eisenhower and Khrushchev collapses.

5. 1962

No. 04 · Cuba

Thirteen days

U-2 photographs find Soviet missile sites in Cuba and start the Cuban Missile Crisis. On 27 October, Maj. Rudolf Anderson is shot down over the island.

6. New airframes and NASA

7. 1967

No. 05 · U-2R

A bigger aircraft

A new airframe, about a third larger, with more fuel and more room for sensors.

In the sim: free update - see Variants

8. 1981

No. 06 · NASA

The science version

Production starts again as the TR-1, and NASA receives the ER-2 for high-altitude research.

In the sim: free update

9. 1994

No. 07 · U-2S

A new engine

The fleet gets the GE F118 turbofan, lighter and more efficient than the old J75. This is the U-2S.

In the sim: the launch aircraft

10. The U-2 today

11. 2023

No. 08 · United States

The balloon

A U-2 flies above the Chinese surveillance balloon as it crosses the United States.

In the sim: the Chinese Surveillance Balloon mission

12. 2025

No. 09 · Anniversary

Seventy years

The anniversary flight lasts 14 hours and covers 6,000 NM.

13. 2026

No. 10 · Today

Still flying

The U.S. Air Force still flies the U-2S from Beale AFB in California, and from forward bases such as RAF Akrotiri and RAF Fairford.

In the sim: RAF Akrotiri and RAF Fairford

Why Pilots Call It the Hardest Aircraft to Fly

Think of a very long glider with a very big jet engine. Almost everything unusual about the U-2 comes from six facts.

103 ftA glider's wingMuch lift and very little drag. The aircraft floats, and it does not want to slow down or come down.

18,900 lb Of thrustOn an airframe of 16,230 lb empty. Light, it climbs at about 11,000 ft/min, more than 40° nose up.

2 wheels In a lineThe pogos fall away on takeoff. From then on, the pilot balances the aircraft like a bicycle.

½Of the weight is fuelThe aircraft that lands is nearly a different aircraft from the one that took off.

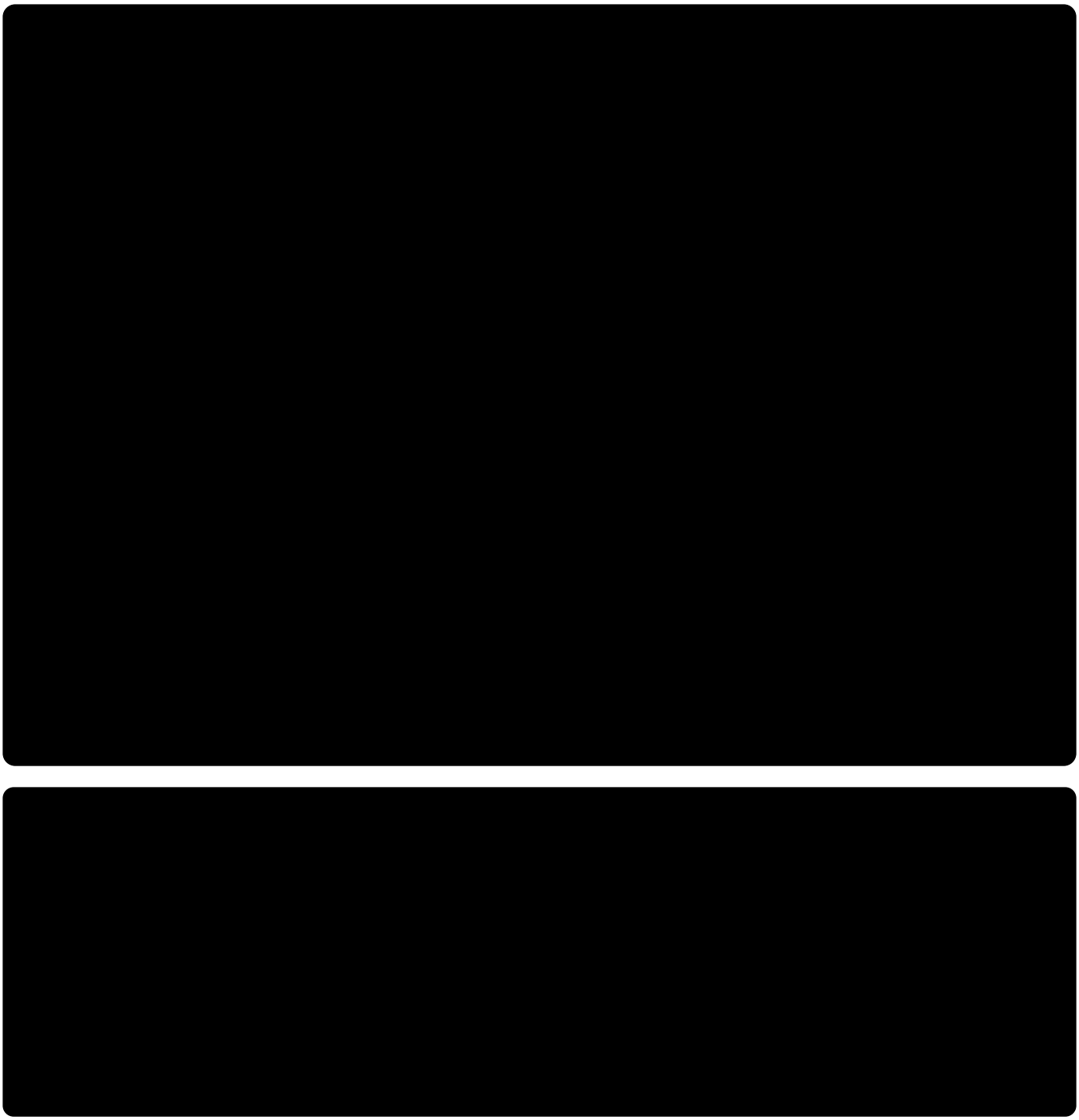
20 kt Stall to speed limitAt 70,000 to 80,000 ft. Every input at altitude must be small and slow.

NoneAutomatic helpNo autothrottle, no automatic spoilers, no antiskid and no differential brakes.

In the cruise at 70,000 ft and higher, only a few knots separate the stall from overspeed. The landing is on the bicycle gear, with a chase car racing down the runway behind the aircraft. Why it flies like this, and how to fly it, is under U2 101 - The Basics.

Reference Numbers

Item	Value
Maximum weight	40,000 lb
Empty weight	16,230 lb
Fuel capacity	2,917 US gal (approx. 19,500 lb)
Wingspan	103 ft
Stall speed at 22,000 lb, flaps up / full flaps (higher when heavier - see Specifications and Limitations)	73 / 67 KIAS
Take-off speed	approx. 95 KIAS
Climb speed	160 KIAS
Maximum flap speed	130 KIAS
Flap settings	0 - 35° in 5° steps
Engine	GE F118



Top and side views of the U-2S with the main dimensions, measured on the 3D model (height on the ground, to the top of the fin: 14 ft 10 in).

Landing Gear and Pogos

The U-2 has a bicycle landing gear: one main gear and a steerable tail gear. On the ground, two detachable outrigger wheels called **pogos** keep the wings level. They behave as they do on the real aircraft.

1Before flightThe pogos have safety pins with red flags. You cannot pull these pins yourself. With the chase car on, the runway crew pulls them after you hold still on the runway for about a minute.

2Take-off rollEach pogo falls away by itself when the wing carries it, between 60 and 88 knots. The left and the right pogo fall in random order, usually a few knots apart.Pins still fitted?Neither pogo falls on take-off, and they stay on in normal flight. Hard wing rocking in the air breaks a pinned pogo off, after four to seven hard roll reversals.

3After landingStop (3 kt or less) and wait, on the runway or wherever you have rolled to. The pogo truck of the chase car drives up, and each pogo goes on when its crew member stands at the wing: the raised wing first, then the crew levels the aircraft and fits the other pogo. The crew also fits new pins.If you do not waitIf you taxi before the crew is done, they stop, and start again when you next stop. The pogos wait for the crew, however long they take.

4Chase car offWith the chase car off (EFB Settings tab), the pogos are back on at touchdown.

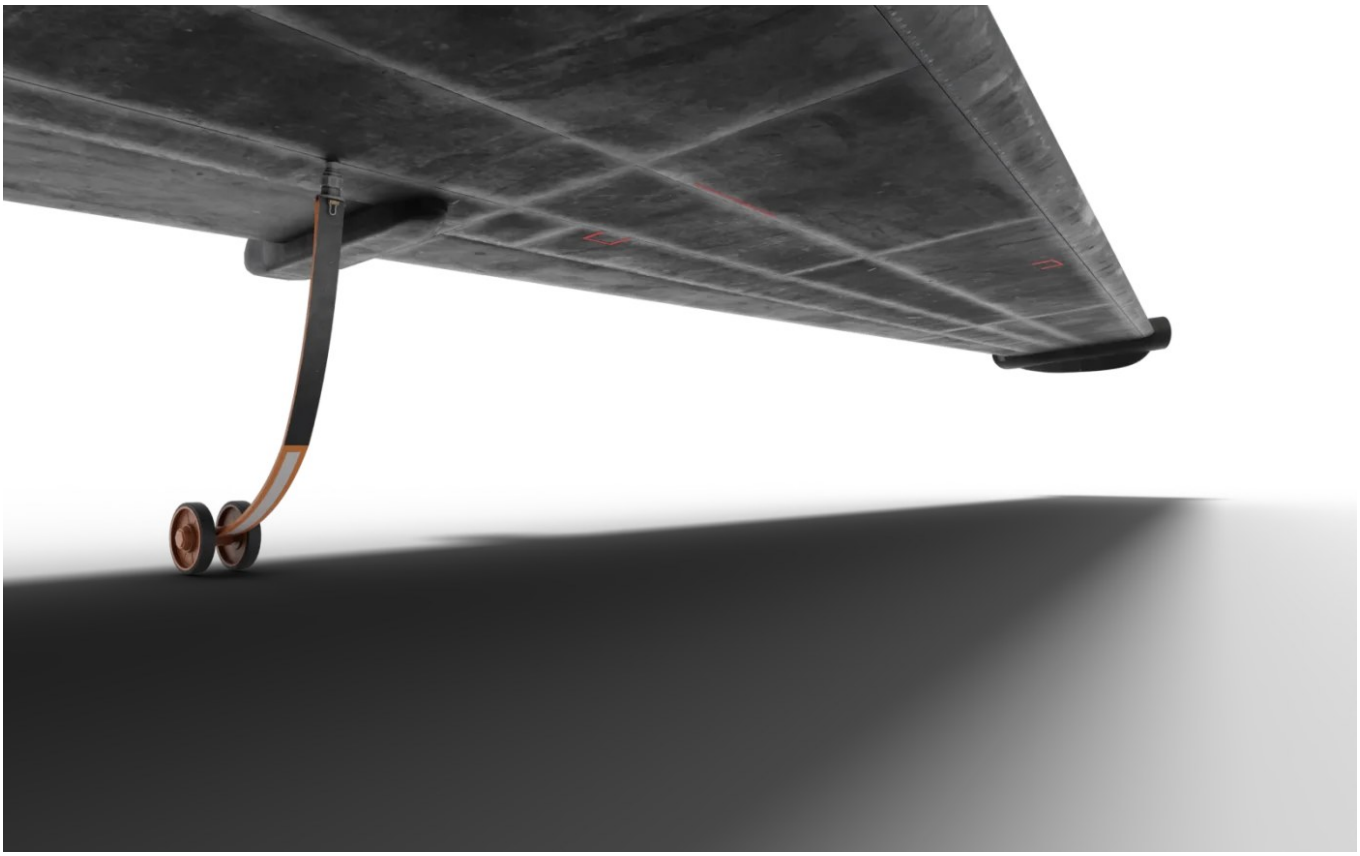
The landing gear pins are separate from the pogo pins. In the walkaround, one click on the main or the tail gear pins removes both, and the EFB **Set up aircraft** presets remove them too.

The full procedures are under Flying the U-2S and Chase Car and Ground Support Equipment.



The bicycle gear: the twin-wheel main gear under the fuselage and the steerable tail gear.

1. **Main gear (twin wheels)**
2. **Tail gear**
3. **Main gear door**
4. **Speed brake (closed)**



A pogo under the left wing, fitted for the ground. It falls away on the take-off roll; the wingtip skid protects the tip when a wing goes down after landing.

1. **Pogo wheels**
2. **Pogo leg**
3. **Wingtip skid**

Your Mobile (Chase Car)

Real U-2 pilots are talked down by a second pilot in a fast car, the "mobile". Yours appears automatically:

- **On departure** you hear "mobile's up".
- **On final approach** (gear down, flaps out, below 1,500 ft) the car joins behind the runway threshold.
- **In the flare** it calls your height above the runway - "ten... five... two... one" - and "left rudder / right rudder" if you move off the centerline.

There is nothing to switch on, but leave the chase car on: it also brings the runway crew that pulls the pogo pins. See Chase Car and Ground Support Equipment.

Configuration

The sensor nose (ASARS-2 radar, Standard or SYERS-2A camera), the Q-bay camera (OBC), the superpods, the SPAN and the dorsal sensors are selected in the U-2 EFB - see Electronic Flight Bag (EFB). What each one is and does is under Sensors.



The three dorsal sensors behind the canopy - one of the fits you change on the EFB Aircraft tab.

1. **Forward dorsal sensor**
2. **Middle dorsal sensor**
3. **Aft dorsal sensor**
4. **Canopy**

Related pages: Variants · Sceneries · U2 101 - The Basics · Quick Start Guide

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Miltech Simulations U-2

Variants

The U-2 comes in three variants, all in one purchase. This manual covers the U-2S. Each variant also has its fit: the sensors and equipment you choose in the U-2 EFB.

Two Releases, One Purchase

Release 1**13 November 2026**The U-2S, 19 liveries, the ASARS-2 radar, the SYERS-2A camera and the optical bar camera, four sceneries with the chase car and the runway and pogo crews, the Datalink Portal, and 7 missions in the U-2 Spyplane Mission Pack.

Release 2 · Free update**A few weeks later**The U-2R with the round-dial cockpit and the J75 engine, NASA's ER-2, period chase cars, and 5 to 10 more missions planned.

The Three Variants

Available 13 Nov 2026**U-2S**Digital cockpitThe aircraft the U.S. Air Force flies today, re-engined with the GE F118 from 1994. Three MFDs, the UFCD, the BCDU, the INS and the SFD. This manual covers the U-2S.In the sim: **U-2S - Digital Cockpit**EngineGE F118Liveries19Ground vehiclesChase car: USAFPogo pickup: ModernCrew van: USAF

Free update**U-2R**Analog cockpitThe larger airframe of 1967, about a third bigger than the first U-2s, with the classic round-dial cockpit and the drift sight.In the sim: **U-2R - Analog Cockpit**EngineP&W J75Liveries15Ground vehiclesChase car: 1970sPogo pickup: OldCrew van: USAF

Free update**ER-2**NASA analog cockpitNASA's high-altitude research aircraft, delivered from 1981, with the analog cockpit.In the sim: **ER-2 - NASA Analog Cockpit**OperatorNASALiveries3Ground vehiclesChase car: NASAPogo pickup: ModernCrew van: NASA

Choose the variant in the aircraft selection: **Miltech Simulations U-2**, then the variation shown on each card. All three share the fuel, electrical, hydraulic, oxygen, autopilot and lift spoiler systems, the chase car with its ground crew, and the U-2 EFB.

U-2S Fit

The fit is the equipment you carry. You change it on the EFB Aircraft tab, on the ground or in flight, and the weights go to the aircraft's payload. The picture shows where each item goes, drawn with all of it fitted at once; the numbers match the table.



Where everything sits, drawn here with all of it fitted at once: ASARS-2 nose, Senior Ruby pods with Senior Spear, SPAN and the dorsal and belly sensors.

#	Item and what it is	Where it goes	Choices	Weight
1	**Nose** The interchangeable nose cone. It decides the working sensor: the radar (MFD RDR page), the camera (MFD CAM page), or none.	Front of the fuselage	ASARS-2 radar Default · Standard (no sensor) · SYERS-2A camera	1,000 · 300 · 650 lb
2	**Q-bay** The equipment bay behind the cockpit. It can carry the optical bar camera (OBC), a panoramic film camera.	Behind the cockpit, with a window underneath	Empty Default · OBC camera The OBC needs the Standard nose.	0 · 1,050 lb
3	**Superpods** Long pods that carry signals-intelligence equipment. In the simulator they change the look, weight and balance only.	On each wing, outboard of the fuselage	Type A (Senior Ruby) Default · Type B (Standard) · None With None, covers fill the gap in the wing.	2 × 800 · 2 × 600 · 0 lb
4	**Senior Spear** An attachment on the Senior Ruby pod. The left wing then sits heavy: about 40 gal moved from the left to the right inboard tank balances it.	On the left Type A pod only	Fitted · Removed	+400 lb, left pod
5	**SPAN** A large fairing with a satellite antenna, to send data to the ground from beyond line of sight.	On the spine, above the wing	Off Default · On	1,100 lb
6	**Dorsal sensors 1 - 3**	On the spine, behind the canopy	Each fitted Default or removed	300 lb each

#	Item and what it is	Where it goes	Choices	Weight
	Three small sensor fairings. The numbers match the markers on the EFB drawing.			
7	**Belly sensor (4)** One sensor fairing.	Under the fuselage, near the Q-bay window	Fitted Default · Removed	300 lb
	Belly blade antennas The ventral blade and hooked antennas.	Under the fuselage	Fitted · Removed	-
	Stabilizer vortex generators Small vanes of the 1968 airframes.	On the horizontal stabilizer	Removed · Fitted	-

The Default tags show the fit of a new installation. Only the nose and the Q-bay decide which sensor works: the ASARS-2 radar, the SYERS-2A camera and the OBC are the working sensors, and you carry one at a time. The other items change the look, the weight and the balance only. All sensor weights are estimates. More on each item is under Sensors and Electronic Flight Bag (EFB), Aircraft tab.

U-2S Liveries

The U-2S comes with 19 liveries. The tail number is also your ATC callsign. To make your own liveries, see Paint Kit.

USAF Default80-1066**USAF 68-10329**68-10329**USAF 68-10331**68-10331**9RW 68-10331**68-10331**USAF 68-10337**68-10337**USAF 80-1066**80-1066**USAF 80-1067**80-1067**USAF 80-1069**80-1069**UN 80-1069**80-1069**USAF 80-1070**80-1070**USAF 80-1070 WR**80-1070**USAF 80-1076**80-1076**USAF 80-1077**80-1077**USAF 80-1078**80-1078**USAF 80-1085**80-1085**USAF 80-1087**80-1087**USAF 80-1092**80-1092**USAF 80-1094**80-1094**USAF 80-1096**80-1096

Related pages: Introduction · Sensors · Electronic Flight Bag (EFB) · Chase Car and Ground Support Equipment · Paint Kit

Miltech Simulations U-2. SIMULATION USE ONLY. This documentation describes the simulated aircraft as delivered in the add-on and must not be used for real-world aviation.

Miltech Simulations U-2

Sceneries

Four airfields come with the U-2. They install with the aircraft package, so you do not need a separate download. Each one has a parking spot made for the U-2, with room for the ground equipment beside it.

Airfields

Included for no additional cost with the release package.

LCRARAF AkrotiriCyprusThe U-2 base on Cyprus, on the south coast of the island. A CIA U-2 detachment came here in August 1970 to watch the Suez Canal ceasefire. The Air Force took over in 1974 under the name OLIVE HARVEST, and U-2s still fly from Akrotiri today.Elevation72 ftRunway10/28 · 2,745 mU-2 parkingGate U 2Open airfield pageEGVARAF FairfordGloucestershire, EnglandThe European base of the U-2, at the USAF bomber base in Gloucestershire, England, also home of the Royal International Air Tattoo. U-2s of the 9th Reconnaissance Wing from Beale AFB have deployed here since 2017, and fly from Fairford on a steady basis.Elevation270 ftRunway09/27 · 3,046 m · ILS both endsU-2 parkingGate U 2Open airfield pageCIA1CIA Nordic BaseFinnish LaplandA fictional airfield: a small Cold War field camp in Finnish Lapland. A gravel strip in the forest, two parking spots and a static U-2R.Elevation512 ftRunway01/19 · 1,706 m gravelU-2 parkingGate U 1 or U 2Open airfield pageKXTAGroom LakeNevada, USAThe secret site where the U-2 story began. The CIA chose this dry lake bed in April 1955 to test the U-2 and train its pilots. The first U-2 arrived in July 1955 and made its first official flight on 4 August 1955. Shown as it was in the 1960s; today the site is better known as Area 51.Elevation5,895 ftRunway14/32 · 4,391 m, plus 4 lake-bed runwaysU-2 parkingAny of 17 ramp spotsOpen airfield page

At Akrotiri, Fairford and the CIA Nordic Base the U-2 spot is a Gate U. Select an airfield for its data table and airport diagram. Groom Lake and RAF Akrotiri are also mission bases - see Missions.

Starting at an Airfield

1. **Choose the airfield** on the world map by its ICAO code, then the U-2 parking spot shown on its card above.
2. **Choose the start.** A parking start is **Cold and Dark**; a runway start is fully powered. See Important Need-to-Knows.
3. **Use the U-2 parking spot.** On a parking start the ground power unit, the air-start unit and the oxygen cart come out beside the aircraft, and the spot keeps that area free. See Chase Car and Ground Support Equipment.

Other Scenery Bundles

These sceneries are not part of the U-2 package. They are sold separately and go well with the U-2.

KTNXSeparate productTonopah Test RangeNevada, USAThe whole Tonopah Test Range: Area 51 as it was in the 1970s and 1980s, Tonopah AFB around 1990, and landmarks along the Extraterrestrial Highway.ByMiltech Simulations and SundownerSimProduct pageKBABSeparate productBeale AFB RetroCalifornia, USABeale AFB in the late 1980s, the Cold War years when the SR-71 still flew from it beside the U-2. For MSFS 2024.ByBlackbird SimulationsProduct pageKBABSeparate productBeale AFB ModernCalifornia, USABeale AFB as it is today, the home of the U-2S and the 9th Reconnaissance Wing, with the PAVE PAWS radar east of the base. For MSFS 2024.ByBlackbird SimulationsProduct page

Note
The scenery is for MSFS 2024, like the aircraft. Fairford, Akrotiri and Groom Lake replace the default airports

while the U-2 package is installed.

Related pages: Missions · Chase Car and Ground Support Equipment · Installation

Miltech Simulations U-2. SIMULATION USE ONLY. This documentation describes the simulated aircraft as delivered in the add-on and must not be used for real-world aviation.

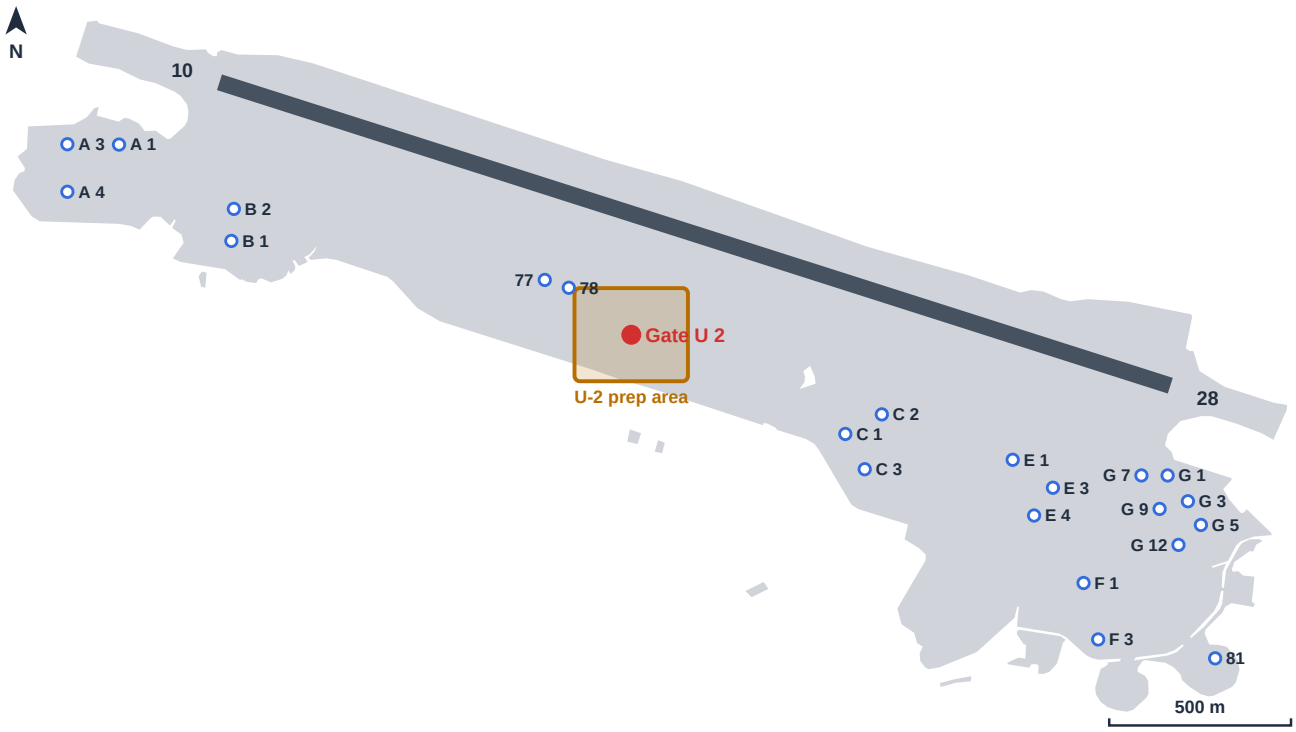
Miltech Simulations U-2

RAF Akrotiri

The U-2 base on Cyprus, on the south coast of the island. A CIA U-2 detachment came here in August 1970 to watch the Suez Canal ceasefire. The Air Force took over in 1974 under the name OLIVE HARVEST, and U-2s still fly from Akrotiri today.

Item	Value
ICAO	LCRA
Where	Akrotiri, Cyprus, 34.590 N 32.988 E
Elevation	72 ft
Runway	10/28, 2,745 × 45 m (9,006 ft)
Parking	23 aircraft spots (Gates A, B, C, E, F, G and U, and Parking)
U-2 parking	**Gate U 2**

Airport Diagram



RAF Akrotiri, north up. Red: the U-2 spot, Gate U 2. Orange box: the U-2 prep area. Blue: the other spawn spots. Letters are gates (C 2 = Gate C 2); numbers are Parking spots. Vehicle spots are not shown.

Related pages: Sceneries · Iran Reconnaissance - Akrotiri · Chase Car and Ground Support Equipment

Miltech Simulations U-2. SIMULATION USE ONLY. This documentation describes the simulated aircraft as delivered in the add-on and must not be used for real-world aviation.

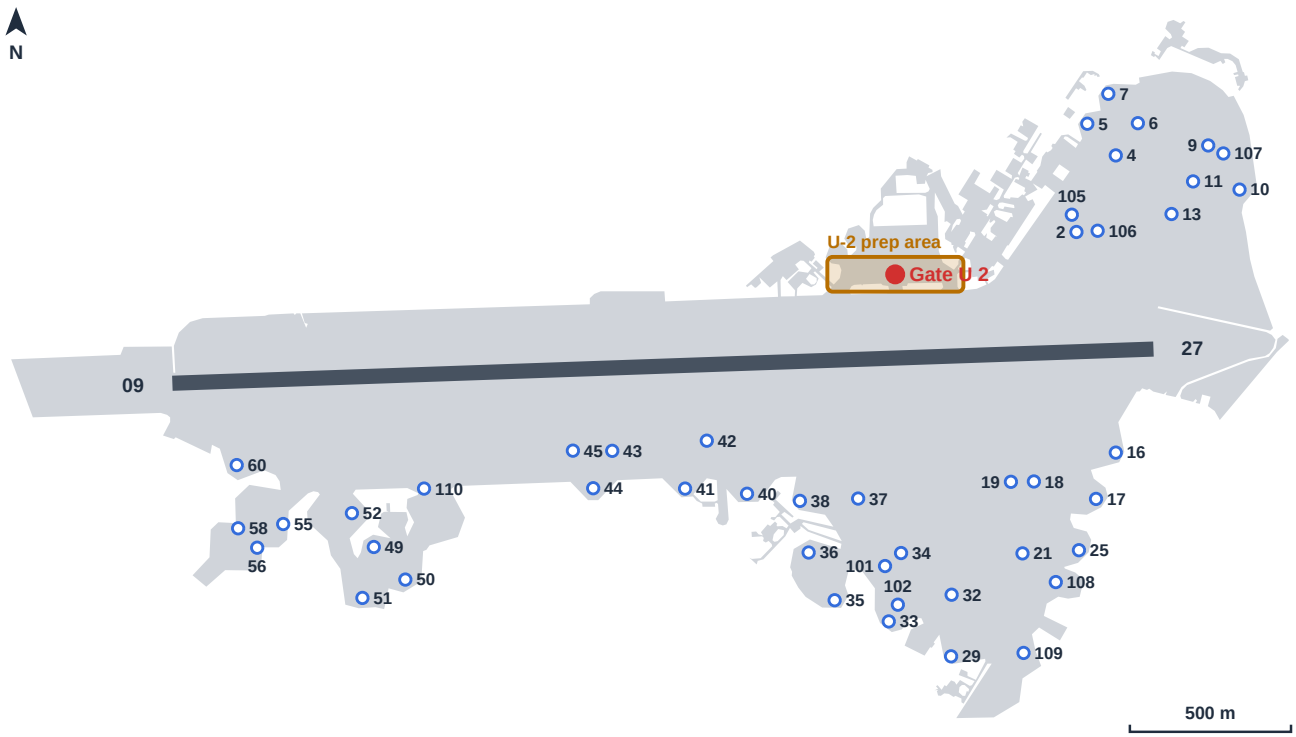
Miltech Simulations U-2

RAF Fairford

The European base of the U-2, at the USAF bomber base in Gloucestershire, England, also home of the Royal International Air Tattoo. U-2s of the 9th Reconnaissance Wing from Beale AFB have deployed here since 2017, and fly from Fairford on a steady basis.

Item	Value
ICAO	EGVA
Where	Gloucestershire, England, 51.684 N 1.790 W
Elevation	270 ft
Runway	09/27, 3,046 × 47 m (9,993 ft)
ILS	111.10 on both ends: IFFA (runway 27) and IFFD (runway 09)
Parking	46 aircraft spots
U-2 parking	**Gate U 2**

Airport Diagram



RAF Fairford, north up. Red: the U-2 spot, Gate U 2. Orange box: the U-2 prep area. Blue: the other spawn spots; the numbers are Parking spots (2 = Parking 2).

Related pages: Sceneries · Flying the U-2S · Chase Car and Ground Support Equipment

Miltech Simulations U-2. SIMULATION USE ONLY. This documentation describes the simulated aircraft as delivered in the add-on and must not be used for real-world aviation.

Miltech Simulations U-2

CIA Nordic Base

A fictional airfield: a small Cold War field camp in Finnish Lapland. A gravel strip in the forest, two parking spots and a static U-2R.

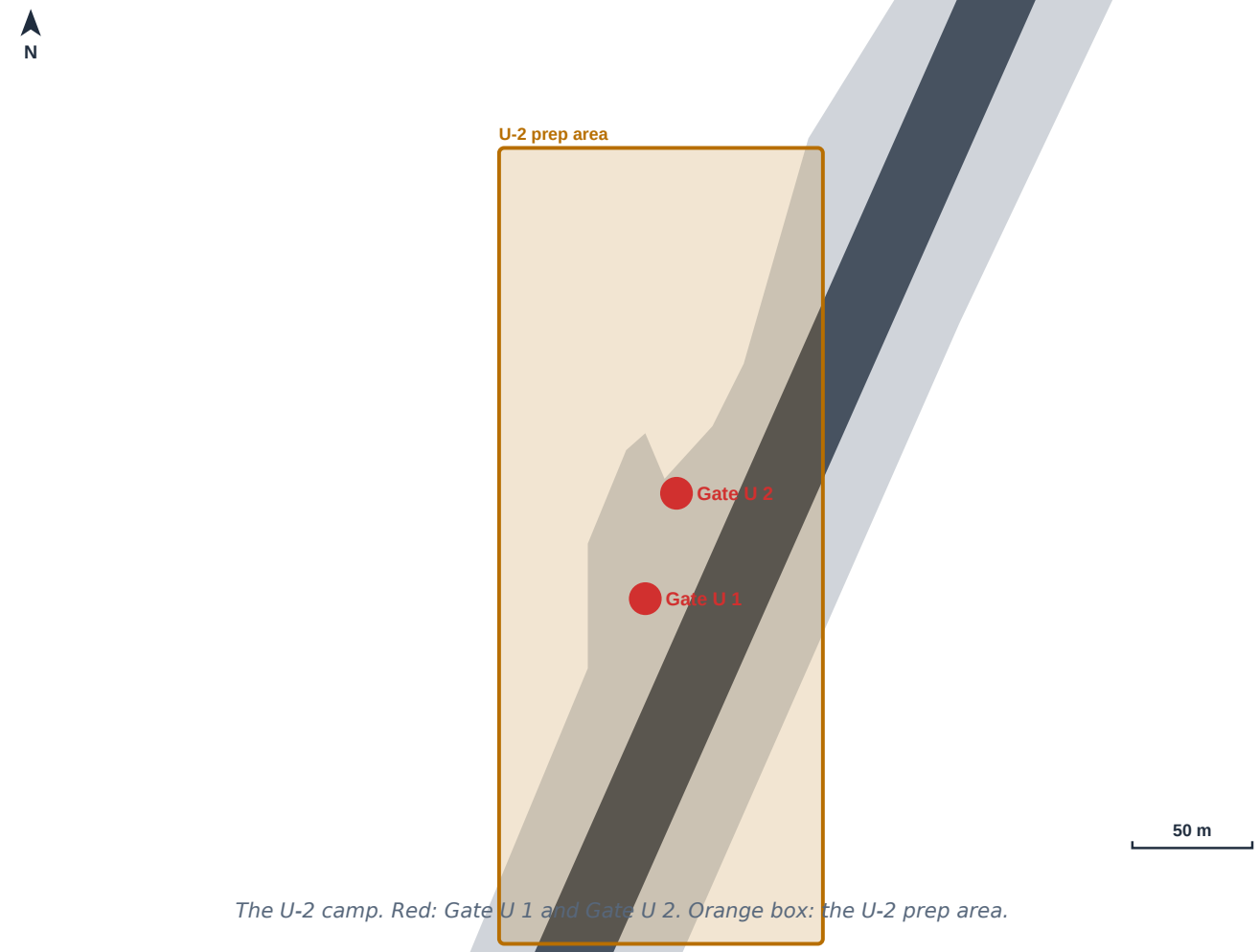
Note
A fictional airfield. The CIA Nordic Base is not a real place. It is a Cold War field camp made for the U-2, set in Finnish Lapland.

Item	Value
ICAO	CIA1
Where	Finnish Lapland, 69.127 N 27.238 E
Elevation	512 ft
Runway	01/19, 1,706 × 30 m (5,597 ft), gravel
Parking	2 spots, both for the U-2
U-2 parking	**Gate U 1** or **Gate U 2**

Airport Diagram



CIA Nordic Base, north up. The U-2 spots and the camp are beside the north half of the gravel runway.



The U-2 camp. Red: Gate U 1 and Gate U 2. Orange box: the U-2 prep area.

Related pages: Sceneries · Variants

Miltech Simulations U-2. SIMULATION USE ONLY. This documentation describes the simulated aircraft as delivered in the add-on and must not be used for real-world aviation.

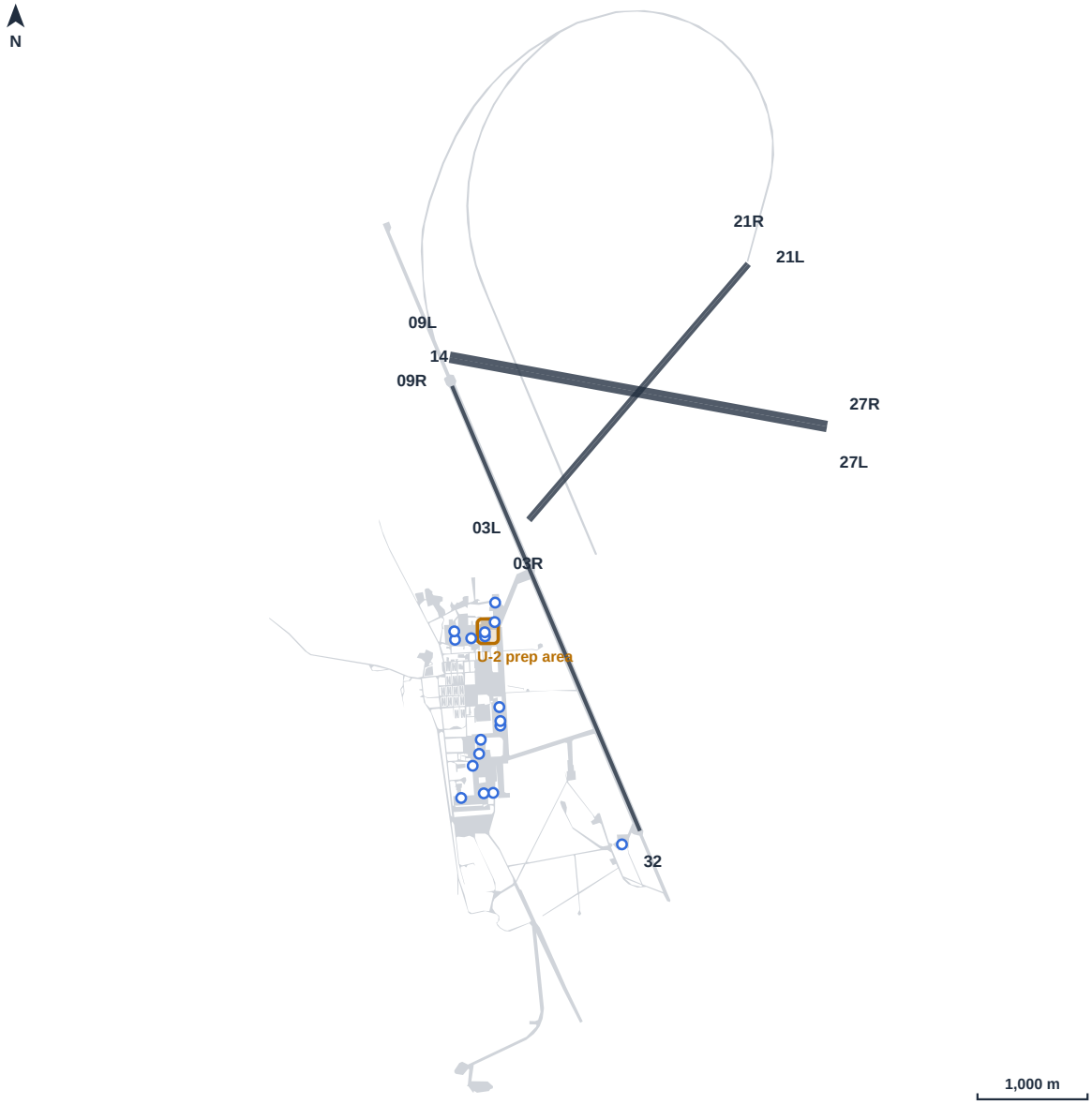
Miltech Simulations U-2

Groom Lake

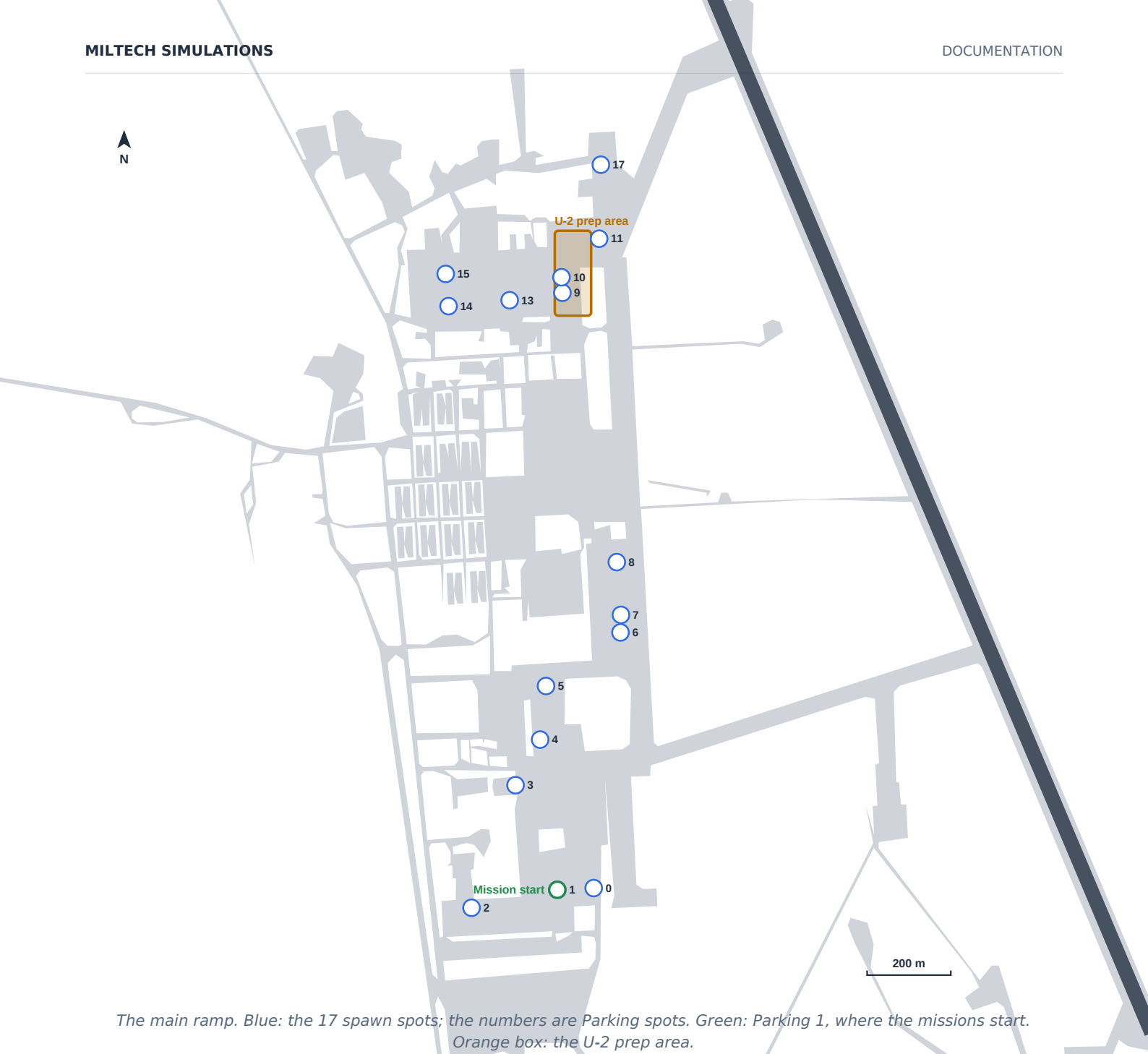
The secret site where the U-2 story began. The CIA chose this dry lake bed in April 1955 to test the U-2 and train its pilots. The first U-2 arrived in July 1955 and made its first official flight on 4 August 1955. Shown as it was in the 1960s; today the site is better known as Area 51.

Item	Value
ICAO	KXTA
Where	Nevada, USA, 37.234 N 115.799 W
Elevation	5,895 ft
Runways	14/32, 4,391 × 35 m (14,406 ft); 03L/21R and 03R/21L, 3,064 m (10,052 ft); 09L/27R and 09R/27L, 3,487 m (11,440 ft)
Parking	17 ramp spots (Parking 0 to 18)
U-2 parking	Any ramp spot. The missions start on **P 1**

Airport Diagram



Groom Lake, north up. The paved runway 14/32 and the four runways on the lake bed. The main ramp is shown below.



The main ramp. Blue: the 17 spawn spots; the numbers are Parking spots. Green: Parking 1, where the missions start. Orange box: the U-2 prep area.

Related pages: Sceneries · U-2 Familiarization - Groom Lake · Introduction

Miltech Simulations U-2. SIMULATION USE ONLY. This documentation describes the simulated aircraft as delivered in the add-on and must not be used for real-world aviation.

Miltech Simulations U-2

Missions

Seven missions come with the U-2 in the **U-2 Spyplane Mission Pack**. They run in Miltech Mission Hub: from a first solo at Groom Lake to NASA survey lines, a UFO hunt, a surveillance balloon and long reconnaissance flights over North Korea and Iran.

Caution
Requires Miltech Mission Hub. The missions run in Miltech Mission Hub, which is sold separately. Get it from the Miltech Simulations store. How to install it and play is under Quick Start: Playing Missions.

Note

Mission pack not showing? Add it by hand:

1. Open **Miltech Mission Hub** from the simulator toolbar.
2. Select **+ (Add Mission Pack)**.
3. In the **File name** field, type miltech-u2.
4. Select **Add**. The **U-2 Spyplane Mission Pack** now shows on the home page.

Mission List

New to the U-2? Start with the Familiarization mission: it is the shortest, it stays near the field and it has a practice approach.

KXTAStart hereU-2 Familiarization - Groom LakeTraining · Groom LakeYour first solo in the U-2: a short handling circuit north of Groom Lake, one steady recording run, a low approach with a go-around and a full-stop landing. Smooth control matters more than speed.Duration1 h 36 minRoute238 NMMinimum altitude15,000 ft MSLOpen mission pageKXTANASA Terrain Study - Groom LakeNASA science · Groom LakeA NASA science flight from Groom Lake to the Colorado Plateau. You fly a calibration line, then three terrain lines over Monument Valley and the San Juan area, one of them a crossing line that records the same ground from a second direction.Duration2 h 8 minRoute1,209 NMMinimum altitude35,000 ft MSLOpen mission pageKPMDNASA Grand Canyon SurveyNASA science · PalmdaleA NASA survey of the Grand Canyon from Palmdale, home of NASA's ER-2s. One calibration line, then three science lines along the canyon from west to east, and back to Palmdale.Duration2 h 16 minRoute944 NMMinimum altitude40,000 ft MSLOpen mission pageKXTAUFO Investigation - RoswellReconnaissance · Groom LakeUnexplained returns appear east of the test range. You follow them from Nevada across Arizona into New Mexico, image the place where one comes down near Roswell, and bring the record back to Groom Lake.Duration1 h 52 minRoute1,322 NMMinimum altitude40,000 ft MSLOpen mission pageKCOFChinese Surveillance Balloon - ObservationReconnaissance · Patrick SFBA high-altitude balloon approaches the South Carolina coast. You fly up the coast from Patrick, make two passes beside the balloon at its own height, and leave the engagement to the intercept force.Duration2 h 32 minRoute1,019 NMMinimum altitude40,000 ft MSLOpen mission pageRKSOOperation Dark Skies - North KoreaReconnaissance · Osan Air BaseA fictional reconnaissance flight set on 5 April 1997. From Osan you climb out over the Yellow Sea, then record Kaechon and Pukchang in one straight pass, then Onchon and the surface area of an underground complex, and return to Osan.Duration2 h 24 minRoute1,034 NMMinimum altitude40,000 ft MSLOpen mission pageLCRAIran Reconnaissance - AkrotiriReconnaissance · RAF AkrotiriThe longest mission in the pack. A fictional reconnaissance flight from Cyprus across the eastern Mediterranean to central Iran, with camera passes over Fordow, Natanz and Isfahan in that order, and the long return to Akrotiri.Duration2 h 48 minRoute2,095 NMMinimum altitude40,000 ft MSLOpen mission page

Route lengths are in NM and minimum altitudes in ft MSL. The durations are the Mission Hub estimates. Select a mission for its full page: briefing, route, strips and tips.

Note
The missions are fiction for the simulator. Real places and events are used as settings only; the sensor pictures come from public map data, not from real reconnaissance.

Starting a Mission

The missions play in Miltech Mission Hub. Mission Hub must be installed; see Quick Start: Playing Missions.

1. Start a free flight with the **Miltech Simulations U-2** and the variant you want. Any start location is fine: the mission moves you to its base.
2. Open **Miltech Mission Hub** from the simulator toolbar. If the **U-2 Spyplane Mission Pack** is missing from the home page, select **+ (Add Mission Pack)**, enter miltech-u2 in the **File name** field and select **Add**. Select **U-2 Spyplane Mission Pack** to see its seven missions.
3. Select a mission, read the briefing on the right, then select **Play Mission**. In MSFS 2024, do not cancel while the mission loads.
4. Select **Ready to Fly**. You are on a parking spot at the base with the engine shut down. Set up the fit on the EFB Aircraft tab, then start as in the Quick Start Guide, or use **Set up aircraft**: **Ready for takeoff**.

Each mission sets its own time of day and uses live weather. The mission HUD (top right) shows the active objective, its timer and the briefing.

Related pages: Sceneries · Sensors · Mission Equipment (PME) · Datalink Portal

Miltech Simulations U-2. SIMULATION USE ONLY. This documentation describes the simulated aircraft as delivered in the add-on and must not be used for real-world aviation.

Miltech Simulations U-2

U-2 Familiarization - Groom Lake

Your first solo in the U-2: a short handling circuit north of Groom Lake, one steady recording run, a low approach with a go-around and a full-stop landing. Smooth control matters more than speed.

Item	Value
Start	Groom Lake (KXTA), P 1, engine shut down
End	Full-stop landing at Groom Lake (KXTA)
Time of day	09:00, set by the mission. Weather: live
Estimated duration	1 h 36 min
Route	12 waypoints, about 238 NM
Minimum altitude for the checks	Above 15,000 ft MSL
Recording strips	1, held for 30 seconds

Objectives

The objectives come one at a time, in this order. Each one shows its direction on screen. How the gates and strips work is under Missions.

1. **Take off**: met at liftoff, within 4.5 NM of the start.
2. **Clear the Ranch**: fly within 4 NM of the point. Climb gradually and stay clear of the terrain around the field.
3. **Climb above 15,000 ft MSL**: stay above 15,000 ft MSL for 5 seconds. This objective runs beside the route: keep following the waypoints while you climb.
4. **Handling leg west**: fly within 6 NM of the point. A smooth right turn toward the next point.
5. **Handling leg north**: fly within 6 NM of the point. Stay above 15,000 ft and avoid abrupt inputs.
6. **Set up - Steady flight exercise**: fly within 2 NM of the strip entry point, lined up on 090° true.
7. **Steady flight exercise**: fly inside the strip, 20 × 4 NM on 090° true, above 15,000 ft MSL for 30 continuous seconds.
8. **Clear strip - Steady flight exercise**: fly within 2 NM of the strip exit point before you turn. Then begin a gradual descent toward the practice approach.
9. **Practice approach setup**: fly within 6 NM of the point. Set up for one low approach over the runway.
10. **Low approach over runway**: fly within 2.4 NM of the point. Go around. Do not land yet.
11. **Confirm climb out**: fly within 6 NM of the point. Then reposition for a full-stop landing.
12. **Return to Base**: land within 4.5 NM of the field. The mission ends 15 seconds after touchdown.

Tips

- This is the best first mission: it is short, it stays near the field and it has the only practice approach in the pack.
- The minimum is only 15,000 ft, so you can fly it below the high-altitude corridor. Fly the pattern and the landing as in Flying the U-2S.
- The low approach completes when you pass within 2.4 NM of the runway point. Keep the gear down and fly a normal go-around: see Go-Around in Flying the U-2S.

Related pages: Missions · Groom Lake · U2 101 - The Basics · Flying the U-2S

Miltech Simulations U-2. SIMULATION USE ONLY. This documentation describes the simulated aircraft as delivered in the add-on and must not be used for real-world aviation.

Miltech Simulations U-2

NASA Terrain Study - Groom Lake

A NASA science flight from Groom Lake to the Colorado Plateau. You fly a calibration line, then three terrain lines over Monument Valley and the San Juan area, one of them a crossing line that records the same ground from a second direction.

Item	Value
Start	Groom Lake (KXTA), P 1, engine shut down
End	Full-stop landing at Groom Lake (KXTA)
Time of day	08:00, set by the mission. Weather: live
Estimated duration	2 h 8 min
Route	25 waypoints, about 1,209 NM
Minimum altitude for the checks	Above 35,000 ft MSL
Recommended observation altitude	At least 60,000 ft MSL
Recording strips	4, held for 30, 45, 45, 45 seconds

Objectives

The objectives come one at a time, in this order. Each one shows its direction on screen. How the gates and strips work is under Missions.

1. **Take off**: met at liftoff, within 4.5 NM of the start.
2. **Clear Groom Lake**: fly within 6 NM of the point. Climb clear of the terrain and follow the route east.
3. **Climb above 35,000 ft MSL**: stay above 35,000 ft MSL for 5 seconds. This objective runs beside the route: keep following the waypoints while you climb.
4. **Set up - Plateau calibration**: fly within 2 NM of the strip entry point, lined up on 090° true.
5. **Plateau calibration**: fly inside the strip, 20 × 4 NM on 090° true, above 35,000 ft MSL for 30 continuous seconds.
6. **Clear strip - Plateau calibration**: fly within 2 NM of the strip exit point before you turn.
7. **Set up - Monument Valley mesa strip**: fly within 2 NM of the strip entry point, lined up on 180° true.
8. **Monument Valley mesa strip**: fly inside the strip, 20 × 4 NM on 180° true, above 35,000 ft MSL for 45 continuous seconds.
9. **Clear strip - Monument Valley mesa strip**: fly within 2 NM of the strip exit point before you turn.
10. **Set up - San Juan terrain strip**: fly within 2 NM of the strip entry point, lined up on 270° true.
11. **San Juan terrain strip**: fly inside the strip, 20 × 4 NM on 270° true, above 35,000 ft MSL for 45 continuous seconds.

12. **Clear strip - San Juan terrain strip**: fly within 2 NM of the strip exit point before you turn.
13. **Set up - Crossing verification strip**: fly within 2 NM of the strip entry point, lined up on 090° true.
14. **Crossing verification strip**: fly inside the strip, 20 × 4 NM on 090° true, above 35,000 ft MSL for 45 continuous seconds.
15. **Clear strip - Crossing verification strip**: fly within 2 NM of the strip exit point before you turn. All lines are recorded. Return to Groom Lake and keep terrain clearance.
16. **Return to Base**: land within 4.5 NM of the field. The mission ends 15 seconds after touchdown.

Tips

- The four lines sit within about 30 NM of each other. The route has extra waypoints for the turns between them: follow them, because the U-2 turns wide at altitude.
- At 60,000 ft and 410 kt a 15° turn has a radius of about 9 NM: plan each turn early. See Flying the U-2S, High-Altitude Handling.
- Groom Lake is at 5,895 ft: expect a longer takeoff roll and a higher true airspeed on the approach.

Related pages: Missions · Groom Lake · Sensors · Mission Equipment (PME)

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Miltech Simulations U-2

NASA Grand Canyon Survey

A NASA survey of the Grand Canyon from Palmdale, home of NASA's ER-2s. One calibration line, then three science lines along the canyon from west to east, and back to Palmdale.

Item	Value
Start	Palmdale (KPMD), P 33, engine shut down
End	Full-stop landing at Palmdale (KPMD)
Time of day	09:00, set by the mission. Weather: live
Estimated duration	2 h 16 min
Route	32 waypoints, about 944 NM
Minimum altitude for the checks	Above 40,000 ft MSL
Recommended observation altitude	At least 60,000 ft MSL
Recording strips	4, held for 30, 45, 60, 60 seconds

Objectives

The objectives come one at a time, in this order. Each one shows its direction on screen. How the gates and strips work is under Missions.

1. **Take off**: met at liftoff, within 3 NM of the start.
2. **Climb toward Arizona**: fly within 16 NM of the point. Plan a sustained climb before the science area.
3. **Climb above 40,000 ft MSL**: stay above 40,000 ft MSL for 5 seconds. This objective runs beside the route: keep following the waypoints while you climb.
4. **Set up - Instrument calibration**: fly within 2 NM of the strip entry point, lined up on 070° true.
5. **Instrument calibration**: fly inside the strip, 20 × 4 NM on 070° true, above 40,000 ft MSL for 30 continuous seconds.
6. **Clear strip - Instrument calibration**: fly within 2 NM of the strip exit point before you turn.
7. **Set up - Western Grand Canyon strip**: fly within 2 NM of the strip entry point, lined up on 053° true.
8. **Western Grand Canyon strip**: fly inside the strip, 15 × 4 NM on 053° true, above 40,000 ft MSL for 45 continuous seconds.
9. **Clear strip - Western Grand Canyon strip**: fly within 2 NM of the strip exit point before you turn.
10. **Set up - Central Grand Canyon strip**: fly within 2 NM of the strip entry point, lined up on 062° true.
11. **Central Grand Canyon strip**: fly inside the strip, 20 × 4 NM on 062° true, above 40,000 ft MSL for 60 continuous seconds.
12. **Clear strip - Central Grand Canyon strip**: fly within 2 NM of the strip exit point before you turn.

13. **Set up - Eastern Grand Canyon strip**: fly within 2 NM of the strip entry point, lined up on 119° true.
14. **Eastern Grand Canyon strip**: fly inside the strip, 20 × 4 NM on 119° true, above 40,000 ft MSL for 60 continuous seconds.
15. **Clear strip - Eastern Grand Canyon strip**: fly within 2 NM of the strip exit point before you turn.
16. **Return west**: fly within 16 NM of the point. The altitude checks are finished. Plan a gradual descent to Palmdale.
17. **Return to Base**: land within 3 NM of the field. The mission ends 15 seconds after touchdown.

Tips

- A good mission for the ER-2 variant: it is a NASA flight from the ER-2 home base.
- The central and eastern lines need 60 seconds each inside the strip. The western line is only 15 NM long, so do not start late.
- Palmdale is a default MSFS airport: it is not part of the U-2 package.

Related pages: Missions · Sensors · Targeting Points

Miltech Simulations U-2. SIMULATION USE ONLY. This documentation describes the simulated aircraft as delivered in the add-on and must not be used for real-world aviation.

Miltech Simulations U-2

UFO Investigation - Roswell

Unexplained returns appear east of the test range. You follow them from Nevada across Arizona into New Mexico, image the place where one comes down near Roswell, and bring the record back to Groom Lake.

Item	Value
Start	Groom Lake (KXTA), P 1, engine shut down
End	Full-stop landing at Groom Lake (KXTA)
Time of day	17:00, set by the mission. Weather: live
Estimated duration	1 h 52 min
Route	15 waypoints, about 1,322 NM
Minimum altitude for the checks	Above 40,000 ft MSL
Recommended observation altitude	At least 60,000 ft MSL
Recording strips	1, held for 30 seconds

Objectives

The objectives come one at a time, in this order. Each one shows its direction on screen. How the gates and strips work is under Missions.

1. **Take off**: met at liftoff, within 4.5 NM of the start.
2. **Investigate first signal**: fly within 10 NM of the point. Strange returns east of the range. Observe; do not chase.
3. **Climb above 40,000 ft MSL**: stay above 40,000 ft MSL for 5 seconds. This objective runs beside the route: keep following the waypoints while you climb.
4. **First visual contact**: fly within 8 NM of the point. A contact ahead. Observe it and continue to the reporting gate.
5. **Continue into Arizona**: fly within 16 NM of the point. The contact has gone. More reports come in from the east.
6. **Second encounter**: fly within 10 NM of the point. Another contact ahead. Keep the observation course.
7. **New Mexico tracking sector**: fly within 16 NM of the point. A contact descends toward Roswell.
8. **Crash report**: fly within 16 NM of the point. A contact has come down near Roswell. The crash site appears.
9. **Set up - Record crash position**: fly within 2 NM of the strip entry point, lined up on 100° true.
10. **Record crash position**: fly inside the strip, 20 × 4 NM on 100° true, above 40,000 ft MSL for 30 continuous seconds.

11. **Clear strip - Record crash position**: fly within 2 NM of the strip exit point before you turn. The crash is fixed at 33.5500 N, 104.6500 W. Return to Groom Lake.
12. **Homebound New Mexico**: fly within 16 NM of the point. Check the remaining fuel.
13. **Homebound Arizona**: fly within 16 NM of the point. Plan your descent and the full-stop landing.
14. **Return to Base**: land within 4.5 NM of the field. The mission ends 15 seconds after touchdown.

Tips

- Fly it with the ASARS-2 nose. Near the two encounters (36.85 N 114.90 W and 35.25 N 109.75 W) contacts move near your track and the radar shows interference; the interference stops after the crash report. See ASARS-2 Radar.
- At the crash site a UFO lies on the ground with a fire beside it. With the SYERS-2A camera, or the ASARS-2 in SPOT, you can find it from altitude. Make the crash point a targeting point: see Targeting Points.
- The route is 1,322 NM: load enough fuel for the return to Groom Lake.

Related pages: Missions · Groom Lake · Mission Equipment (PME)

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Miltech Simulations U-2

Operation Dark Skies - North Korea

A fictional reconnaissance flight set on 5 April 1997. From Osan you climb out over the Yellow Sea, then record Kaechon and Pukchang in one straight pass, then Onchon and the surface area of an underground complex, and return to Osan.

Item	Value
Start	Osan Air Base (RKSO), P 7, engine shut down
End	Full-stop landing at Osan Air Base (RKSO)
Time of day	07:30, set by the mission. Weather: live
Estimated duration	2 h 24 min
Route	50 waypoints, about 1,034 NM
Minimum altitude for the checks	Above 40,000 ft MSL
Recommended observation altitude	At least 60,000 ft MSL
Recording strips	3, held for 60, 45, 45 seconds

Objectives

The objectives come one at a time, in this order. Each one shows its direction on screen. How the gates and strips work is under Missions.

1. **Take off**: met at liftoff, within 2.2 NM of the start.
2. **Yellow Sea climb**: fly within 14 NM of the point. Depart westward and climb over the Yellow Sea.
3. **Climb above 40,000 ft MSL**: stay above 40,000 ft MSL for 5 seconds. This objective runs beside the route: keep following the waypoints while you climb.
4. **Northbound sea transit**: fly within 12 NM of the point. Continue north and prepare the camera view.
5. **Northern approach**: fly within 10 NM of the point. Make a broad turn toward the Kaechon set-up point, 30 NM before the strip.
6. **Set up - Kaechon and Pukchang**: fly within 2 NM of the strip entry point, lined up on 167° true.
7. **Kaechon and Pukchang**: fly inside the strip, 26 × 4 NM on 167° true, above 40,000 ft MSL for 60 continuous seconds.
8. **Complete - Kaechon and Pukchang**: fly within 2 NM of the strip exit point before you turn.
9. **Set up - Onchon**: fly within 2 NM of the strip entry point, lined up on 180° true.
10. **Onchon**: fly inside the strip, 20 × 4 NM on 180° true, above 40,000 ft MSL for 45 continuous seconds.
11. **Complete - Onchon**: fly within 2 NM of the strip exit point before you turn. Follow the 50 NM lead-out and the broad turn in the route.

12. **Set up - Underground Complex surface area**: fly within 2 NM of the strip entry point, lined up on 090° true.
13. **Underground Complex surface area**: fly inside the strip, 20 × 4 NM on 090° true, above 40,000 ft MSL for 45 continuous seconds.
14. **Complete - Underground Complex surface area**: fly within 2 NM of the strip exit point before you turn.
15. **Clear the final target**: fly within 8 NM of the point. All targets are recorded. Continue clear, then turn south.
16. **Southbound return**: fly within 10 NM of the point. Check the remaining fuel.
17. **Recovery transit**: fly within 10 NM of the point. Descend toward Osan for a full-stop landing.
18. **Return to Base**: land within 2.2 NM of the field. The mission ends 15 seconds after touchdown.

Tips

- The route has 50 waypoints, with long straight lead-ins and lead-outs. They give you room to turn: follow them rather than cutting the corners.
- The first strip is 26 NM long and needs 60 continuous seconds: line up on the set-up point and keep the wings level through both targets.
- Osan is a default MSFS airport: it is not part of the U-2 package. The COM 2 presets hold an Osan frequency.

Related pages: Missions · Sensors · Targeting Points

Miltech Simulations U-2. SIMULATION USE ONLY. This documentation describes the simulated aircraft as delivered in the add-on and must not be used for real-world aviation.

Miltech Simulations U-2

Chinese Surveillance Balloon - Observation

A high-altitude balloon approaches the South Carolina coast. You fly up the coast from Patrick, make two passes beside the balloon at its own height, and leave the engagement to the intercept force.

Item	Value
Start	Patrick SFB (KCOF), P 31, engine shut down
End	Full-stop landing at Patrick SFB (KCOF)
Time of day	09:00, set by the mission. Weather: live
Estimated duration	2 h 32 min
Route	26 waypoints, about 1,019 NM
Minimum altitude for the checks	Above 40,000 ft MSL
Recommended observation altitude	64,000 ft MSL, the height of the balloon
Recording strips	2, held for 30, 30 seconds

Objectives

The objectives come one at a time, in this order. Each one shows its direction on screen. How the gates and strips work is under Missions.

1. **Take off**: met at liftoff, within 2.2 NM of the start.
2. **Daytona coastal transit**: fly within 6 NM of the point. Follow the coast north and keep climbing.
3. **Jacksonville coastal climb**: fly within 6 NM of the point.
4. **Climb above 40,000 ft MSL**: stay above 40,000 ft MSL for 5 seconds. This objective runs beside the route: keep following the waypoints while you climb.
5. **Brunswick coastal transit**: fly within 6 NM of the point.
6. **Savannah coastal transit**: fly within 6 NM of the point.
7. **Charleston coastal transit**: fly within 6 NM of the point.
8. **Offshore observation approach**: fly within 6 NM of the point. Turn gently north toward the first pass. Keep your distance.
9. **Set up - Balloon envelope observation**: fly within 2 NM of the strip entry point, lined up on 000° true.
10. **Balloon envelope observation**: fly inside the strip, 20 × 4 NM on 000° true, above 40,000 ft MSL for 30 continuous seconds.

11. **Clear strip - Balloon envelope observation**: fly within 2 NM of the strip exit point before you turn. Fly the 50 NM lead-out, then the broad hairpin.
12. **Set up - Payload observation**: fly within 2 NM of the strip entry point, lined up on 180° true.
13. **Payload observation**: fly inside the strip, 20 × 4 NM on 180° true, above 40,000 ft MSL for 30 continuous seconds.
14. **Clear strip - Payload observation**: fly within 2 NM of the strip exit point before you turn. The intercept force has the target. Turn for Savannah and the coast.
15. **Savannah coast - return**: fly within 6 NM of the point.
16. **Brunswick coast - return**: fly within 6 NM of the point.
17. **Jacksonville coast - return**: fly within 6 NM of the point. Control reports that the balloon is down.
18. **Daytona coast - return**: fly within 6 NM of the point. Begin the planned descent for Patrick.
19. **Return to Base**: land within 2.2 NM of the field. The mission ends 15 seconds after touchdown.

Tips

- The balloon flies at 64,000 ft at 33.55 N, 78.65 W, between the two strips. Climb to its height to see it beside you: the strips pass about 0.2 NM to each side of it.
- The balloon is a solid object: do not fly into it.
- Patrick is a default MSFS airport: it is not part of the U-2 package.

Related pages: Missions · Sensors · Targeting Points

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Miltech Simulations U-2

Iran Reconnaissance - Akrotiri

The longest mission in the pack. A fictional reconnaissance flight from Cyprus across the eastern Mediterranean to central Iran, with camera passes over Fordow, Natanz and Isfahan in that order, and the long return to Akrotiri.

Item	Value
Start	RAF Akrotiri (LCRA), Gate A 3, engine shut down
End	Full-stop landing at RAF Akrotiri (LCRA)
Time of day	08:00, set by the mission. Weather: live
Estimated duration	2 h 48 min
Route	22 waypoints, about 2,095 NM
Minimum altitude for the checks	Above 40,000 ft MSL
Recommended observation altitude	At least 60,000 ft MSL
Recording strips	3, held for 45, 45, 45 seconds

Objectives

The objectives come one at a time, in this order. Each one shows its direction on screen. How the gates and strips work is under Missions.

1. **Take off**: met at liftoff, within 2.2 NM of the start.
2. **Mediterranean climb**: fly within 16 NM of the point. Fly east from Cyprus and climb.
3. **Climb above 40,000 ft MSL**: stay above 40,000 ft MSL for 5 seconds. This objective runs beside the route: keep following the waypoints while you climb.
4. **Eastbound transit**: fly within 16 NM of the point.
5. **Inland transit**: fly within 16 NM of the point. Check the fuel before you continue.
6. **Western Iran transit**: fly within 16 NM of the point.
7. **Fordow approach**: fly within 16 NM of the point. Prepare the camera view and make a broad turn onto the Fordow line.
8. **Set up - Fordow Uranium Enrichment Plant**: fly within 2 NM of the strip entry point, lined up on 145° true.
9. **Fordow Uranium Enrichment Plant**: fly inside the strip, 20 × 4 NM on 145° true, above 40,000 ft MSL for 45 continuous seconds.
10. **Complete - Fordow Uranium Enrichment Plant**: fly within 2 NM of the strip exit point before you turn.

11. **Set up - Natanz Nuclear Facility**: fly within 2 NM of the strip entry point, lined up on 170° true.
12. **Natanz Nuclear Facility**: fly inside the strip, 20 × 4 NM on 170° true, above 40,000 ft MSL for 45 continuous seconds.
13. **Complete - Natanz Nuclear Facility**: fly within 2 NM of the strip exit point before you turn.
14. **Set up - Isfahan Nuclear Technology Center**: fly within 2 NM of the strip entry point, lined up on 200° true.
15. **Isfahan Nuclear Technology Center**: fly inside the strip, 20 × 4 NM on 200° true, above 40,000 ft MSL for 45 continuous seconds.
16. **Complete - Isfahan Nuclear Technology Center**: fly within 2 NM of the strip exit point before you turn.
17. **Clear the collection area**: fly within 16 NM of the point. Make the broad turn west.
18. **Return across the interior**: fly within 16 NM of the point. Check the fuel for the return.
19. **Westbound transit**: fly within 16 NM of the point.
20. **Mediterranean return**: fly within 16 NM of the point. Plan the descent toward Akrotiri.
21. **Return to Base**: land within 2.2 NM of the field. The mission ends 15 seconds after touchdown.

Tips

- 2,095 NM is a long way: take full fuel and keep the cruise climb at M .715.
- The mission starts on Gate A 3, not on the U-2 parking spot (Gate U 2), so the ground carts may not come out by themselves. Set them to Shown in the EFB Ground tab, or use Set up aircraft: Ready for takeoff.
- RAF Akrotiri comes with the U-2: see RAF Akrotiri.

Related pages: Missions · RAF Akrotiri · Mission Equipment (PME) · Targeting Points

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Miltech Simulations U-2

Activating the Aircraft

The Miltech Simulations U-2 uses a lightweight activation and version control system to make sure your product license is valid and always up to date.

Note
An active internet connection is required on initial activation of the aircraft. After this, the aircraft can be used offline for a period of time. Our system will automatically check your license from time to time.

Activation by Store

Depending on where you purchased the product, activation may differ:

Where you bought it	Activation
MiltechSimulations.com / Contrail App	A serial key is generated and automatically entered into the product. Under normal circumstances, activation happens silently and without user input.
iniBuilds / BlackbirdSim.com	A serial key is provided at the time of purchase. Copy and paste this key into the aircraft's popup activation panel upon first simulator load.
MS Marketplace	No activation key is required. The product activates automatically through the simulator platform.

Common Activation Issues

If the product fails to activate correctly, it may present in one or more of the following ways:

- The Multi-Function Displays (MFDs) appear completely black.
- Error messages appear on one or more avionics screens upon loading the aircraft.
- The activation prompt does not accept a valid key or does not respond.

Caution
Need help? If you experience any of these issues, or have a setup that prevents activation from working correctly, contact our support team at contact@miltechsimulations.com. Include your purchase information and a brief description of the problem. We're here to help.

Related pages: Installation · Contact Us

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Miltech Simulations U-2

Low VRAM Version

A Low VRAM version of the U-2 is available for PC users with limited hardware, especially graphics cards with little video memory (VRAM).

When to Use It

If you get low FPS with the aircraft, a lack of VRAM is the most likely cause. The Low VRAM version reduces video memory consumption by over 2 GB.

Download

U-2 Low VRAM Version// **Download**

Installing

1. Install the standard package first.
2. Locate the installation folder of the U-2.
3. Unpack the Low VRAM archive directly into your MSFS 2024 U-2 installation folder.
4. Replace all files when the system asks.

After an Update

An update of the aircraft puts the standard files back. Apply the Low VRAM version again after each update.

Related pages: Installation · Contact Us

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Miltech Simulations U-2

Paint Kit

Use the paint kit to make your own liveries for the U-2.

Download

U-2 Paint Kit// **Download**

Related pages: Introduction · Variants · Contact Us

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Miltech Simulations U-2

Glossary

The abbreviations and special words that this manual and the U-2S cockpit use, from A to Z. On the other pages, an abbreviation with a dotted underline links to its entry here.

AC / DC

Alternating / direct current - the two halves of the electrical system.

ADF

Automatic Direction Finder - points to an NDB.

ADI

Attitude Director Indicator - the artificial horizon on the PFD.

ADSU

The air data unit that measures airspeed and altitude for the INS and MFDs.

AFCS

Automatic Flight Control System - the autopilot.

AGL

Above ground level.

ALN / IFA

INS ground alignment / in-flight alignment.

AMAD

Airframe Mounted Accessory Drive - the gearbox that drives the generators and the hydraulic pump, with its own oil system.

AOA

Angle of attack. Shown normalized: 1.00 = stall.

AP

Autopilot (the AP box on the PFD).

APCU

The autopilot computer of the AFCS; STAT / FAULT shows its status and, under MX, its fault codes.

AQ

Align quality. Counts down during alignment; lower is better.

ARC-210

The backup radio control panel on the left console - the simulator's COM 3.

ASARS-2

Advanced Synthetic Aperture Radar System - the radar nose (MFD RDR page).

ASU / GPU

Air-start unit / ground power unit - the ground carts.

ATS

Air Turbine Starter - spun by the ground starting cart or the emergency start system.

AVP

Avionics Processor - the computer that drives the three MFDs.

BCDU

Backup Control Display Unit.

BIT / SBIT

Built-in test / startup built-in test.

BRG / RNG

Bearing / range.

CHBDL

Common High Bandwidth Data Link (not simulated).

CNI

Communication, Navigation, Identification.

CRS

Course.

DCLT / DCO

Declutter / drift cut-out (PFD keys).

DDL2

The aircraft's data link - in the simulation the EFB datalink (telemetry sharing).

D/L

Data link transmitter position (SATCOM) on TRANS SEL; not simulated.

DP

Destination Point - a waypoint in the aircraft's own database.

DS

Direct steer - fly straight to a DP.

ECS

Environmental Control System - cockpit cooling, heating and pressurization.

EFA

Electronic Flight Aid - the MFD checklist reader.

EFB

Electronic Flight Bag - the U-2 EFB app on the MSFS tablet.

EGPS

Embedded GPS - the GPS receiver inside the INS.

EGT

Exhaust gas temperature.

EMER

Emergency: the emergency airfield file and page, the emergency squawk (7700), or an emergency bus.

ESS

Emergency Start System - one-shot hydrazine airstart.

ESS / MON

Essential / monitored electrical buses. The essential DC buses stay powered on the battery; the monitored buses only have power from a generator, the TR or ground power.

EW / EWS

Electronic warfare / electronic warfare system.

FAT

Free air temperature - the outside air temperature, from the temperature probe (SYS/PERF).

FF

Fuel flow.

FL

Flight level - altitude in hundreds of feet at 29.92 inHg.

FOB

Fuel on board. On SYS / PERF it shows how long that fuel lasts at the present fuel flow; DEST FOB is the fuel on arrival.

FPM

Flight Path Marker.

F/T, T/T, T/F, TTD, TFD

INS steering modes: from-to, to-to, to-from, to-to with distance, to-from with distance.

GMT / UTC

Zulu time.

GS / G/S

Glideslope.

Guard

The emergency frequency 121.500, and the separate guard receiver each COM radio has for it (the G on the UFCD).

H-70

The hydrazine fuel of the emergency start system.

HDG

Heading.

HF / UHF / VHF

High / ultra-high / very high frequency radio bands.

HSD

Horizontal situation display - the moving map under the HSI.

HSI

Horizontal Situation Indicator - the compass display on the lower PFD.

IAS / KIAS

Indicated airspeed / in knots.

IBIT

Initiated Built-In Test.

ICAW

Indications, Cautions, Advisories and Warnings - the MFD alert system. Every message: ICAW Message Dictionary.

IFF

Identification Friend or Foe - the transponder.

ILS / LOC

Instrument Landing System / its localizer.

INOP

Inoperative - present in the cockpit, no function in the simulator.

INS / INU

Inertial Navigation System / Unit.

ISS pump

The electric pump that refills the lift spoilers' emergency accumulator (SPOILER switch in EMER).

KT / NM

Knots / nautical miles.

LN33

The INS unit (LN33 FAULT = INS navigation failed).

LOX

Liquid oxygen.

LS key

Line-select key beside a display line.

Mark IV

The camera control panel on the right console: MASTER, MODE (also the radar's power), DRIFTSIGHT, SHUTTER VELOCITY and FRAME COUNTER for the OBC, the A-D lights and the viewsight hand control that aims the camera and moves the radar cursor. With no imaging sensor fitted a blank plate takes its place. See Mark IV Camera Panel.

MEC

Main engine control - the engine's fuel control; it cuts the fuel at 110.25 % N2 to stop an overspeed.

MFD

Multi-Function Display.

Mobile

The chase car and the pilot in it.

MSFS

Microsoft Flight Simulator 2024.

N1 / N2

Fan / core speed of the engine, percent rpm.

NDB

Non-directional beacon - the station an ADF points to.

OBC

Optical bar camera - the film camera that can fly in the Q-bay with the Standard nose (MFD CAM page).

OFLY

Overfly - fly over a DP instead of turning before it.

OND

Off / Night / Day - the MFD power knob.

ORB

Orbit count on the steering pages.

PDOP

Position dilution of precision - GPS geometry quality, lower is better.

PFD

Primary Flight Display - the main flying page of the MFD.

PME

Prime Mission Equipment - cameras, radar, sensors.

Pogo

Detachable outrigger wheel under each wing.

PRI / SEC

Primary / Secondary engine control mode.

PWR / STBY / NORM

Power / standby / normal - switch and mode legends.

Q-bay

Equipment bay behind the cockpit. It can carry the OBC camera (EFB Aircraft tab).

ROZ

Restricted Operating Zone - a circular zone drawn on the map.

RPLAN

Replan - the MFD route-planning page.

RT

On the BCDU: the RT page shown while the AVP runs. On the ARC-210: receiver-transmitter (RT1 = COM 1, RT2 = COM 2).

SATCOM

Satellite communication radio (not simulated).

SFD

Standby Flight Display.

SHED

ESS DC SHED - the push button with the amber SHED legend that takes the secondary essential DC loads off. See Electrical and Avionics Power.

SPAN

The satellite antenna fairing on the spine (EFB Aircraft tab).

SPOT / SRCH

The two ASARS-2 radar modes: SPOT images a small patch at high resolution, SRCH (search) covers the whole coverage area.

SSA

The ASARS-2 imagery recorder, powered by the MK IV MASTER switch.

STD

Standard altimeter setting, 29.92 inHg (1013 hPa).

Sump

The small fuselage tank that feeds the engine.

Superpods

The equipment pods on the wings: Senior Ruby (Type A), Standard (Type B) or none fitted. Senior Spear is an attachment on the left Senior Ruby pod (EFB Aircraft tab).

SYERS-2A

Senior Year Electro-optical Reconnaissance System - the camera nose (MFD CAM page).

TACAN

Military radio navigation aid giving bearing and distance.

TD

Target data - the STAT / LOAD file that fills the TP list from an INS Planner plan.

TP

Targeting point - a spot on the ground marked for the sensors, up to 10 at a time. See Targeting Points. In the U-2S manual TP means turn point, where the aircraft starts its turn before a DP; this guide writes that out.

TR

Transformer-Rectifier - makes DC from AC. On the DP pages: Turn Radius.

TRK

Ground track.

TTG / DTG

Time to go / distance to go.

UFCD

Up-Front Control Display.

UPLD

Upload - a route or airport file sent to the aircraft by the datalink (from SimBrief via the EFB).

XFER / XFMR

Transfer (fuel); XFMR is how the cross-transfer switch tooltips spell it.

XTK

Cross-track error - distance off the course line.

Related pages: Introduction · Cockpit Panels · ICAW Message Dictionary

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Miltech Simulations U-2

Contact Us

Don't hesitate to reach out! Use any of these channels for support enquiries, commercial enquiries or suggestions.

Before you contact support, please check Important Need-to-Knows and Quick Answers: most questions are answered there.

Channel	Use it for	Where
Bug report	Something does not work as this manual says	bugs.miltechsimulations.com/report
Feature request	An idea for the aircraft or for this manual	bugs.miltechsimulations.com/request
Support Center	Purchases, licenses, downloads and installation	miltechsimulations.com/pages/contact
Email	Support and commercial enquiries	contact@miltechsimulations.com
Discord	Questions and talk with other pilots and the team	discord.gg/PaCu8xS5pm
Forum	Discussions with the community	miltechsimulations.talkyard.net
Documentation	All Miltech Simulations manuals	docs.miltechsimulations.com

Note
When you report a problem, please include the aircraft variant (U-2S, U-2R or ER-2), the product version (MFD STAT / VERS page on the U-2S), and how you started the flight (parking, runway or air).

Related pages: Quick Answers · Important Need-to-Knows · Installation

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Privacy

The aircraft sends your flight data only while you have the datalink switched on (EFB Datalink tab - it is off every time the aircraft loads; see Electronic Flight Bag and Datalink Portal). Otherwise the online features only download map, imagery and elevation data, and your SimBrief flight plan when you load one.

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Credits

A list of people who made this product possible. The same credits are on the MFD under STAT → VERS.

Miltech Simulations:

- **Gabriel:** General Manager
- **Vasy:** Project Manager
- **Dan:** Development Support, Animations, 3D
- **Max:** Liveries, Texturing
- **John:** Sceneries, QA, Research
- **Piotr:** Missions
- **ElectronVolt:** Flight Model Revisions
- **Brayan:** 3D Assets
- **Luis:** Interior and Exterior 3D Modeling, Texturing
- **Marc:** Exterior Texturing
- **Nace:** Original Flight Model
- **Ivan:** WASM Dev
- **PropAir:** Systems Support
- **JinxxDCS:** Animations

Echo 19 Audio:

- **Echo19:** Audio Design

External Help:

- **Grifforge:** 3D Outsourcing
- **3D Reach:** 3D Outsourcing
- **woooosh_boom:** Screenshots and Trailer
- **Gdevore:** Cockpit Reference
- **Ryan Dorling:** Reference and Research
- **Aviationalds:** Trailer

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Third-Party Data:

- **OpenStreetMap contributors**, via OpenFreeMap / OpenMapTiles (ODbL): camera night road lighting, radar airfields and buildings, TP object read
- **Google Maps:** camera imagery, radar SPOT imagery and TP object read

- **Mapzen Terrain Tiles (Terrarium)**, AWS Open Data program: radar elevation
- **Impact Observatory, Microsoft and Esri**, Sentinel-2 10 m Land Use/Land Cover (CC BY 4.0): radar land cover
- **Mozilla pdf.js** (Apache 2.0 license): sunshade PDF rendering

The full source list is in the EFB, Datalink tab, Attributions.

Related pages: Contact Us · Introduction

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Miltech Simulations U-2

U2 101 - The Basics

These characteristics combine to earn the U-2 a widely accepted title as the most difficult aircraft in the world to fly.

New to the U-2? This page shows, in pictures, what kind of aircraft it is and what to expect from the first taxi to the final stop. No switches and no procedures: Normal Procedures has the technique and the Checklists have the steps.

Note
Sim values. Performance values are measured in the sim. They may not accurately represent (nor do they intend to accurately represent) the performance of the real aircraft.

Interactive resource: Is The U-2 Spy Plane The Hardest Aircraft In The World To Land? | MythBusters

Watch first: Is The U-2 Spy Plane The Hardest Aircraft In The World To Land? (MythBusters, YouTube)

1The AircraftWhat kind of aircraft it is, and why it flies the way it does.2A Flight, Step by StepFrom the start to the stop: ground, takeoff, climb, cruise, descent and landing.3Before You FlyWhat is normal, the classic mistakes, and your first three flights.

Part 1The AircraftA very long glider with a very big jet engine.

The Short Version

Think of the U-2 as a very long glider with a very big jet engine. Almost everything strange about it comes from these six facts.

103 ftA glider's wingLots of lift and very little drag: it floats, glides and does not want to slow down or come down.

17,000 lbA huge engineThrust on an airframe of 16,230 lb empty. Light, it climbs at about 11,000 ft/min.

2 wheelsIn a lineOne main wheel and a tailwheel. The pogos fall away on takeoff; then you balance it like a bicycle.

19,500 lbHalf of it is fuelFull tanks. The aircraft you take off in and the one you land are nearly two different aircraft.

1/13Very thin airOf the sea-level air is left at 65,000 ft. The speed needle reads low and the speed band gets narrow.

0Nothing does it for youNo autothrottle, automatic spoilers, antiskid or differential brakes. The throttle is yours.

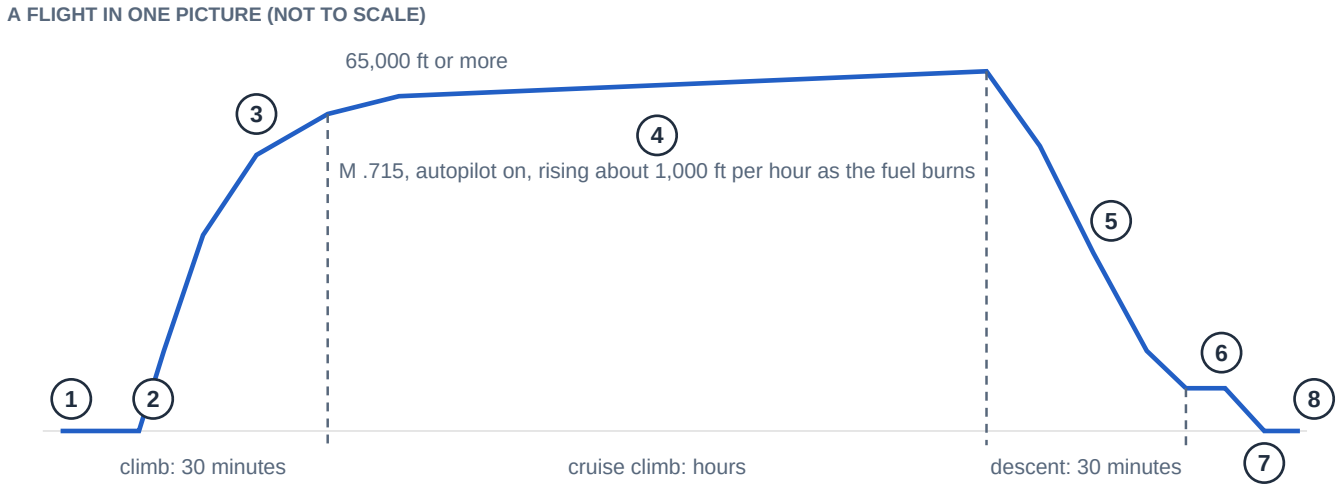


Everything the aircraft stands on, seen from the front.

1. **Main wheel**, with the tailwheel in line behind it

2. **Pogos**, 59 ft apart, gone after takeoff
3. **Wing tip skids**, 51 ft out, the only thing left to lean on

A Flight in One Picture



The numbers match the list below. Half an hour up, half an hour down, and almost all of the difficulty in the first minute and the last.

1. **Taxi.** Slow, wide turns and a lot of wing to look after.
2. **Takeoff.** 6 to 13 seconds on the runway, then a very steep climb.
3. **Climb.** Fast at first, then slower and slower. The first 40,000 ft take about 10 minutes. The last 25,000 ft take about 20 more.
4. **Cruise climb.** Hours of calm. The autopilot flies, you watch the fuel and the engine.
5. **Descent.** Gear down, everything out, throttle at idle, for about 150 NM.
6. **Pattern.** A few busy minutes at 1,500 ft and below, slowing down to landing speed.
7. **Landing.** The last 15 seconds are the hardest part of the whole flight.
8. **Rollout.** You are down, but you are still flying the wings until the aircraft stops.

Why It Flies Like This

The long wing

A long, thin wing is what gets the U-2 to 70,000 ft. It also means the aircraft hates losing speed or height.

- **It coasts.** Close the throttle and very little happens. Clean, with the engine at idle, it comes down only about 150 - 300 ft/min from 50,000 to 30,000 ft.
- **It floats.** Close to the runway the wing gets extra help from the ground. The aircraft stays up longer than you expect, and the stall comes about 4 kt lower.
- **It is wide.** At 12 ft a bank of only 13° puts a wing tip on the runway. Small banks near the ground, always.
- **It bends.** Look out at the wing in a pull-up. It flexes with the load. That is normal.

Two aircraft in one

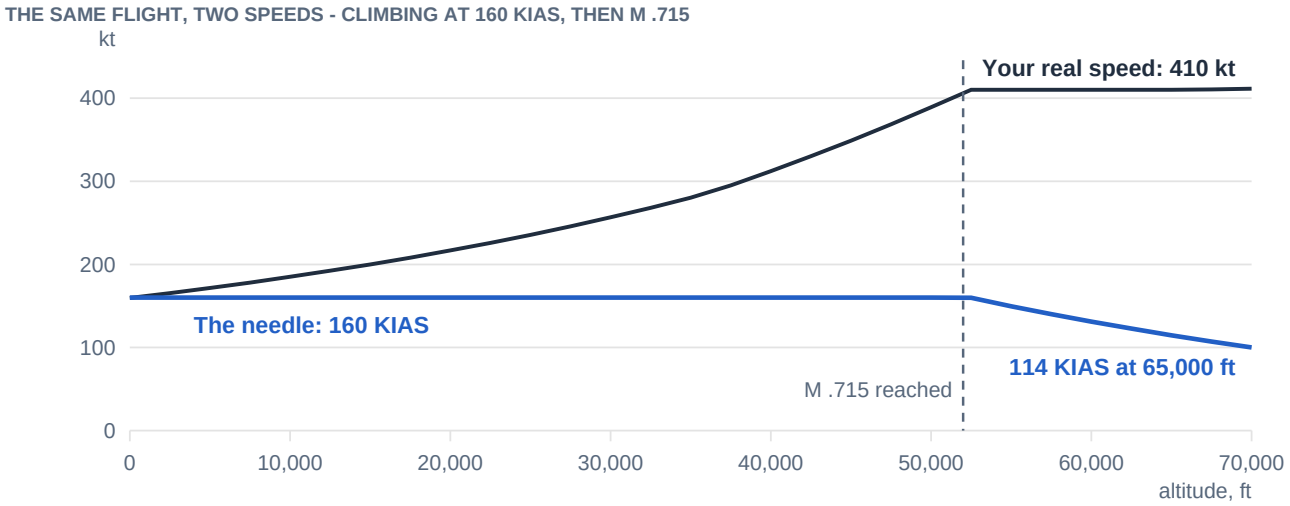
Fuel is about half the takeoff weight, so the aircraft changes character as it burns off. Know your weight before you do anything: the EFB Aircraft tab shows Gross.

Same aircraft	Heavy, about 34,500 lb	Light, about 22,500 lb
Liftoff, measured	98 KIAS, 12.5 s, 1,044 ft	76 KIAS, 6.4 s, 468 ft
Climb rate low down	about 6,000 - 8,000 ft/min	about 11,000 ft/min
Nose in the climb, measured	25 - 30° up at 135 KIAS	about 43° up at 140 KIAS
Stall, flaps up	about 95 KIAS	about 74 KIAS
Where the cruise climb settles	about 65,500 ft	about 74,000 ft

Every 100 gal of fuel is 670 lb, and about 1 kt on your landing speed.

The speed needle reads low

The wing only feels how much air hits it, and that is what the airspeed needle shows: indicated airspeed, KIAS. Up high the air is so thin that you have to go much faster for the same amount of air to arrive. So the needle and your real speed drift apart.



Standard day. Up to about 52,000 ft you hold the needle still and your real speed grows. From there you hold the Mach, your real speed stays the same and the needle falls by itself.

What to expect: from about 52,000 ft you hold Mach instead of KIAS, and the needle falls by itself: about 130 KIAS at 60,000 ft and about 115 at 65,000 ft. You have not slowed down. The MFD ground speed will show about 410 kt with no wind, while the needle reads what a light aircraft does on final.

The speed band closes up

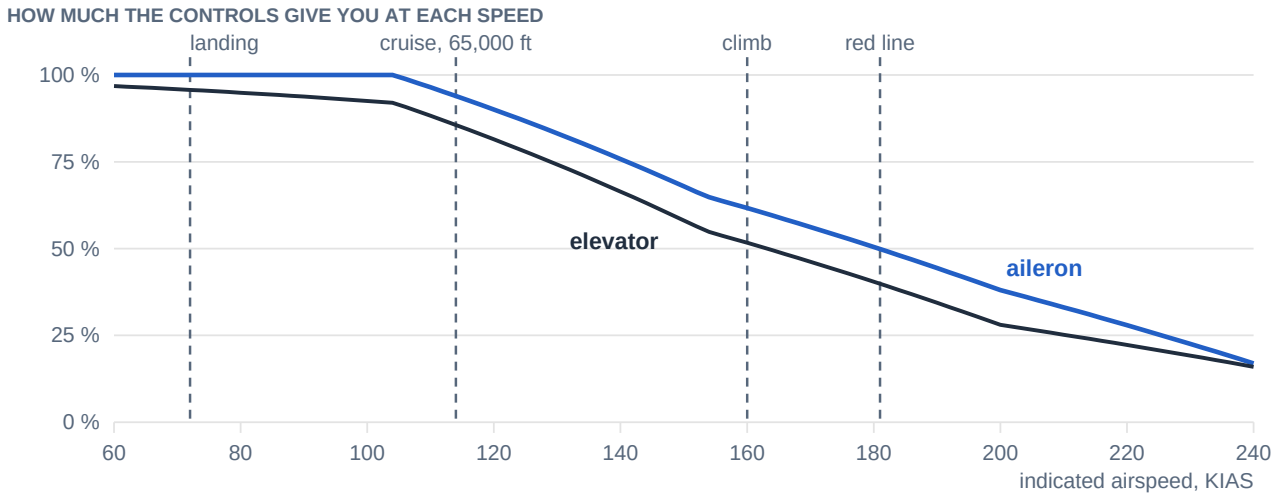
Two things limit your speed: the stall below you and the red line above you. Low down they are far apart. Up high the red line comes down to meet you, because it is set by Mach. Pilots call the top of this picture the coffin corner.

How narrow, and what to do about it: see **The Coffin Corner** below.

- **At the top of a cruise climb** you have about 7 kt to the red line and about 13 kt to the stall. You can stay there for hours with the autopilot on, but nothing you do up here should be sudden.
- **The red line gap hardly changes.** It is about 7 kt whatever you weigh.
- **The stall gap does.** It depends on how high you are for your weight. Each extra 1,000 ft takes about 3 kt off it. Do not try to force the aircraft higher than it wants to go. Wait for the fuel to burn off.
- **No warning from the wing.** In the sim there is no Mach buffet, and up here no tone sounds before the stall. See High-Altitude Handling.

Controls: soft, stiff, soft

The harder the air pushes on the control surfaces, the less they move. So the controls are at their best on the approach and in the cruise, where the indicated speed is low, and get stiff in between.



From the U-2S flight model: the share of the low-speed control effect left at each indicated airspeed. The rudder is not shown.

- **The yoke has a long way to go:** 120° each way. Turn it past about 38° and a roll spoiler pops up on that wing, so the roll rate jumps.
- **The trim is slow:** about 1° every 3 seconds. Plan ahead and do not wait for it.
- **At 240 KIAS,** the red line with gust control UP, the controls are nearly solid: less than a fifth of their effect is left.

Part 2A Flight, Step by StepWhat to expect from the first taxi to the final stop.

Starting the Aircraft

There are three ways to get the U-2 ready to fly. The Quick Start Guide takes you through each one.

1Runway startReady at onceStart your flight on the runway: engine running, avionics up, INS aligned.2EFB presetUp to 3 minutesAlready parked: EFB **Set up aircraft**, *Ready for takeoff* or *Ready for taxi*.3Cold and Dark startAbout 5 minutesStart on a parking spot with everything off and set it all up yourself.

On the Ground

The U-2 taxies like a bus with a 103 ft plank on the roof.

- **It will not move at idle.** Bring the power up to about 78 % N2 until it rolls, then back to idle. Once it is rolling it keeps rolling.

- **It turns wide.** The tailwheel answers half a second after the pedals. Full pedal gives a 189 ft radius, so a U-turn needs about 380 ft of tarmac, and about 480 ft for the wing tips. Start every turn early.
- **One brake.** Either pedal brakes the main wheel. You cannot steer with the brakes, and there is no antiskid.
- **Wait for the crew.** On the runway, stop and hold still. A pickup brings two technicians to pull the pogo pins. Go before they finish and the pogos stay on after liftoff.

Takeoff

Forget the long, patient takeoff roll of a jet. Full throttle and it is gone.

- **The airspeed reads zero at first.** In the logged run it stayed near zero until about 18 kt over the ground. That is normal.
- **Watch for the pogos.** They fall away one after the other between 60 and 88 KIAS. From that moment there is nothing under the wings. Keep them level with the aileron.
- **Be ready for the climb.** It feels like the nose is pointing at the sky, because it nearly is: 25 - 30° heavy, over 40° light. Hold the speed with the nose and stay on the PFD.
- **Light, you run out of pattern very quickly.** At 11,000 ft/min you pass 1,500 ft about 10 seconds after liftoff.
- **Do not lower the nose suddenly.** The speed runs away at once. The AIRSPEED lamp comes on at 180 KIAS.

Climb

Hold 160 KIAS and the aircraft goes up like a rocket, then slowly runs out of breath.

Climb rate at 34,000 lb (estimate)	Sea level	20,000	40,000	55,000	65,000 ft
ft/min	7,750	5,000	2,600	1,400	300

- **Above about 45,000 ft the engine needs watching.** Full throttle above about 55,000 ft runs into the EGT limit, so you trim the power with the vernier to hold 650 - 725 °C.
- **From about 52,000 ft fly the Mach:** M .715, with the autopilot if you like. The needle starts to fall, as shown above.
- **Do not push the nose over.** Below 1 g the AMAD oil pump uncovers and you get a warning at once.
- **Rough air low down?** GUST CONTROL UP takes load off the wing and moves the red line up to 241 KIAS, below 43,000 ft.

Cruise

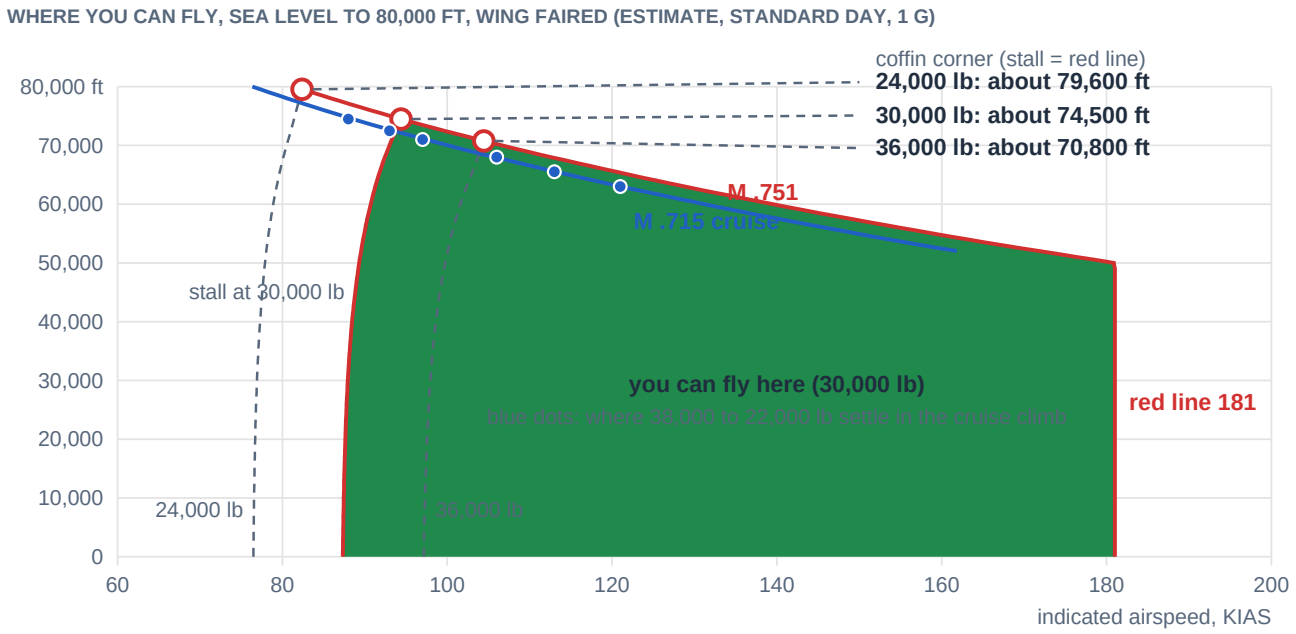
This is where the U-2 is happiest. It is also the quietest part of the job.

- **You do not level off.** With the engine at climb power and the autopilot holding M .715, the aircraft rises about 1,000 ft per hour as the fuel burns.
- **The autopilot flies the aircraft, you fly the engine.** It never touches the throttle. Keep the EGT at 650 - 725 °C with the vernier.
- **Be gentle.** Small, slow inputs, then wait and see. The aircraft is in the narrow band and the trim is slow.

- **Turns are enormous.** At 410 kt and 15° of bank the circle has a radius of about 9 NM, and a U-turn takes about 4 minutes.
- **Turbulence can trip the autopilot.** Above 60,000 ft moderate turbulence switches off all three axes. Switch each one ON again.
- **Watch the balance.** If the autopilot is holding aileron, one wing is heavier. Move fuel across, see CRUISE TRIM AND BALANCE.

The Coffin Corner

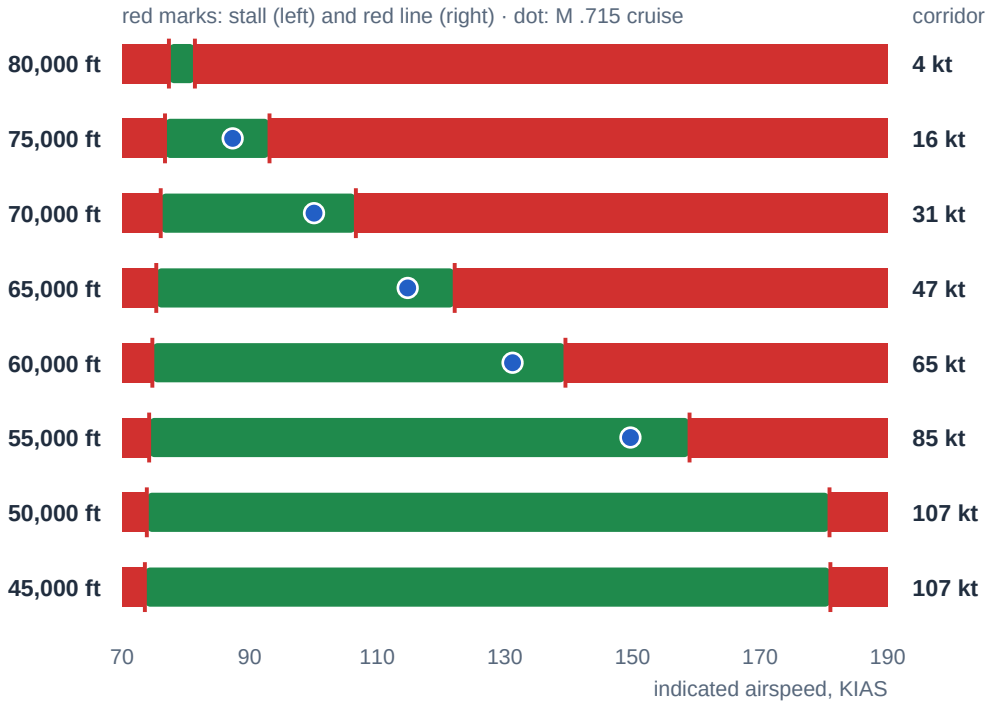
Up high the U-2 flies in a corridor only about 20 kt wide. Below it the wing stalls. Above it you pass the Mach red line. Pilots call the top of that corridor the coffin corner.



Green: where you can fly at 30,000 lb. Dashed: the stall at 24,000 and 36,000 lb. The red line is 181 KIAS up to about 49,500 ft, then Mach .751. Where a stall line meets the red line (open circle) is the coffin corner for that weight: about 70,800 ft at 36,000 lb, 74,500 ft at 30,000 lb and 79,600 ft at 24,000 lb. The dots on the blue line show where each weight settles in the cruise climb, about 7,000 ft below its corner.

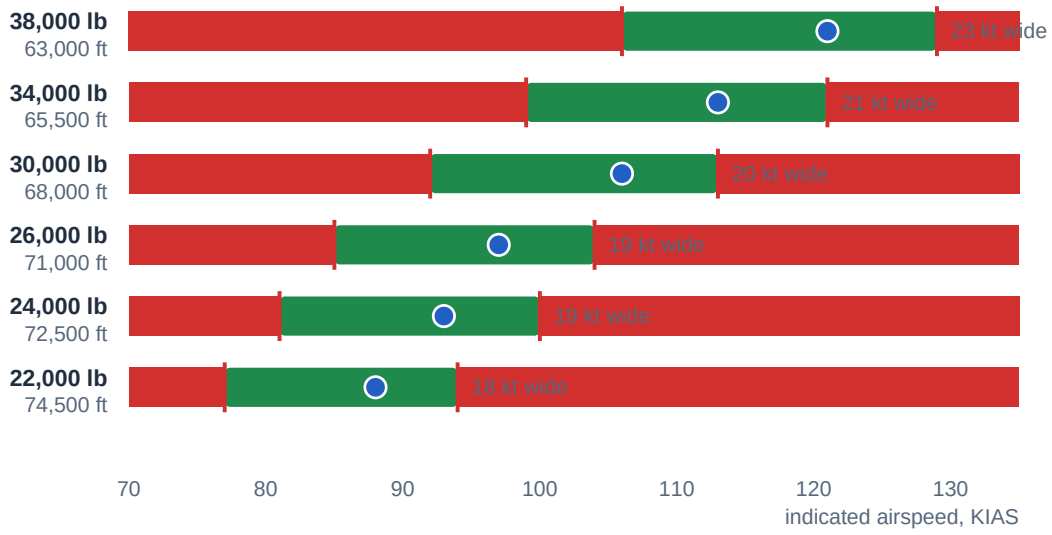
- **Two limits, coming together.** The stall stays near the same indicated speed as you climb (it creeps up a few knots). The red line is set by Mach .751, so its indicated speed falls fast above 50,000 ft: 159 KIAS at 55,000 ft, about 140 at 60,000, 122 at 65,000, about 107 at 70,000.
- **Higher is narrower.** At one weight, each extra 1,000 ft takes about 3 kt off the room to the stall. In the cruise climb the aircraft only goes up as the fuel burns off and it gets lighter, so the corridor stays about 18 - 23 kt wide all the way up (see the table).
- **The small gap is on top.** At M .715 the red line is only 6 - 8 kt above you. The stall is 11 - 15 kt below. Most mistakes up here are too fast, not too slow.

AT 22,000 LB: THE CORRIDOR FROM 45,000 TO 80,000 FT (ESTIMATE, STANDARD DAY, 1 G)



Every row is one altitude at the same weight, 22,000 lb, the weight near the end of a long mission. Green is where you can fly, between the stall (left red mark) and the red line (right red mark). Only the altitude changes: the stall creeps up a few knots and the red line comes down fast. At 80,000 ft only a few knots are left, and M .715 is already slower than the stall (no dot): the coffin corner for 22,000 lb is at about 82,000 ft. At 30,000 lb the corridor closes at about 74,500 ft. Below about 50,000 ft the red line is 181 KIAS.

THE CORRIDOR AT YOUR CRUISE-CLIMB ALTITUDE (ESTIMATE, STANDARD DAY, 1 G)



Green: where you can fly. Red lines: the stall (left) and the Mach .751 red line (right). Dot: M .715, the cruise speed. Each weight settles at its own altitude, so the corridor stays about 18 - 23 kt wide.

Where the corner itself is

The chart shows where the two lines meet: at about 69,500 ft at 38,000 lb, 70,800 ft at 36,000 lb, 74,500 ft at 30,000 lb, 79,500 ft at 24,000 lb and 82,000 ft at 22,000 lb. That is about 7,000 ft above where the engine can take you at each weight, so in a normal cruise climb you never reach it.

You can get closer by pulling up (a zoom) or by forcing the climb at a lower speed: do not.

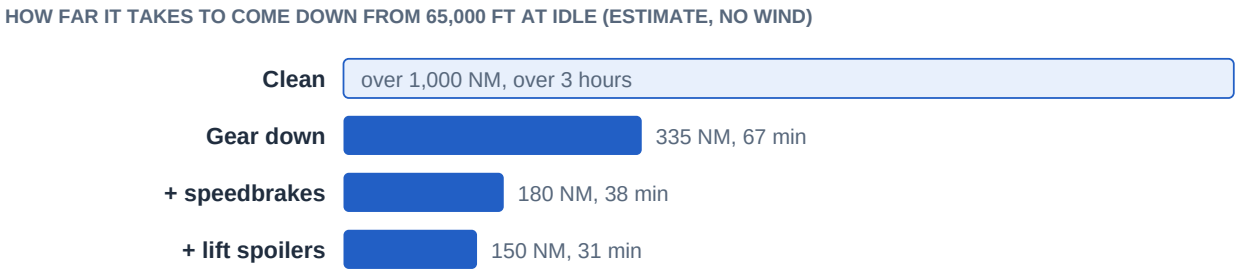
What makes the corridor narrower

- **Bank.** A turn raises the stall: about 7 % at 30° of bank. At M .715 a level turn at about 40° of bank stalls the wing, at every weight (see the table). The AFCS turns at 15°, at most 25°. By hand, keep to the same.
- **Gust control UP.** It raises the stall speed and above 43,000 ft it does not raise the red line. Keep it FAIRED in the cruise.
- **Lift spoilers up.** They add 2 kt to the stall.
- **Turbulence.** A gust changes your speed by several knots in a second, in the narrow band that is most of the margin. Above 60,000 ft moderate turbulence switches off the autopilot. Hold the attitude gently and let the speed settle.
- **On the fast side you get warnings.** The red bar on the PFD and SFD speed tapes, the Mach digits turning red, MACH RATE when you will reach M .75 within 5 seconds, and AIRCRAFT OVERSPEED past the red line. The drag starts to rise at about M .65 and climbs quickly past .75, so the aircraft resists a runaway.
- **On the slow side you get almost nothing.** In the sim there is no Mach buffet, and up here no stall tone: the AOA gauge reads low because it corrects for Mach, the tones start at .70 and the wing lets go at about .60. The AFCS MACH and ALT modes give way before the stall, but by hand it is up to you.
- **Too fast?** Nose up a little, or a touch of throttle back. Correct at once.
- **Too slow?** Lower the nose gently and let the speed come back. Do not pull. The red line is not far away.
- **A warmer day** does not move these KIAS numbers at a given altitude. It puts your cruise climb lower, where the corridor is wider.

More: Flying the U-2S → High-Altitude Handling.

Descent

Getting a glider down from 65,000 ft takes planning. Gear down at 65,000 ft is not a mistake: it is the first thing you do, and the gear has no speed limit.



Each bar adds to the one above it. Without the gear this wing barely comes down at all.

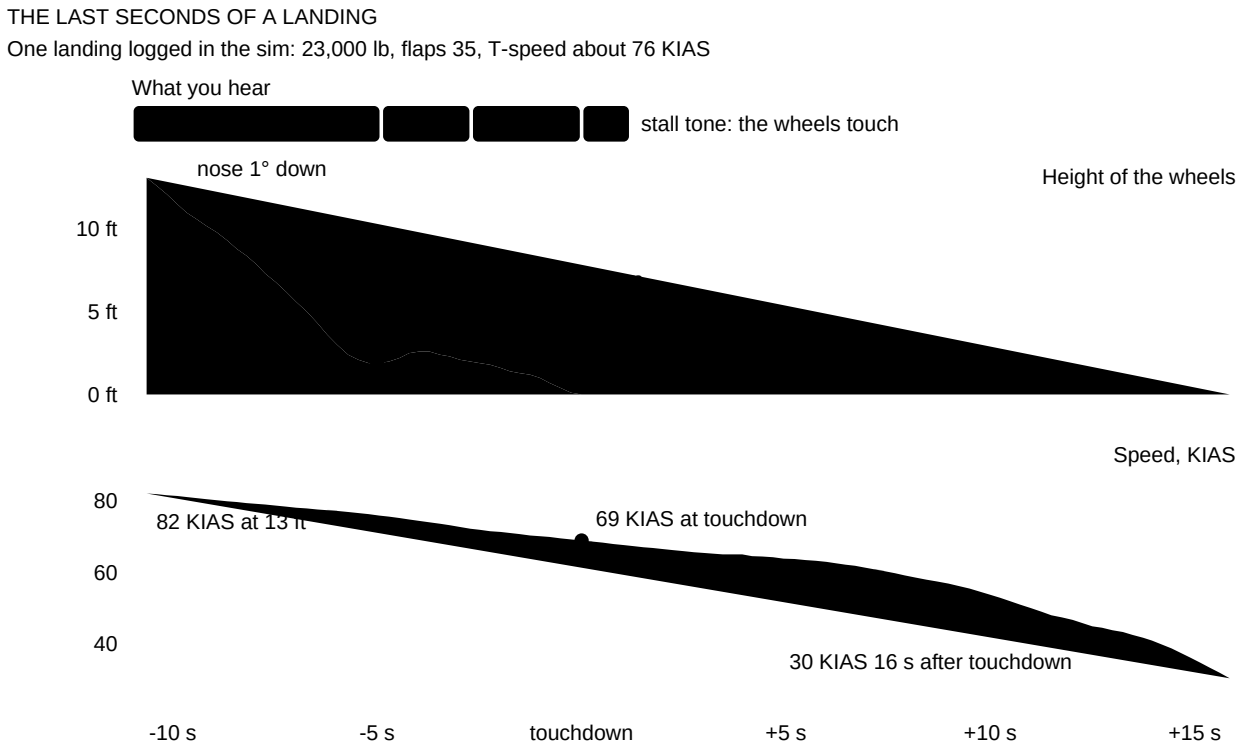
- **Start early.** About 2.4 NM for every 1,000 ft you have to lose, so about 150 NM from 63,000 ft, plus extra for a tailwind.
- **Expect about 1,700 - 2,500 ft/min** with everything out.
- **The engine stays busy.** Flight idle up high is still about 81 - 85 % N2. It is not stuck.
- **The needle comes back up** as you descend, the opposite of the climb. Below 53,000 ft you fly 160 KIAS again.

- **Clean up in time.** The lift spoilers and gust control have to be sorted out before the pattern, and the flap lever is locked while gust control is UP.

The Landing

This is the part the U-2 is famous for. In most aircraft you land with speed to spare, on wheels spread wide. Here you land at the edge of the stall, in the same slightly nose-up attitude the aircraft has on the ground, so that the main wheel and tailwheel touch together, and then you balance on them.

On final expect the nose a few degrees **down**, about 90 KIAS and 600 - 700 ft/min with the throttle at idle, flaps 35 and the speedbrakes out (measured). Then, in the last 10 seconds, everything happens at once:



One logged landing. The tones are placed for that weight by the AOA system: steady at T-speed, fast beeps about 4 kt below it, the stall tone about 7 kt below it.

- **You are lower than you think.** In this landing the wheels were 2 ft above the runway five seconds before they touched. In the U-2 you fly it down to a couple of feet, not to a flare height.
- **The speed falls by itself,** a little over 1 kt per second. You only hold the height and wait. Every knot too fast at the threshold is about another second of float and over 100 ft of runway.
- **Listen.** Slow beeps, steady tone at T-speed, fast beeps about 4 kt below it, high stall tone about 7 kt below it. The stall tone is where the wheels should touch.
- **The mobile helps.** With the chase car on, a second pilot calls your height: "ten... five... two... one", and "left rudder" or "right rudder" if you drift. Height is hard to judge from the cockpit, so trust the calls.
- **The nose comes up slowly,** from about 1° down to about 3.5° up, over the last 10 seconds. If the aircraft touches on the main wheel first it can pitch up and fly again.

Caution
Press the SPOILER button at touchdown. Nothing deploys by itself. Without the lift spoilers the wing

keeps flying and the aircraft will not stay down.

It is not over until it stops

- **Keep flying the wings.** Left alone, a wing goes down in a few seconds. Keep working the aileron all the way down the runway. It gets weaker as you slow.
- **In the logged landing** the aircraft was down to 30 KIAS 16 seconds after touchdown.
- **One wing tip will settle on the runway** at the end. That is what the skid is for.
- **Stop straight ahead and stay there.** About a minute later the crew arrives, fits the pogos and levels the aircraft, in about half a minute. The pogos wait for the crew, however long they take.

If It Stalls

Well away from the ground the U-2's stall is not frightening. The nose comes down by itself, and the roll and yaw stay under control. Lower the nose a little more, level the wings and let the speed come back. With the stall strips in, a wing drops. With them out, as they are from 24° of flap, the wings stay level.

What makes it dangerous is where it happens:

- **In the flare:** if the stall tone comes while you are still several feet up, the aircraft will drop in. Above 750 ft/min at touchdown the gear is damaged (with crash damage on).
- **In a turn:** the stall speed goes up about 7 % at 30° of bank, so about 5 kt at landing speed. Keep to 30° in the pattern.
- **Close to the ground:** a dropped wing soon becomes a wing tip on the runway, and at speed that can throw the aircraft around.
- **Up high:** no tone warns you. The autopilot's MACH and ALT modes give way before the stall, but by hand it is up to you. Lower the nose gently: the red line is not far away.

Part 3Before You FlyThe surprises, the mistakes and a plan for your first flights.

That Is Normal

These all look like faults the first time you see them.

What you see	Why
The aircraft stays put at idle	It needs a burst of power to get rolling, about 78 % N2.
The AOA indexer is lit on the ramp	The AOA reads about .65 at the two-point attitude.
The airspeed reads zero early in the takeoff roll	It starts reading at about 18 kt.
The pogos fell off	That is their job. The crew fits them again after landing.
The nose is 30° or more above the horizon	That is the climb attitude on this much thrust.
The oil quantity drops to about 8.5 qt in the climb	The reading swings with the climb and comes back. The oil itself does not change.
The needle falls above 52,000 ft	You are holding Mach. Your real speed has not changed.

What you see	Why
The AOA shows only .15 to .40 in the cruise	The gauge corrects for Mach. Fly the Mach, not the AOA.
The altitude keeps creeping up	That is the cruise climb.
The throttle does not follow the autopilot	There is no autothrottle.
The cabin altitude reads about 29,000 ft at 70,000 ft	The cabin only holds 3.88 psi, which is why you stay on oxygen.
The trim keeps running after the autopilot goes off	The autopilot can take the trim past its stops, and it runs back at the normal slow rate.
Idle up high is about 81 - 85 % N2	That is flight idle. Near 70,000 ft it eases to about 81 %.
The gear is down at 65,000 ft	It is your biggest source of drag on the way down.
A wing tip rests on the runway after landing	With no pogos, the aircraft has to lean on something.

Classic Mistakes

Mistake	What happens	Fix
Not binding the lift spoilers	You touch down and cannot kill the lift	Bind **Toggle water rudder** before you fly, see Keybinds Guide
Rolling before the crew has finished	The pogos stay on after liftoff	Wait for "ground crew clear".
Forgetting the wings when the pogos go	A wing drops on the runway	Have aileron ready from 60 KIAS
Lowering the nose in the climb	The speed runs past 180 KIAS in seconds	Small pitch changes, and bring the power back if you need to level off
Staying at full throttle up high	EGT HIGH from about 55,000 ft	Vernier to 650 - 725 °C from about 45,000 ft
Big inputs at altitude	A roll spoiler pops and the speed moves	Small and slow, then wait
Forcing it higher when heavy	The stall gap closes by about 3 kt per 1,000 ft	Let the fuel burn off
Starting down too late	You arrive thousands of feet high	Start about 150 NM out, gear down first
Crossing the threshold fast or high	A long float, and maybe no runway left	T-speed, 10 ft at most, throttle idle
Flaring too high	The stall tone comes early and it drops in	Fly it down to 2 - 3 ft, then hold it there
Touching main wheel first	The nose pitches up and it flies again	Both wheels together, in the two-point attitude

Mistake	What happens	Fix
Relaxing after touchdown	A wing goes down and the aircraft swings	Aileron and rudder until it stops

Your Recommended First Three Flights

1CircuitsStart on the runway with about 500 gal: at least 70 in the sump, the rest equally in the two inboards, with the outboards empty. With the default equipment that is about 23,600 lb and a T-speed of about 77 KIAS. Keep the chase car on and wait for the crew. Take off, and start bringing the power back as soon as you are flying: 1,500 ft comes very quickly at this weight. Fly the pattern, land, stop and let the crew fit the pogos.The pattern is in Normal Procedures. Set yourself a light target: both wheels together on the centreline, wings level to the stop.

2A trip to the topLoad about 900 gal and climb all the way. Watch the needle fall past 52,000 ft, set MACH on the autopilot and spend half an hour in the cruise getting a feel for the engine and the speed band.About an hour and a half. You should land under 24,300 lb, so your normal landing still works. Check the weight on the way down.

3The real thingNow start from Cold and Dark with the Quick Start Guide and the Checklists.

Related pages: Normal Procedures - Flying the U-2S · High Altitude and the Cruise Climb · Angle of Attack (AOA) · Speedbrakes and Lift Spoilers · Checklists

Miltech Simulations U-2. SIMULATION USE ONLY. This documentation describes the simulated aircraft as delivered in the add-on and must not be used for real-world aviation.

Miltech Simulations U-2

Quick Start Guide

This guide takes you from a cold aircraft to ready for takeoff. MSFS sets the starting state by where you start: a parking spot is Cold and Dark, a runway is ready to fly. Choose one of the three ways below.

1Runway startReady at onceStart your flight on the runway: engine running, avionics up, INS aligned.2EFB presetUp to 3 minutesAlready parked: EFB **Set up aircraft**, *Ready for takeoff* or *Ready for taxi*.3Cold and Dark startAbout 5 minutesStart on a parking spot with everything off and set it all up yourself, step by step.

1. Runway Start

Start your flight **on the runway** (or in the air). The aircraft loads fully powered: engine running, boost pumps on, all avionics on, INS aligned, transponder on, pitch trim in AUTO, canopy closed with the CANOPY SEAL ON, the SPOILER switch in ARM, EW CONT in RPT and the guard receiver muted (white G on the UFCD).

Before you roll

1. **Set the altimeter.**
2. **Wait for the runway crew.** Hold still: with the chase car on, two technicians pull the pogo safety pins in about a minute. Wait for "ground crew clear".Go without them and the pogos stay on, and the emergency start system keeps its ground safety pin (no airstart). See Normal Procedures - Flying the U-2S.

2. EFB Preset

Already on a parking spot? Stop, open the EFB Aircraft tab, **Set up aircraft**, and choose a preset. The engine goes straight to ground idle (no ground carts needed) and the avionics come up with the INS aligned. Allow up to three minutes.

Preset	What you get
Ready for takeoff	Canopy closed and seal ON, SPOILER switch ARM, EW CONT RPT, landing light on, pitot heat off, transponder NORM, AFCS POWER with PITCH, ROLL and YAW on.
Ready for taxi	The same, but the canopy seal, SPOILER switch, EW CONT, landing light and autopilot are left off, and the taxi light is on.
Ready to start	Stops at the ENGINE START checklist: ground power connected, avionics up, INS aligned, engine off and canopy open. You start the engine yourself (step 9 below).

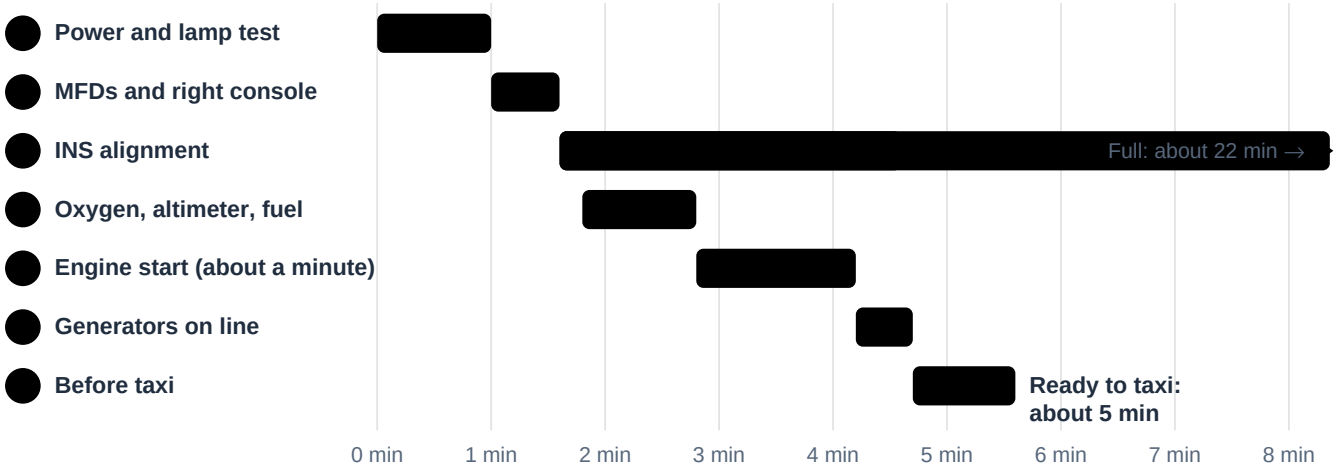
Every preset tunes the radios and sets the altimeter, and the MFDs skip their power-on test. The parking brake stays set (not with the EFB option **Cockpit handle** on *Stall strip*). The covers and gear pins come off; the wheel chocks stay on, and the pogo pins wait for the runway crew (see Before you roll).

3. Cold and Dark Start

On a parking spot everything is off and the canopy is open. Ground power, starting air and oxygen come from the carts on your stand, worked from the EFB Ground tab.

COLD AND DARK - WHAT RUNS WHEN

The INS alignment is the long item: start it early and do the other steps while it runs.



*The numbers are the steps below. Times are with the default Fast avionics start-up and the EFB option **INS alignment time** on Short. With Full you wait about 22 minutes for the INS before taxi; Instant takes no time at all. Realistic avionics start-up adds up to 3 minutes at step 4.*

A Power and checks

1. Electrical panel**Power**

- EFB Ground tab, Servicing, **Ground power**: *Connect*. Until it is connected, the switch does nothing (the MSFS ground-services power cart is not used).
- BATTERY to EXT PWR.
- EXTERNAL POWER ON.
- Leave the generator, inverter and transformer-rectifier switches OFF until the engine runs.

No ground power? BATTERY NORM alone powers every display, the INS and the BCDU, but the autopilot and the EW system need AC, the monitored DC bus (exterior lights, seat adjust) stays dead without the transformer-rectifier, the panel lights need essential AC, and the battery runs down.

2. Warning panel**Warning panel test**

- Hold MASTER LIGHT TEST: every warning lamp lights, and the red gear handle light too (with LANDING GEAR NOT DN on the MFDs).
- Both LOX quantity needles run down towards zero (both oxygen alerts after about 9 s with full converters). Let go and they come back.
- With the engine stopped these lamps are normal: DC GEN MAIN AC HYD OIL AMAD SEC OXY.
- Press the MASTER CAUTION lamp to reset it.

3. MFD**Turn on the MFDs**

- Turn the small knob in the top right corner of each MFD from OFF to DAY.
- Each display runs its 9-second power-on test, then shows DISPLAY BUS OR AVP FAILURE until the AVP is up.

B Avionics and the INS

1. Avionics power, right wall**Right console, slowest first**

- INS: flick to LOAD, then ON.
- SFD ON: power-on test, then attitude initialization (10 s, or 3 minutes with *Realistic* start-up). The aircraft must not move.
- AVP ON: the MFD pages appear once it is up (7 s, or 2 minutes with *Realistic* start-up).
- UFCD ON: 9-second self-test.
- BCDU ON: 15-second start.
- IFF ON: comes up in standby.
- PITCH TRIM AUTO.
- EW CONT (top right of the main panel, beside the SFD) to REC if you want the EW system. It runs a self-test first (30 s, or 5 minutes with *Realistic* start-up) and needs AC power: ground power or the engine.

2. MFD NAV / INIT**Start the INS alignment**

- As soon as the MFDs are up: NAV → INIT.
- R1 ALN, then R2 YES.
- It is the longest item: do the next steps while it runs.

With the AVP running the BCDU only shows its RT page, so the MFD is the place to do it. See the INS chapter.

C While the INS aligns

1. Oxygen panel**Oxygen**

- Oxygen systems 1 and 2 ON.
- The OXY lamp goes out after a few seconds.

2. MFD PFD**Altimeter**

- Set the baro on the MFD to clear the red ALT box.
- RESET BARO.

3. Fuel panel**Fuel**

- Both FUEL BOOST PUMP switches ON.
- Check the sump on SYS → PERF (about 70 gal).
- Set your fuel bugs.

D Engine start

1. Throttle quadrant**Start the engine**

- Throttle OFF: right-click the throttle below 10 %.
- Parking brake set.
- EFB Ground tab, Servicing, **Air Supply Unit**: *Attach*, then *Apply*. Or press MIC on the yoke or throttle to call for the air. Attach brings the air-start unit out if it is hidden.
- The cart connects the hose and the air comes on: the starter turns the engine, and ignition is automatic.
- At 20 % N2, right-click the throttle again to select IDLE. The engine lights off and accelerates to ground idle, about 60 % N2 at sea level.

- The crew removes the air by itself. HYD, AMAD, OIL and SEC go out; DC GEN and MAIN AC stay on until the next step.

Full procedure and what can go wrong: Engine Start and Cockpit Controls.

2. Electrical panel**Generators on line, ground power off**

- MAIN AC GENERATOR NORM.
- MAIN DC GENERATOR NORM: DC GEN goes out.
- BATTERY NORM.
- EXTERNAL POWER OFF: the main AC generator takes over and MAIN AC goes out.
- STANDBY GENERATOR, EMERGENCY INVERTER and TRANSFORMER RECTIFIER to NORM.

Keep this order: with the battery still in EXT PWR and the DC generator off, switching external power off leaves the DC buses dead - the displays go out and the INS alignment starts again. The AC generator cannot come on line while external power is connected; expect a brief flicker at the hand-over. The full sequence with the TEST checks is the After Engine Start checklist.

E Before taxi

1. AFCS panel**Before taxi**

- Gear pins out in the walkaround (one click removes both).
- Wheel chocks off: EFB Ground tab **Wheel Chocks Off**, or click them away in the walkaround.
- INS accepted (N on the PFD).
- IFF NORM and squawk set on the UFCD.
- AFCS POWER on, and its PITCH, ROLL and YAW switches ON (all three are OFF from Cold and Dark).
- MANUAL TRIM POWER on the yoke ON, and the pitch trim set (it only moves with hydraulic pressure).
- SPOILER switch ARM.
- Canopy closed (click the CANOPY LATCH placard) and CANOPY SEAL ON.
- Oxygen switches ON, radios tuned.
- Hold the brakes and release the PARKING BRAKE (push the handle). This also takes off any ground cart still connected.

> Tip
> Set the EFB option **INS alignment time** to *Short* and the whole cold start fits into about five minutes. Then wait for the runway crew as in Before you roll.

Related pages: Important Need-to-Knows · Preflight and Power-Up · Engine Start and Taxi · Inertial Navigation System (INS) · Normal Procedures - Flying the U-2S

Miltech Simulations U-2. SIMULATION USE ONLY. This documentation describes the simulated aircraft as delivered in the add-on and must not be used for real-world aviation.

Miltech Simulations U-2

Important Need-to-Knows

The U-2S does some things differently from other aircraft in the simulator. Read these points before your first flight. Select a title to open its details.

Navigation is flown from the aircraft's own Destination Points

- The U-2S INS steering computer flies the **ACTIVE destination point (DP) file** - the route you see on the MFD NAV/DPS page and on the map. Enter or edit your route there, on the UFCD DP page or on the BCDU (with the AVP off). The MSFS flight plan is **not** used for INS steering.
- Flight director, MILES / time to go and the autopilot NAV mode all follow the DP file. The INS must be aligned (in NAV).
- Steering modes (F/T, T/T, T/F, TTD, TFD), direct steer, overfly and orbits are explained with drawings under Navigation System (INS Steering).

Engine start needs ground starting air

- The engine is started with air from the air-start unit, a cart on your stand, through the U-2 EFB (Ground tab, Servicing, **Air Supply Unit**), or with a press of MIC on the yoke or the throttle grip, your call to the ground crew to apply the air.

The cart has to be shown beside the aircraft and you must be parked off the runway with the parking brake set or the wheel chocks fitted. It drives to its service point and connects the hose first, so give it a moment. Ground power works the same way (Ground tab, **Ground power**: *Connect*).

The EFB *Ready for takeoff* preset and your Engine auto-start key start the engine without any cart. There is no starter switch to press: on the U-2S your starter key is the throttle AIRSTART button, and that only works in flight.

- The throttle has an OFF / IDLE stop: right-click the throttle (below 10 %) or bind **Increase Cowl Flap 4**. Start with the throttle OFF, go to IDLE at 20 % N2.
- See Engine Start and Cockpit Controls.

Pogo pins: stop on the runway for the crew

- On every ground start, parking or runway, the pogos carry safety pins, and only the runway crew can pull them. Hold still on the runway with the chase car on (EFB Settings tab); the crew needs about a minute. A pickup pulls up and two technicians walk out, one to each pogo. Wait until they are back and you hear "ground crew clear".
- If you roll early, or the chase car is off, the pins stay in and the pogos stay on for the whole flight. If that happens, shake the aircraft hard in flight until they fall. The emergency start system's ground safety pin comes out with the pogo pins, so without the crew there is no airstart either.
- The gear pins and the wheel chocks are yours: see Quick Answers and Landing Gear.

Canopy seal before takeoff

- The cockpit only pressurizes with the **CANOPY SEAL** T-handle ON, and the canopy cannot be opened while it is ON. From Cold and Dark the seal is OFF - set it ON before takeoff, and OFF before you open the canopy after landing.

Fuel and Payload

- Fuel is loaded through the built-in MSFS menu. The mission equipment and its weight are set on the EFB Aircraft tab: the aircraft writes those weights back if you change them in the MSFS menu. Only the pilot is yours to change there.
- The engine only feeds from the small **sump tank** (CenterSUMPTank). Always load at least 70 gallons into it. If the sump runs dry the engine stops, no matter how much fuel is in the wings.
- See Aircraft Systems / Fuel System.

Speedbrakes and Lift Spoilers are two different things

- Your normal spoiler key or axis moves the fuselage **speedbrakes** only.
- The wing **lift spoilers** are operated with the yoke SPOILER button. ▣ **You must map a button to "Toggle water rudder"** to use it from your controller, and the SPOILER switch must be in ARM.
- There is no automatic spoiler deployment on touchdown.
- See Speedbrakes and Lift Spoilers.

Cold and Dark vs Ready to Fly

- MSFS sets the starting state based on the starting location. Parking = Cold and Dark. Runway or air = fully powered, avionics started, INS aligned. A runway start also has the canopy closed and sealed, the SPOILER switch in ARM and EW CONT in RPT. It still has its pogo pins: hold still until the runway crew is done.
- A Cold and Dark aircraft really is dark: every switch is OFF - battery, generators, fuel pumps, lights, oxygen, avionics, the three MFD power knobs, the autopilot PITCH / ROLL / YAW switches - and the canopy is open. Work through the Quick Start Guide.
- Parked and in a hurry? The EFB Aircraft tab, **Set up aircraft**, sets the aircraft up for you while you stand still on the ground: *Ready to start* has everything done up to the engine start, with ground power connected, the avionics up and the INS aligned, the engine off and the canopy open; *Ready for takeoff* starts the engine with ground air (no carts needed) and brings the avionics up with the INS aligned; *Cold & dark* shuts everything down.

The Ready presets take off the gear pins and covers, but not the wheel chocks or the pogo pins.

- Battery power alone is enough to run every display and radio. The generators (or ground power) are only needed to keep it that way.

INS Alignment

- From Cold and Dark the INS must be aligned before you get attitude on the PFD and navigation. A full alignment takes 22 minutes, a limited one 5 minutes.
- The alignment time can be shortened in the U-2 EFB (Settings tab, **INS alignment time**): Full / Short (3 min) / Instant.
- Do not move the aircraft during the alignment.

MFDs show "DISPLAY BUS OR AVP FAILURE"

- This is normal while the AVP is off or starting. Each display first runs its own 9-second power-on test when it gets power, then shows this message until the AVP is up: 7 seconds after you switch it on with the EFB option **Avionics startup time** on *Fast* (the default), 2 minutes on *Realistic*. After it has started, set the altimeter once to clear the red ALT box.

- Before the message, each MFD runs its own 9-second power-on test every time its knob goes from OFF to NIGHT or DAY, and when its power comes back after more than 5 seconds. An MFD without power stays dark.

Landing Gear Warning

- The gear warning comes on whenever the gear is up and you are in the landing configuration - flaps at 20° or more - or on the ground. Lower the gear before you extend the flaps past 15°.

Radios are VHF

- The simulator's COM radios are VHF (118.000 - 136.990 MHz). COM 1 and COM 2 are kept in 8.33 kHz spacing, so the 8.33 kHz channels can be tuned too. The preset lists hold real VHF frequencies: COM 1 for Beale AFB and the US, COM 2 for the deployed bases (Fairford, Akrotiri, Osan, Al Dhafra). Preset 0 on either radio is guard, 121.500.

Pausing the Sim and Sim Rate

- All custom systems (fuel, oxygen, INS, timers) follow simulator time: they stop when you pause and speed up with sim rate.

Related pages: Quick Start Guide · Keybinds Guide · U2 101 - The Basics

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Miltech Simulations U-2

Normal Procedures - Flying the U-2S

The U-2 is easy to fly in the middle of its envelope and hard at both ends: at the top, where the speed band is narrow, and at the bottom, where you land a glider on one wheel. This page is the technique, phase by phase. The checklists tell you *what* to set; this page tells you *how* to fly it. For what the aircraft is like and what to expect, read U2 101 - The Basics first.

Note
Sim values. Performance values are measured in the sim. They may not accurately represent (nor do they intend to accurately represent) the performance of the real aircraft.

Tip
Practise the landing first. Start on the runway, take off, and fly a few patterns before your first long flight. The chase car is on by default (EFB Settings tab).

Before You Fly

- Bind a button to **Toggle water rudder** - that is the yoke SPOILER button for the lift spoilers. Your normal spoiler key or axis only moves the speedbrakes. See Keybinds Guide.
- Use a joystick with a rudder axis or twist grip if you can. On the runway the rudder is your only steering above about 25 kt.
- Know your weight. Takeoff and landing speeds depend on it - the EFB Aircraft tab shows **Gross**, and Specifications and Limitations has the speed tables.

Taxi

On the ground the U-2 rolls on its main wheel and the steerable tailwheel. The two pogos under the wings keep it level. Steer with the rudder pedals.

- **Breakaway:** with the engine running the aircraft stays put at idle. Bring the power up to about 78 % N2 (a little more when heavy) until it moves, then ease it back to what keeps it rolling.
- **Steering:** the tailwheel follows the pedals about half a second late and eases in, so plan your turns ahead. Full pedal holds a 189 ft radius at the main wheel, with the outer wingtip about 240 ft from the centre of the turn. The full turn is there up to about 20 kt and fades to about 1.4° by 25 kt.

With the outside wing tip on the ground the turn comes out wider. Taxi slowly. The EFB option **Taxi steering** on *Easy* takes the delay away and turns down to about 75 ft; above 20 kt it fades out the same way.

- **Brakes:** either pedal brakes the main wheel. There is no differential braking, so you cannot steer with the brakes, and there is no antiskid.
- **Look at the wingtips.** 51 ft of wing each side passes over grass, lights and signs that a fighter would miss.
- Take the wheel chocks off first (EFB Ground tab **Wheel Chocks Off**, or in the walkaround): releasing the parking brake doesn't remove them. Do not move before the INS is in NAV and the SFD attitude is up - moving restarts an unfinished alignment. With the chase car on, the mobile calls "taxi clear" as you start to roll.

Takeoff

Line up on the centreline and stop. This is where the pogo safety pins come out: hold still and, with the chase car on, a pickup pulls up and two technicians walk out, one to each pogo.

Stand still until they have finished and are back at the pickup: the red flags on the pogos are gone and you hear "ground crew clear". The parking brake is not needed for this. If you move off early they stop, and the pins they have not finished stay in.

1. **Run up.** Hold the brakes, throttle to 85 % N2, check N2, EGT and fuel flow and that no master caution is lit.
2. **Release and go.** Brakes off, throttle full. Hold the yoke neutral in pitch. Keep straight with the rudder - the tailwheel steering fades out between about 20 and 25 kt.
3. **Pogos.** Between 60 and 88 KIAS each pogo falls away by itself, one after the other. From that moment you balance on the main wheel: **keep the wings level with the aileron**.They go by airspeed alone - rocking the wings does nothing. With the pogo pins still fitted (no runway crew, or the chase car off) they stay on for the whole flight, unless hard wing rocking in the air snaps them off: four to seven hard roll reversals each.
4. **Liftoff.** Hold the slight nose-up two-point attitude - a little back pressure keeps the tailwheel on the runway - and let the aircraft fly off. Liftoff comes between about 80 and 110 KIAS, depending on weight: about 83 KIAS after about 490 ft at 22,500 lb, and about 103 KIAS after about 1,230 ft at 34,500 lb.
5. **Climb out.** Gear up. Raise the nose smoothly to hold 160 KIAS.The climb is very steep at full throttle - expect about 20° nose up and about 6,000 ft/min when heavy, about 30° and about 9,000 ft/min when light. Keep below 180 KIAS: the AIRSPEED lamp comes on there with the wing faired.

Climb

Hold 160 KIAS until the Mach reaches .715, at about 52,000 ft, then hold M .715. Start at full throttle. From about 45,000 ft watch the EGT and use the vernier to hold **650 - 725 °C**: that is climb power, about 93 - 95 % N1 and 98 - 99 % N2.

At full throttle above about 55,000 ft the EGT runs up to 840 °C, where the engine control holds it in PRI, just under EGT HIGH at 842 °C; in SEC nothing holds it.

- **Turbulence low down:** GUST CONTROL UP unloads the wing. The red line rises to 241 KIAS below 43,000 ft and AIRSPEED HIGH to 230. In heavy turbulence fly 120 - 130 KIAS. Back to FAIRED in smooth air, at 150 KIAS or less, and expect a pitch change. See Gust Control.
- **Autopilot:** once the aircraft is stable, engage the AFCS. Basic mode holds your pitch attitude; above 52,000 ft press MACH at .715 and the AFCS pitches to hold it. ALT and MACH cannot be on together. See AFCS System.
- Run the checks at 18,000 ft (SPOILER switch to ARM, altimeters 29.92) and at 52,000 ft - Takeoff and Climb checklists.
- The climb rate falls from thousands of feet per minute low down to a few hundred at about 59,500 - 73,000 ft, depending on weight. That is the start of the cruise climb - see High Altitude and the Cruise Climb.
- **Heavy controls:** the elevator and ailerons get heavier with speed. At about 155 KIAS the ailerons give a little under 40 % of their low-speed response and the elevator a little under half; at about 195 KIAS the ailerons about a quarter and the elevator under a fifth; near 240 KIAS both are nearly locked.

Full yoke rolls about 20°/s on a flaps-35 approach, about 16°/s at 160 KIAS and about 10°/s at 210 KIAS with GUST CONTROL UP. At high speed the push you need to hold her hardly grows with speed: faired at 180 KIAS,

full nose-down trim leaves a light push; with GUST CONTROL UP the stabilizer trims her all the way to the 241 KIAS red line, with at most a light push close to it. Above about 120 KIAS this help follows the speed only once it has moved about 2.5 kt, then eases in, so after a speed change a light push or pull can stay: trim it out.

Close to the red line the yoke's reach is cut as well: from about 12 kt below the IAS red line the roll travel closes to 30 %, so the roll spoilers stay down, and near the Mach red line both axes close to 65 %. On the approach and at altitude they are light again.

- **Oil quantity:** the reading swings in the climb and descent while the oil itself stays the same: down to about 8.5 qt at 45,000 ft, and back to about 12 at 70,000 ft or in level flight. See Specifications and Limitations.

High-Altitude Handling

Up high you fly M .715 with the autopilot in MACH and let the aircraft climb as the fuel burns. At the top of the cruise climb the usable speed band is about 20 kt wide: the Mach buffet and the red line about 5 - 6 kt above you, the stall 8 - 14 kt below.

Small, slow inputs, 15° of bank, gust control FAIRED, and up here any AOA tone is a stall warning. The technique and the margins are in High Altitude and the Cruise Climb.

Descent

The U-2 is clean and slippery. To come down you put out everything it has and pull the throttle to idle. High up the engine holds a flight idle of about 75 % N1 and 85 % N2, easing to about 69 % and 81 % at 70,000 ft so the aircraft can slow down up there.

1. **Configure.** Gear down, throttle idle, speedbrakes OUT (hold the throttle SPEED BRAKE switch - about 5 seconds), SPOILER switch ARM and landing spoilers LET DN, gust control UP before you pass 180 KIAS.The lift spoilers come up and stay up. Above 105 KIAS the airflow pushes them partly down, so their drag grows as you slow. One wing's give a little more than the other's: a slow roll while they are up at speed may be that, so check with them in before you trim.
2. **Speeds.** M .715 down to 53,000 ft, then 160 KIAS. In smooth air 170 - 180 KIAS with gust control UP, never into the red bar. In rough air 160 KIAS at most, 120 - 130 in heavy turbulence.
3. **Expect** about 1,700 - 2,500 ft/min and about 150 NM from 65,000 ft to the pattern.
4. **On the way down:** windshield anti-fog ON before the canopy fogs, altimeters - PFD and SFD separately - to the local setting at 18,000 ft, oxygen stays ON. See the Descent and Approach checklists.

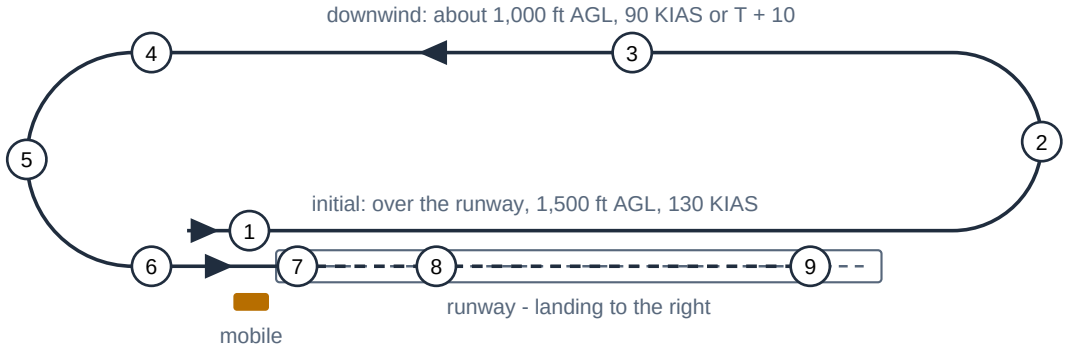
Approach

Before you enter the pattern, clean up and slow down:

- Landing spoilers to LANDING - the lift spoilers go down; the SPOILER switch stays in ARM.
- Gust control FAIRED at 150 KIAS or less: the flaps come back to 0° and the ailerons down by themselves, and the nose goes down. The flap lever does nothing while gust control is UP.
- Work out your T-speed from the fuel you really have: 70 KIAS + 1 kt per 100 gal + 1 kt per 650 lb of zero fuel weight above 18,700 lb.
- Check the fuel balance with the autopilot off: the aileron you need to hold the wings level points to the heavy wing. Fix it now, not on short final.

Fly the standard 360° overhead pattern. The heights and speeds are targets, not limits.

360° OVERHEAD PATTERN - SEEN FROM ABOVE



The numbers follow the LANDING PATTERN checklist. Keep the bank to 30° at most - the AOA rises with the bank.

1. **Initial approach** - over the runway at about 1,500 ft AGL and 130 KIAS.
2. **Turn to downwind** near the far end of the runway: descending, 20 - 30° of bank, speed held with the throttle. Flaps 20 - 35° (35 recommended) below 130 KIAS, then 90 KIAS or T + 10. The flaps pitch the nose down as they run: trim nose up, and with flaps 35 expect to hold some back pressure even at full nose-up trim. AOA about .64: indexer yellow and green, turning green as you slow towards T-speed (green alone from .65).
3. **Downwind** at about 1,000 ft AGL. Gear down, speedbrakes out. Power for a gentle descent at the same speed. BEFORE LANDING checklist.
4. **Turn to final** at about 700 ft AGL, 20 - 30° of bank, coordinated.
5. **90° point** at about 500 ft AGL, still 90 KIAS or T + 10.
6. **Roll out** on the centreline at about 250 ft AGL, on speed. With the gear down and the flaps out, the mobile joins behind the threshold below 1,500 ft.
7. **Threshold** at T-speed, 10 ft at most, throttle idle. AOA about .80: indexer green and red, and the approach beeps turn into the steady 500 Hz flare tone.
8. **Touchdown** on the main wheel and tailwheel together, then the SPOILER button - see below.
9. **Stop** straight ahead on the runway and hold the brakes. The crew fits the pogos.

The Two-Point Landing

The U-2 lands on its main wheel and tailwheel at the same moment, in the same slightly nose-up attitude it sits in on the ground. You fly it down to a few feet, then hold it off and let it settle as the speed bleeds away.

1. **Cross the threshold low and on speed:** T-speed, 10 ft or less, throttle idle. Every knot and every foot too much becomes a long float - the ground effect under this wing is strong.
2. **Hold it off.** As the wing comes into ground effect, keep it a few feet up with gentle back pressure. Raise the nose slowly towards the two-point attitude while the speed decays. Keep the wings level and the nose on the centreline with the rudder.The mobile calls your height: "ten... five... two... one", and "left rudder" or "right rudder" if you drift off the centreline.
3. **Listen to the tones.** At T-speed the approach beeps turn into the steady flare tone. It turns into fast high beeps, the touchdown tone, about 4 kt below T, and the stall tone (1450 Hz) comes about 7 kt below T. That is where the wheels should touch.

The wing itself stalls under a knot later: about 67 KIAS at 22,000 lb and 70 at 24,000 with flaps 35. Right over the runway the ground effect lets her fly about 7 - 9 kt slower, so she may float on in the stall tone: hold her

off until she settles.

4. **Touch down on both wheels together.** Do not drive it on with speed to spare: the main wheel is ahead of the centre of gravity, so a main-wheel-first touchdown can pitch the nose up and lift you off again. Above 750 ft/min the gear is damaged (with crash damage on). Above about 500 ft/min (8.3 ft/s) at 24,300 lb or less, and less when heavier, the cyan HARD LANDING advisory shows the sink rate of the touchdown.
5. **SPOILER button at touchdown.** The lift spoilers kill the lift and keep the aircraft on the runway. Hold the button, or click it to latch them up. Nothing deploys by itself. See Speedbrakes and Lift Spoilers.

Note
Heavy? Above 24,300 lb use the heavy-weight technique: a low sink rate and no full-stall touchdown - fly it onto the runway. The T-speed table is in Specifications and Limitations.

Rollout: Wings Level to a Stop

Once you are down, the landing is not over. The U-2 now balances on one wheel, and the wing wants to fall to one side.

- **Fly the wings** with the aileron all the way down the runway. Left neutral, a wing goes down in a few seconds. Put in aileron against the low wing early - it gets less effective as you slow.
- **Keep straight with the rudder.** The tailwheel only takes over below about 25 kt (full turn below about 20 kt), so go easy on the pedals as you slow down. Keep it firmly on the runway.
- **Brakes as needed** - either pedal, main wheel only, no antiskid.
- As you slow, one wingtip skid settles onto the runway. That is normal.
- If you taxi on without the pogos, put the yoke fully into each turn to keep the wing up.
- When directional control is good: speedbrakes IN, flaps UP, lift spoilers DOWN (SPOILER button again if you latched them).
- **Stop on the runway** and hold the brakes. The pogo truck's crew fits the pogo under the raised wing, the aircraft is levelled, then they fit the other one. The pogos wait for the crew, however late they are. If you move off, they stop and start again when you next stop.

Crosswind

The simulation has no crosswind limit, but the long wing and the single main wheel make every crosswind hard. Start with light winds.

- **Takeoff:** aileron into the wind and rudder for the centreline - full rudder if needed. Stop any yaw at once. Out of rudder, dip the downwind wing slightly. After the pogos drop the wing is all yours: hold it level against the wind. After liftoff hold the ground track with rudder and a slight bank into the wind.
- **Landing:** bank into the wind and hold the centreline with downwind rudder (wing low). Keep it through the touchdown and the rollout, and use the lift spoilers as needed. Expect the upwind wing to need aileron all the way to the stop.
- Lift spoilers up make the aircraft heavier on its wheel - raise them at touchdown, crosswind or not.

Go-Around

If the approach is not right - too fast, too high over the threshold, drifting - go around early. There is no prize for saving a bad U-2 approach.

1. **Throttle full.** From idle the engine takes about 8 seconds to give half its thrust and about 12 for nearly all of it: go around early.
2. **Clean up the drag:** lift spoilers down (landing spoilers in LANDING, SPOILER button released or clicked again), speedbrakes IN - hold the switch about 5 seconds.
3. **Climb** at the pattern speed, 90 KIAS or T + 10, with the AOA in the green. Keep the gear down if you stay in the pattern: with the gear up and 20° of flap or more you get LANDING GEAR NOT DN.
4. **Flaps:** bring them up in steps as you accelerate, and keep below 130 KIAS while they are out (FLAPS DOWN). Re-enter the pattern at 1,500 ft AGL and 130 KIAS.

After a touchdown (touch-and-go, 24,300 lb at most): slow to 50 KIAS, flaps and lift spoilers in, then full throttle - keeping the wings level all the way, because the pogos are gone. They only come back when you stop.

Related pages: U2 101 - The Basics · Checklists · Angle of Attack (AOA) · Speedbrakes and Lift Spoilers · Chase Car and Ground Support Equipment

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Miltech Simulations U-2

High Altitude and the Cruise Climb

Most of a U-2 flight is spent above 60,000 ft in the cruise climb. Up there the aircraft is light on the controls, slow to answer and close to its limits on both sides of the speed band. This page explains how the cruise climb works, how to get into it, how to fly it with and without the autopilot, what warns you and what to do when something goes wrong. This page describes what the simulation does.

Note
Sim values. Performance values are measured in the sim. They may not accurately represent (nor do they intend to accurately represent) the performance of the real aircraft.

M .715Cruise MachHeld by the autopilot in MACH, at climb power.

~20 ktUsable speed bandBetween the stall and the red line at the top.

+800 ft/hThe climb never stopsThe aircraft rises as it burns fuel.

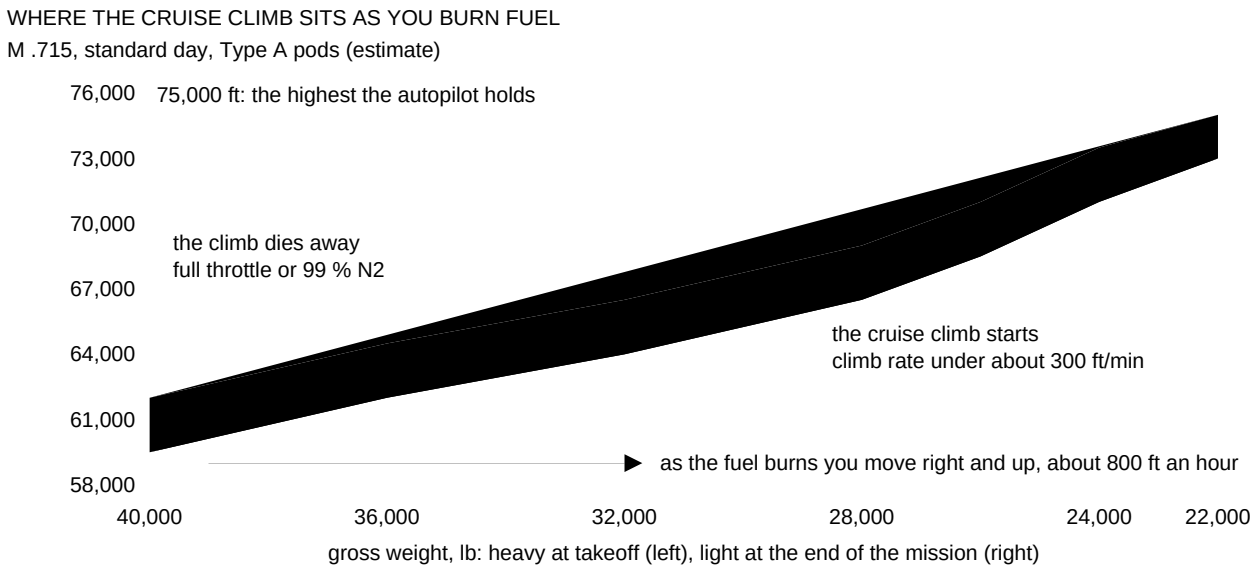
75,000 ftAutopilot ceilingThe highest the autopilot holds.

Note
About the numbers. Standard day, M .715, Type A pods fitted. Speeds are what the PFD shows. Heights, margins and fuel flows are worked out from the flight model and the engine tables. Your weight is on the EFB Aircraft tab (**Gross**).

How the Cruise Climb Works

The U-2 does not level off at a cruising altitude. You hold M .715 and climb power and let the aircraft find its own height. At a fixed Mach the engine's thrust and the airframe's drag both shrink as the air thins, so for each weight there is one height where the thrust just covers the drag and the climb dies away.

Burn fuel and that height moves up. Up there the engine burns roughly 1,000 - 1,450 lb of fuel an hour, and the aircraft gains about 750 - 850 ft in that hour. With the autopilot in MACH this happens by itself.



With the autopilot in MACH the aircraft stays in the blue band and creeps up as it burns fuel. At 94 % N2 (650 °C) every line is about 1,800 ft lower; a warm day puts them lower too.

Full throttle, or 99 % N2 on the vernier. At 94 % N2 every line is about 1,800 ft lower; a warm day puts them lower too. A heavy aircraft starts its cruise climb at about 60,000 ft and works its way up through the flight: from a 40,000 lb takeoff it reaches 70,000 ft only late in a long mission.

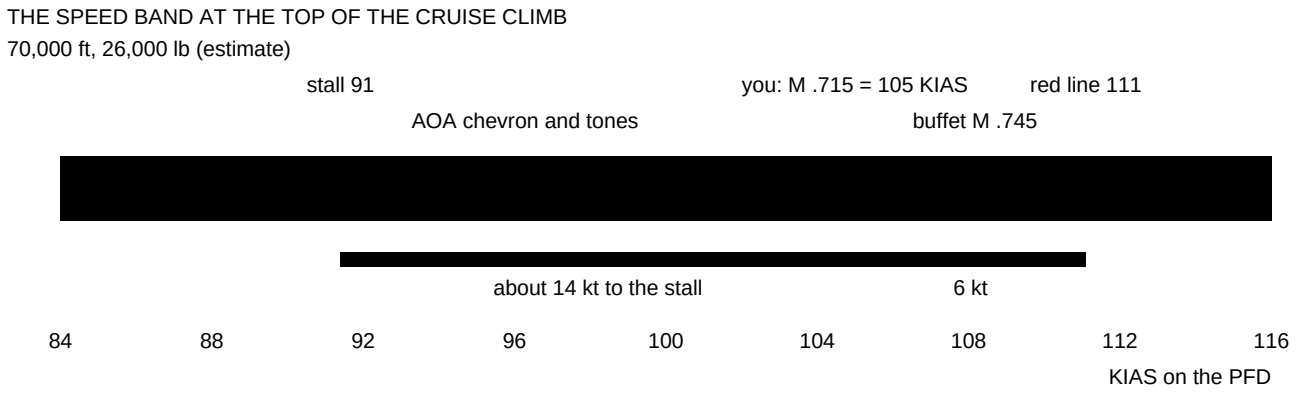
Getting There

1. **Climb at 160 KIAS.** Full throttle from brake release. From about 45,000 ft set climb power with the vernier: EGT 650 - 725 °C, 94 - 99 % N2.
2. **At about 52,000 ft change to Mach.** The Mach reaches .715 there: hold it from now on and let the needle fall by itself, to about 133 KIAS at 60,000 ft, 118 at 65,000 and 105 at 70,000. Run the 52,000 FT CLIMB CHECK.
3. **Engage MACH.** With the aircraft steady at M .715, press MACH on the AFCS panel (AFCS engaged first). MACH needs valid air data: with an IAS or ALT flag it drops to pitch hold. In rough air, wait for smooth air before you engage it.
4. **Let the climb rate die away.** From thousands of feet per minute at 50,000 ft it falls to a few hundred where your cruise climb starts - from about 59,500 ft heavy to about 71,000 ft at 24,000 lb. Nothing is wrong: that is the cruise climb.
5. **Set up for the long haul.** GUST CONTROL FAIRED, the sideslip centred with the YAW BAL knob, the ROLL sync bar centred (balance the fuel if it is not), and the CRUISE CLIMB checklist.

The Speed Band at the Top

At the top of the cruise climb the whole usable speed range is about 20 kt wide. Above you are the Mach buffet and the red line, about 5 and 6 kt away, at every weight. The stall below you is about 12 - 14 kt away when you are heavy and about 8 kt when you are light.

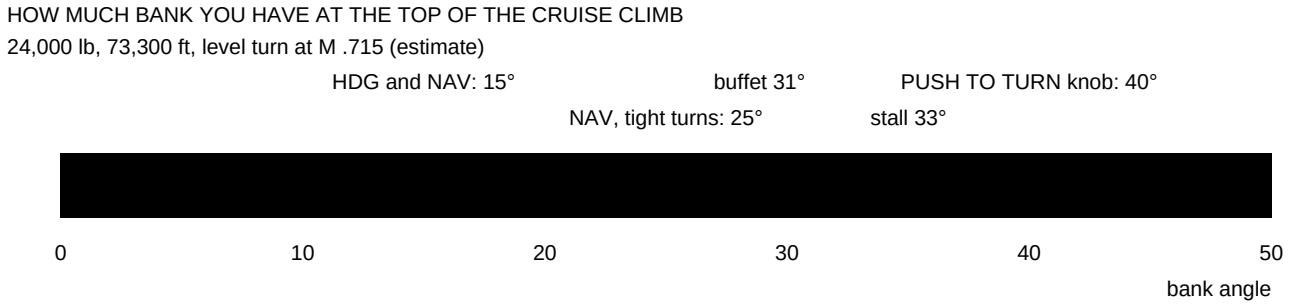
At the same weight that lower gap shrinks by about 3 kt for every 1,000 ft higher, so forcing the aircraft above its top, in a zoom or by slowing down, eats into it fast. Wait for the fuel to burn off.



Near the top of the cruise climb for this weight. Heavier, the stall gap is a little wider; lighter, it narrows to about 8 kt. The gap above you stays about 6 kt at every weight.

Turning up High

Every degree of bank asks the wing for more lift, and at the top of the climb it has little to spare. A level turn loads the wing about 4 % more at 15°, 10 % at 25° and 15 % at 30°, as if the aircraft were that much heavier.



A level turn asks the wing for more lift: about 4 % more at 15°, 10 % at 25° and 15 % at 30°. The PUSH TO TURN knob can bank you past the stall up here. A couple of thousand feet below your top there are a few degrees more on each line.

- **The autopilot keeps you clear.** HDG and NAV turn at 15°. NAV goes up to 25° only in a turn forced tighter between close destination points, and comes back to 15° as you near the stall.
- **Leave the PUSH TO TURN knob alone at the top.** It banks to 40°, past the buffet and the stall up here.
- **By hand, 15 - 20°, 25° at most.** A couple of thousand feet below your top you have a few degrees more.
- **Turns are wide.** At about 410 kt true airspeed, 15° of bank gives a radius of about 9 NM, and a U-turn takes about 4 minutes. At 25° it is about 5 NM and 2½ minutes. Each destination point's turn radius sets how wide NAV turns - see Navigation System.

Flying It with the Autopilot

MACH hold is the cruise climb: the autopilot pitches to hold the Mach, and the aircraft climbs as it gets lighter. See AFCS System.

- **Slow on purpose.** Above 60,000 ft the Mach wanders a few thousandths and corrections take minutes. A .010 change on PITCH MACH takes about 3 minutes. Do not chase it by hand.
- **Throttle is yours.** The autopilot does not move it.
- **Stall margin.** Near the stall, MACH lets the speed rise and ALT gives up height.
- **Trim.** With PITCH TRIM in AUTO the autopilot trims. At disconnect the trim runs back slowly, so expect a slow pitch change.
- **Knobs at 5.** If it hunts in rough air, set MACH/ALT towards 3 and PITCH RATE towards 7.
- **↔ Hunting below 60,000 ft:** switch MACH off and engage it again higher.
- **ALT hold** is for a level leg below your top (for example 45,000 ft), not the cruise climb. Do not use it heavy or near the stall.
- **Trips.** Large pitch, bank (over 45°) or yaw rates switch an axis off. Fly by hand, then cycle each tripped axis switch OFF and ON.

Flying It by Hand

- **Fly the attitude, then wait.** Change pitch by half a degree and give the Mach 10 - 20 seconds. Keep making small corrections.
- **Trim in blips.** A short blip is a lot.
- **Keep the yoke inside 38°.** Past that, a roll spoiler comes up on the low wing.

- **Keep the sideslip centred** with the rudder or YAW BAL.

Balance, Trim and the Long Haul

- **Heavy wing:** the ROLL sync bar beside the SFD moves off centre. Cross-transfer fuel until it is centred - CRUISE TRIM AND BALANCE. Do not use aileron trim up here.
- **Bank that stays:** ROLL off, balance the fuel, ROLL on again.
- **Once an hour:** check fuel (SYS → CNSUM and PERF), balance, N2, EGT, oxygen and cabin altitude (about 29,000 ft is normal).
- **Plan the end early:** you need about 150 NM to come down.

Turbulence up High

- **Light:** no problem for the autopilot.
- **Keep gust control FAIRED.** Gust UP narrows the speed band at the top. It is for rough air lower down.

Leaving the Cruise Climb

The first part of the way down is the slowest: up here idle is still a lot of thrust and the low indicated speed takes the bite out of the drag devices. Put everything out together.

- **Start about 150 NM out.** About 2.4 NM for every 1,000 ft, more with a tailwind. With everything out it takes about 20 minutes and 110 NM from 72,000 ft to 20,000 ft.
- **Gear down first** (it has no speed limit), throttle idle, speedbrakes OUT, SPOILER switch ARM with landing spoilers LET DN. The lift spoilers do the most up here. Gust control UP before you pass 180 KIAS.
- **M .715 down to 53,000 ft, then 160 KIAS.** The needle climbs back as you come down.
- The full descent is in Flying the U-2S and the Descent and Approach checklists.

Related pages: Cruise · AFCS System (Autopilot) · Specifications and Limitations

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Miltech Simulations U-2

Keybinds Guide

Every U-2S function you can bind in MSFS, grouped by system. Several U-2S functions have no MSFS control of their own, so the aircraft borrows controls it does not otherwise need (a water rudder, cowl flaps, mixtures 3 and 4, condition levers): the names in the binding column are the ones to search for.

Note
Clickable in Cockpit column
There is a control in the cockpit: the keybind is optional.
There is no control in the cockpit: a keybind or axis is the only way to use it.
To bind: in MSFS open **Settings**, then **Controls**, search for the name in the binding column and assign a key, button or axis to it.

Primary Flight Controls

Function	MSFS Axis and Key Bindings	Clickable in Cockpit
Elevator	ELEVATOR AXIS	
Ailerons	AILERONS AXIS	
Rudder	RUDDER AXIS You may need the split rudder axes, depending on your hardware (RUDDER AXIS LEFT and RUDDER AXIS RIGHT).	
Throttle	THROTTLE AXIS IDLE to FULL.	
Wheel Brakes	BRAKES or LEFT BRAKE AXIS or RIGHT BRAKE AXIS Either pedal brakes the single main wheel: there is no differential braking.	
Parking Brake	TOGGLE PARKING BRAKE or SET PARKING BRAKE Works normally, except with the EFB option **Cockpit handle** on *Stall strip*: there is no parking brake then, and the keys do nothing. The wheel chocks are on the EFB Ground tab.	
Flaps	INCREASE FLAPS or DECREASE FLAPS or FLAPS AXIS Faired to 35° in 5° steps.	

Trims

Function	MSFS Key Bindings	Clickable in Cockpit
Pitch Trim	ELEVATOR TRIM UP and ELEVATOR TRIM DOWN	
Pitch Trim Wheel	ELEVATOR TRIM AXIS	

Function	MSFS Key Bindings	Clickable in Cockpit
Aileron Trim	AILERON TRIM LEFT and AILERON TRIM RIGHT or AILERON TRIM AXIS	

Lift Spoilers and Speedbrakes

Function	MSFS Key Bindings	Clickable in Cockpit
Lift Spoilers (yoke SPOILER button)	TOGGLE WATER RUDDER Each press is one click: a click latches the lift spoilers up, the next one releases them. Bound on both press and release, it works as a hold button. Needs the SPOILER switch in ARM or EMER and LANDING / LET DN in LANDING.	
Speedbrakes	TOGGLE SPOILERS or EXTEND SPOILERS or RETRACT SPOILERS	

Engine

Function	MSFS Key Bindings	Clickable in Cockpit
Throttle OFF / IDLE	INCREASE COWL FLAP 4 Moves the throttle between OFF (fuel cutoff) and IDLE. Into OFF only with the throttle below 10 %.	
Airstart	TOGGLE STARTER 1 or STARTER 1 (HELD) or TOGGLE ALL STARTERS	
Engine Autostart	ENGINE AUTO START	
Engine Auto Shutdown	ENGINE AUTO SHUTDOWN	

Landing Gear

Function	MSFS Key Bindings	Clickable in Cockpit
Landing Gear	LANDING GEAR UP or LANDING GEAR DOWN or TOGGLE LANDING GEAR or SET LANDING GEAR	
Manual Gear Release	TOGGLE EMERGENCY GEAR HANDLE	

AFCS (Autopilot)

Function	MSFS Key Bindings	Clickable in Cockpit
AFCS Engage / Disconnect	TOGGLE AUTOPILOT MASTER or AUTOPILOT ON or AUTOPILOT OFF	

Function	MSFS Key Bindings	Clickable in Cockpit
Altitude Hold	TOGGLE ALTITUDE HOLD AFCS ALT mode, with the AFCS engaged and PITCH on: holds the altitude at the moment of the press.	
Heading	INCREASE HEADING BUG or DECREASE HEADING BUG or SET HEADING BUG Set the PFD heading marker, the same as L3 HDG on the PFD; HDG mode follows it.	
Course	INCREASE VOR 1 OBS or DECREASE VOR 1 OBS or INCREASE TACAN 1 OBS or DECREASE TACAN 1 OBS	
Altitude Select	INCREASE AUTOPILOT REFERENCE ALTITUDE or DECREASE AUTOPILOT REFERENCE ALTITUDE Set the PFD altitude bug. With ALT holding, the AFCS also goes to the new altitude at once, and a step counts from the altitude it is holding, not from the bug.	
Airspeed Bug	INCREASE AUTOPILOT REFERENCE AIRSPEED or DECREASE AUTOPILOT REFERENCE AIRSPEED	
Mach Hold Target	INCREASE AUTOPILOT REFERENCE MACH or DECREASE AUTOPILOT REFERENCE MACH With MACH engaged they change the Mach it holds, .001 a step, like the PITCH/MACH wheel. With MACH off they do nothing.	

Electrical, Lights and Radios

Function	MSFS Key Bindings	Clickable in Cockpit
Battery	TOGGLE MASTER BATTERY or MASTER BATTERY ON or MASTER BATTERY OFF Moves the cockpit BATTERY switch.	
Generators	TOGGLE ALTERNATOR 1 Moves the cockpit generator selector.	
Landing Light	TOGGLE LANDING LIGHTS Moves the cockpit switch. The light only comes on with the gear down.	
Navigation Lights	TOGGLE NAV LIGHTS Moves the cockpit NAV switch.	
Transponder	SET TRANSPONDER CODE or TRANSPONDER IDENT	
Altimeter Setting	INCREASE ALTIMETER or DECREASE ALTIMETER	

Camera and Sensors

Function	MSFS Key Bindings	Clickable in Cockpit
Camera Zoom In	INCREASE MIXTURE 3 MFD camera zoom in, in 1× steps up to 32×; above 32× it steps through 48×, 64× and 73× (90× in SWIR and MWIR). The picture stops at the zoom the distance to the ground allows. With the OBC it goes up to 15×.	
Camera Zoom Out	DECREASE MIXTURE 3 Zoom out, 1× a step; below 1× it halves, down to 0.5×.	
Camera Zoom Reset	DECREASE MIXTURE 4 Camera zoom back to 1×.	
Camera Capture	INCREASE MIXTURE 4	
Viewsight Hand Control Fore / Aft	INCREASE CONDITION LEVER 1 or DECREASE CONDITION LEVER 1 or CONDITION LEVER 1 AXIS The lever on the Mark IV panel: aims the SYERS-2A forward / aft, or moves the radar cursor in range. The OBC only looks left and right. The axis is a rate control: the lever holds where you let go. Each input is scaled by the zoom, so a move covers the same part of the picture at any zoom. See Mark IV Camera Panel.	
Viewsight Hand Control Left / Right	INCREASE CONDITION LEVER 2 or DECREASE CONDITION LEVER 2 or CONDITION LEVER 2 AXIS Aims the camera right / left, or moves the radar cursor in bearing.	
Viewsight Centre	SET CONDITION LEVER Camera straight down; radar cursor ahead at half range.	
Targeting Point Designate	CONDITION LEVER HIGH IDLE Marks the point the sensor is aimed at as a new targeting point, in the first free slot of ten. See Targeting Points.	

Related pages: Speedbrakes and Lift Spoilers · AFCS System (Autopilot) · Important Need-to-Knows · Quick Start Guide

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Miltech Simulations U-2

Quick Answers

The fastest way to do the everyday things. Each answer gives the easiest route in the cockpit; the linked page explains the alternatives and the details. Key names are the legends you see on the displays.

Navigation

How do I go direct to a destination point?

1. On any MFD press B1 FLT, T2 MAP.
2. Press L2 DS. Turn the **right** rocker until the DP number you want shows - the cyan line on the map is the track you will fly.
3. Press R1 ENT. The aircraft turns towards it at once and the route continues from that DP.

Also: MFD NAV → DPS, L3 DS, pick the DP with INC/DEC, R1 YES. Or the UFCD HOM page: box the TO number on the F/T line, type the DP number, ENT. See Navigation System.

How do I load a flight plan from SimBrief?

1. Plan the flight in **SimBrief**. In the U-2 EFB, **Flight plan** tab, enter your SimBrief Pilot ID once.
2. On an MFD press B6 STAT, T5 LOAD. Select ST2 - SIMBRIEF and press R6 LOAD.
3. The route goes into the ACTIVE file and the map shows it. Check it on NAV → DPS.

Or send it from the EFB: **Flight plan** tab, *Route*, **Send route to aircraft**. It arrives as an UPLD file: accept it on the MFD or the BCDU. If the EFB option *Activate loaded flight plans* is off, the plan goes to a store file: select it on DPS and press LOAD.

How do I load a flight plan from INSPlanner?

1. Open insplanner.miltechsimulations.com. Click the map to add the waypoints (at least 2), then **Send to Aircraft**. Write down the 6-digit ID.
2. On an MFD press B6 STAT, T5 LOAD. Select ST3 - INSPLANNER and press R5 DTAIL.
3. Press L2 PLAN, type the 6 digits on the UFCD keypad, then L3 FTCH. The points show in the list.
4. Press R6 LOAD. Check the route on NAV → DPS.

Use ST4 - INSPLANNER 2 for a second plan. Zones, TP boxes and charts are in INSPlanner.

How do I send a flight plan from the MSFS EFB?

1. Make the route in the MSFS 2024 EFB flight planning app and send it to the avionics.
2. The U-2 puts it in ST1 - EFB by itself. With the EFB option *Activate loaded flight plans* on (the default), it becomes the ACTIVE file at once.
3. Check it on NAV → DPS. If it is not active: B6 STAT, T5 LOAD, select ST1 - EFB and press R6 LOAD.

Each fix becomes a DP (up to 99, names to 8 characters). Legs with no fix, such as a climb to an altitude, are not loaded.

How do I enter a destination point by hand?

1. UFCD DP page. LS1, type the DP number (1-99), ENT.
2. LS3: latitude as six digits DDMMmm (39° 08.16' = 390816), ENT. LS3 again and 2 for N or 8 for S.
3. LS4: longitude as seven digits DDDMMmm, ENT. LS4 again and 4 for W or 6 for E.
4. Optional: LS2 and turn the knob for the name (large knob letters, small knob digits, push for the next character), ENT.

The point appears on the MFD and BCDU immediately. See UFCD.

How do I fly an orbit?

1. Make the file contain the orbit: the start point entered twice - once where the loop begins and again where it ends (same position, same turn radius) - then the exit point, then nothing. Three shipped routes already have one (CROSS US, DEBORAHA, JOANR001: DP 3 = DP 8).
2. Steering mode F/T.
3. UFCD HOM page, box ORB, type the number of laps (2-15), ENT.

ORBIT REJECT = the file has no valid double DP. See Navigation System / Orbits.

How do I overfly the next point instead of cutting the corner?

1. MAP page, L3 OFLY, then L4 YES.
2. Press OFLY again when you want to rejoin the route.

How do I change the map scale or put north up?

Left rocker = scale (10 / 25 / 100 / 200 / 400 NM; 100 when the flight loads). L1 NORTH toggles north-up (green) and track-up (white). All three MFDs share the scale, NORTH and the SMBL options.

How do I find the nearest airfield?

1. UFCD EMER page - 01 is the nearest field in the EMER file, with bearing, range, time and fuel on arrival.
2. To steer to it: LS4 DIR STR, ENT. This makes the EMER file the ACTIVE route; it is refused while the autopilot flies NAV.

The EMER file can be filled from SimBrief airports with the EFB datalink uplink (Flight plan tab, *Airports - EMER file*).

Radios and Transponder

How do I enter a COM frequency?

1. UFCD HOM page. Press LS1 (COM1) or LS2 (COM2) **twice** so the box sits on the frequency.
2. Type the digits - 1245 for 124.500, 127175 for 127.175.
3. ENT. Nothing changes until you press it.

VHF only, 118.000-136.990 on the 8.33 kHz channels (118.005, 118.010, 118.015, 118.025 ...); a frequency that is not a channel flashes and is refused. The previous frequency is kept: with nothing typed, ENT swaps back to it.

How do I set the squawk?

1. IFF switch ON (right console).
2. UFCD IFF page. LS2, four digits (0-7), ENT.
3. Box MSTR: with LS3 and turn the knob to NORM - it powers up in standby.

Ident: the IDENT key. Emergency: knob to EMER, ENT (7700).

How do I tune an ILS?

1. UFCD HOM page. Press LS3 four times (channel → X/Y → mode → ILS).
2. Type the frequency - 1095 for 109.50 - and ENT.
3. On the PFD press L6 ILS as the steering source and set the course with R3 CRS.

Also: MFD COM → CNI, L2 EDIT, L1 once to box the ILS frequency, then INC/DEC through the localizer channels. Only the 40 localizer frequencies from 108.10 to 111.95 are accepted.

How do I tune a TACAN?

1. UFCD HOM page, LS3, type the channel (1-126), ENT. LS3 again toggles X / Y.
2. PFD L5 TAC to steer by it; R3 CRS for the radial (double-press = direct to the station).

Flying

How do I set the altimeter?

PFD R2 BARO, then turn the UFCD knob (or type 2992 ENT on the UFCD - its PAD comes on by itself). R1 while it is open sets standard 29.92. The SFD has its own setting: turn its knob too (push = 29.92). R4 in BARO switches all three MFDs and the SFD to hPa.

How do I set a heading or altitude for the autopilot?

1. PFD L3 HDG and turn the UFCD knob (double-press HDG = present heading). Press HDG on the AFCS panel.
2. Level off at the altitude you want and press ALT on the AFCS panel - it holds the altitude you are at. To move it, turn the PITCH MACH wheel: 100 ft per click. Hold your speed with the throttle.

How do I make the autopilot fly the route?

1. INS in NAV (N or L on the PFD) and a route in the ACTIVE file.
2. PFD L4 NAV as the steering source.
3. AFCS ENGAGE, then NAV on the AFCS panel. The lamp lights when it is tracking.

How do I use the lift spoilers?

1. Once: bind **Toggle water rudder** in MSFS Controls.
2. SPOILER switch ARM, landing-spoiler switch LANDING.
3. Press the bound button at touchdown; press again to retract. For the descent use LET DN instead - they stay up.

Your normal spoiler key only moves the fuselage speedbrakes. See Speedbrakes and Lift Spoilers.

How do I record a fix?

UFCD FIX key. It appears on MFD NAV → FIX at once and as a black X on the map. L2 ADD on the FIX page records one too.

Start-Up

How do I align the INS quickly?

1. EFB, Settings tab, **INS alignment time** = *Instant* (or *Short*).
2. INS switch to LOAD, then ON.
3. MFD NAV → INIT: R1 ALN, R2 YES. When FULL NAV READY shows: R1 ACPT, R2 YES.

How do I connect ground power?

1. Stop off the runway and set the PARKING BRAKE.
2. EFB, Ground tab: the ground power unit (GPU) must be on the stand (*Shown* if it is not). Then Servicing, **Ground power**: *Connect*. The cart drives to its service point; wait until the line reads *Connected*.
3. BATTERY to EXT PWR, then EXTERNAL POWER ON.

The cart comes off line as soon as you release the parking brake or hide it. See Electrical and Avionics Power.

How do I start the engine?

1. Boost pumps ON, throttle OFF (right-click the throttle below 10 %).
2. EFB, Ground tab: the air-start unit (ASU) is brought out by *Attach* if it is hidden; the parking brake must be set. Then Servicing, **Air Supply Unit**: *Attach*, then *Apply* (or press MIC on the yoke or throttle: the crew applies it). The cart drives up and connects the hose; the air comes on once it is connected.
3. At 20 % N2 right-click the throttle to IDLE. The crew removes the air by itself.

Nothing happens without the starting air. Or let the EFB do the whole start, no carts needed: Aircraft tab, **Set up aircraft**, *Ready for takeoff*. See Engine Start.

How do I get the pins and chocks off?

1. **Gear pins:** in the walkaround, stopped on the ground, click the main or tail gear pins once. The EFB **Set up aircraft** *Ready* presets remove them too.
2. **Wheel chocks:** stopped on the ground, use **Wheel Chocks Off** on the EFB Ground tab or click them away in the walkaround; **Wheel Chocks On** there puts them back. They don't follow the parking brake.
3. **Pogo pins:** leave them. Line up on the runway, hold still with the chase car on, and wait for "ground crew clear".

Without the runway crew the pogos stay on for the whole flight. See Takeoff.

How do I skip the long avionics start-ups?

EFB, Settings tab, **Avionics startup time** = *Fast* (the default): AVP 7 s, SFD 10 s, EW self-test 30 s. *Realistic* is 2, 3 and 5 minutes. Or start on the runway - everything is already on, EW CONT in RPT included - or use **Set up aircraft** on the EFB Aircraft tab.

How do I open the canopy?

Set the CANOPY SEAL T-handle OFF (left console), then click the CANOPY LATCH placard on the right sill. On the ground only. Seal ON again before takeoff or the cabin will not pressurize.

Alerts and Sensors

How do I clear an alert?

L7 ACK on any MFD clears the alert line; click the MASTER CAUTION lamp to reset the lamp and tone. The alert itself stays on STAT → ICAW until its cause is gone. To stop a nuisance alert from lighting the Master Caution again, inhibit it on STAT → HIST (INHB).

How do I use the camera or the radar?

1. EFB, Aircraft tab: fit the **ASARS-2** nose for the radar, or for the camera the **SYERS-2A** nose - or the Standard nose with the **OBC** in the Q-bay.
2. Radar: MODE to STBY on the Mark IV panel (right console) starts the warm-up. SYERS-2A: on the Mark IV panel (right console) MK IV MASTER ON and MODE to STBY to boot it. OBC: DRIFTSIGHT and MK IV MASTER ON boot it, then MODE OFF runs its self-test. The boot takes 30 seconds; with the EFB option **Sensor warm-up time** on *Realistic* the radar takes 12 minutes, the SYERS-2A 4 and the OBC 90 seconds.
3. MFD B5 PME, then CAM or RDR. Then MODE 1-5: the radar radiates once airborne, the SYERS-2A opens at once, and the OBC photographs at or above 5,000 ft. L4 TEST runs the radar's or the SYERS-2A's self-test on the ground.

Camera zoom is on the left rocker of the CAM page and on the *Increase / Decrease mixture 3* bindings, the band on L3. Both pages need an internet connection. If a page stays black although the camera is open or the radar sweeps, a VPN or web filter may be blocking the map servers - the EFB Datalink tab's console names the error; see Mission Equipment.

How do I use targeting points?

1. Fit an imaging sensor on the EFB Aircraft tab, and bind **Condition lever high idle** in MSFS Controls.
2. To mark a point: open the camera or get the radar operating, put the crosshair on the target with the hand control and press the binding. The TP goes in the first free slot. The camera and radar SPOT read the object's size; radar SRCH gives a 300 ft square.
3. To load points from a plan: B6 STAT, T5 LOAD, L6 TD - INSPLANNER, type the plan number, R6 LOAD. This replaces the whole list.
4. See them: yellow triangles on the MAP, yellow boxes on the CAM and RDR pictures, the list on NAV → DPS (L1 FILE to TP).
5. Fly there: on that list L3 DS, pick the TP with L1/L2, R1 YES. The aircraft flies straight to it and then keeps turning right until you select something else.

To point a sensor at a TP: CAM or RDR page, R4 DP, R2 to TP, right rocker, R1 ENT. See Targeting Points.

How do I change the nose, pods or antennas?

EFB, Aircraft tab: click the chips on the aircraft drawing, or use the Nose / Superpods / Q-bay rows under it (and Senior Spear with the Senior Ruby pods) and the SPAN switch - on the ground or in flight. The weights go to the payload automatically.

Related pages: Up-Front Control Display (UFCD) · Navigation Pages (NAV)

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Miltech Simulations U-2

Specifications and Limitations

The numbers our U-2S works with: size, weights, engine, speeds and limits. Where a limit has an alert, the alert is named. Where the sim enforces nothing, this page says so.

Note
Sim values. Performance values are measured in the sim. They may not accurately represent (nor do they intend to accurately represent) the performance of the real aircraft.

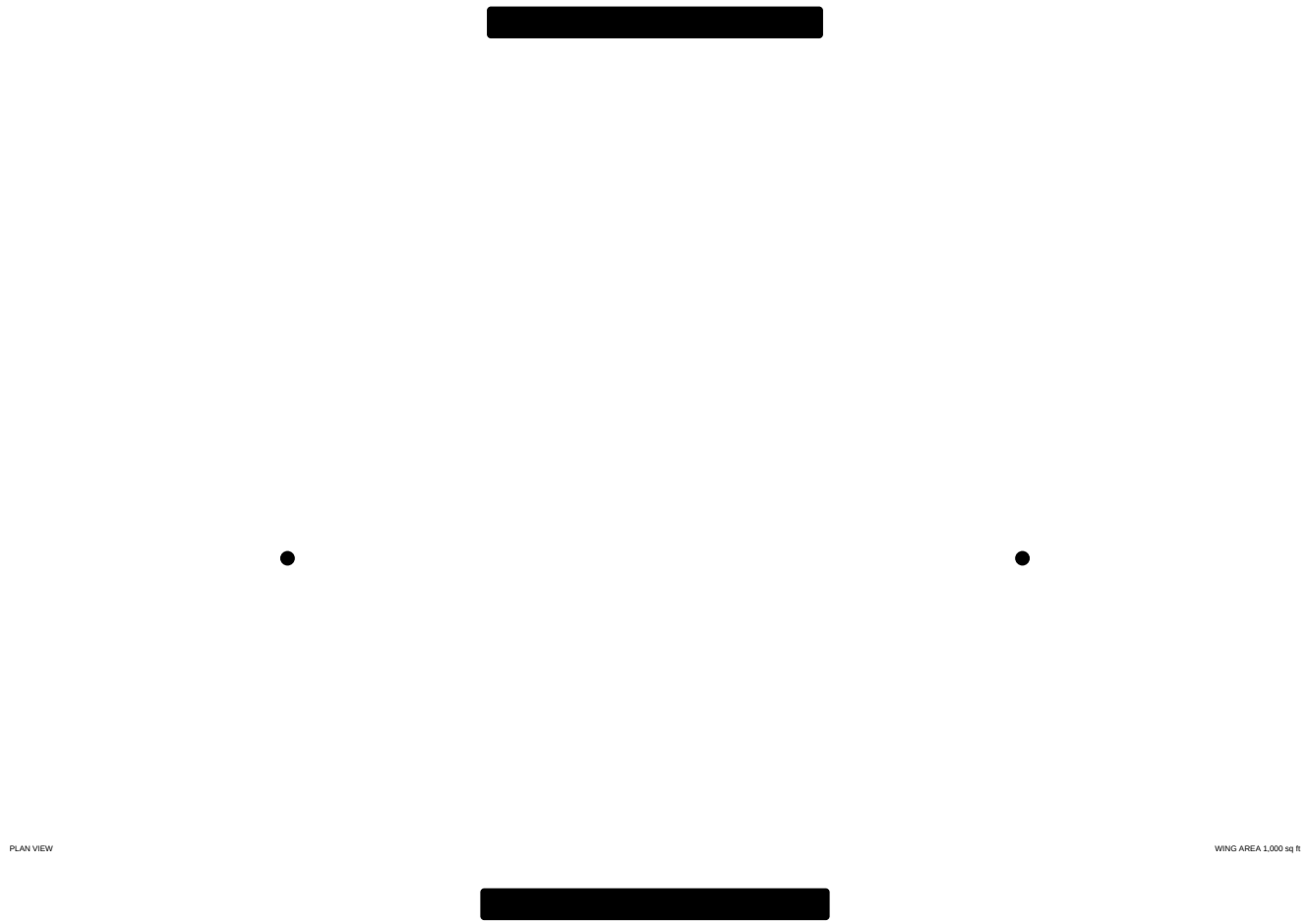
103 ftWingspan

40,000 lbMaximum gross weight

17,000 lbThrust, sea level, full throttle

2,917 galFuel, full tanks

Dimensions





The U-2S in the sim: ASARS-2 nose, Senior Ruby pods and SPAN. Pogo positions in red.

Item	Value
Wingspan	103 ft
Wing area	1,000 sq ft
Length, nose to tail	about 64 ft
Height, on the main wheel, level	about 17 ft
Main wheel to tailwheel	21.7 ft
Pogo wheels, left to right	59 ft
Wingtip skids, from the centerline	51 ft each side
Ground attitude on main wheel and tailwheel	3.6° nose up

Weights

Item	Value
Empty weight	16,230 lb
Pilot with pressure suit	210 lb
Nose, superpods, Q-bay, SPAN, external sensors	see EFB Aircraft tab
Fuel, full tanks	2,917 US gal (about 19,540 lb at 6.7 lb/gal)
Maximum gross weight	40,000 lb
Center of gravity range	17 - 28 % MAC
Landing weight for the normal technique	24,300 lb or less

The aircraft does not stop you loading more than 40,000 lb. The EFB Aircraft tab shows **Gross** against 40,000 lb and warns you above it. Some typical loads:

Fit	Payload	Zero fuel	With full fuel
Standard nose with the OBC camera, Senior Ruby (Type A) pods	3,160 lb	19,390 lb	38,930 lb
ASARS-2 nose, Senior Ruby (Type A) pods	2,810 lb	19,040 lb	38,580 lb
ASARS-2 nose, Standard (Type B) pods, SPAN	3,510 lb	19,740 lb	39,280 lb

Payload includes the pilot and, where fitted, the 1,050 lb OBC in the Q-bay. Each external sensor adds 300 lb (all four are fitted by default); Senior Spear adds 400 lb.

Engine

Item	Value
Engine	GE F118
Rated thrust, sea level, static	about 17,000 lb at full throttle
Ground idle, sea level	about 60 % N2 / 22 % N1
Idle thrust, low down	about 370 lb, held by the engine control up to about 160 KIAS
Flight idle, above about 18,000 ft	about 80 - 85 % N2 / 65 - 75 % N1
Light-off on a ground start	18 % N2 or more (throttle to IDLE at 20 %)
Starter cut-out	50 % N2
Thrust in SEC, full throttle	up to 10 % less than in PRI (no throttle stop)
Airstart (emergency start system)	25,000 ft or lower, 90 KIAS or more (any speed below 10,000 ft), one attempt

The limits below are shown on SYS → PERF in red or yellow, and raise an MFD alert. See System Pages and Warnings and Alerts.

Parameter	Normal	Limit and alert
N1	about 22 % at ground idle, 92 - 96 % at full throttle	Readout red above 100 %. N1 FAN OVERSPEED above 102 %.
N2	about 60 % at ground idle, 96 - 101 % at full throttle	Readout red above 106.3 %. N2 CORE OVERSPEED above 106.3 %, or above 105.8 % for 10 seconds.

Parameter	Normal	Limit and alert
EGT	about 420 °C at ground idle, 760 °C at full throttle on takeoff (830 °C on a day 20 °C above standard), 650 - 725 °C at climb power	Running (N2 above 55 %): red and EGT HIGH from 842 °C. In a start: above 890 °C, or 843 °C for 10 seconds.
Oil pressure	about 22 psi at idle, 50 psi at full power	OIL and ENG OIL PRESS LOW at 10 psi or less (not on the ground below 55 % N2). ENG OIL PRESS HIGH at 75 psi for 10 seconds.
Oil temperature	-	ENG OIL TEMP HIGH at 160 °C, LOW at -40 °C.
Oil quantity	12 qt when full, in level flight. The reading changes in a climb or a descent.	ENG OIL QTY LOW below 8 qt. Read it in level flight.
Hydraulic pressure	about 3,000 psi	HYD below 2,500 psi. HYD PRESS LOW below 2,850 psi on the ground (above 55 % N2) or 2,800 psi in the air, for 5 seconds. HYD PRESS HIGH above 3,250 psi for 5 seconds, or above 3,500.
Fuel pressure	15 - 19 psi, two pumps	FUEL PRESS LOW below 8 psi, FUEL PRESS HIGH above 25.
Sump quantity	about 70 gal (50 on the outboards)	FUEL SUMP and FUEL SUMP LOW at about 38 gal.

In PRI the engine control holds the EGT at 840 °C, just under EGT HIGH; in SEC nothing holds it, and full throttle above about 55,000 ft runs past 842 °C. Hold 650 - 725 °C with the vernier up there.

The MEC cuts the fuel if N2 reaches 110.25 %; bring the throttle below 10 % to clear it. Past a limit you get the alert; the engine is not damaged.

Speed Limits

The U-2's speed limit changes with altitude and with the gust-control setting. The PFD and SFD draw it as a red band, and the speed digits turn red when you pass it. The lower of the airspeed and Mach limits applies.

Altitude	Airspeed limit	Mach limit
Below 30,500 ft	181 KIAS wing faired 241 KIAS gust control UP	M .751
30,500 - 42,999 ft		M .651
43,000 - 49,499 ft	181 KIAS either way	M .751
49,500 ft and above	none	

Alert	Comes on
AIRSPEED and AIRSPEED HIGH	From 180 KIAS wing faired, 230 KIAS gust control UP - at any altitude.
AIRCRAFT OVERSPEED	At or past the red band, airspeed or Mach.
MACH RATE	When, at your present rate of acceleration, you will reach M .75 within 5 seconds.

Alert	Comes on
AIRSPEED DEVIATION / MACH DEVIATION	Only if you set the PFD speed limit monitors (L1 A/S).

Performance Calculator

Stall speeds, takeoff and landing speeds and distances, the cruise ceiling and the fuel for a trip, for your fit and your conditions. It is the calculator of the Datalink portal, on the same aircraft numbers (flight model, engine tables and the EFB fuel model). Your entries are kept in this browser.

Loading the calculator...

Cruise Techniques

The ◇ **Technique** selector on the CONFIG tab sets how the cruise is flown. The fuel, range and cruise altitude figures change with it.

Technique	How it is flown	Result
Long-range cruise	Full throttle climb, then Mach 0.715 at 3,000 ft below the altitude where the climb rate falls to 100 ft/min. The speed stays at least 10 kt above the stall, and the altitude stays at 80,000 ft or lower. As the fuel burns, the aircraft climbs slowly.	The throttle is below full in the cruise. This gives the lowest fuel burn for each NM and the longest range.
Max-altitude cruise	Full throttle all the time. The aircraft climbs until the climb rate falls to 50 ft/min, then holds the altitude. This is the method of the EFB fuel planner.	A higher cruise altitude, with 25 - 35 % more fuel for each NM than the long-range cruise.

Use the max-altitude cruise to get the same figures as the EFB in the aircraft. Use the long-range cruise to plan for the maximum distance. For the technique in flight, see High Altitude and the Cruise Climb.

Altitude limit	Value
Altitude the autopilot can hold	up to 75,000 ft
Flaps	none above 45,000 ft
Airstart	25,000 ft or lower
Cabin pressure differential	3.88 psi (canopy seal ON)

Load Factor

Flaps	Positive	Negative
Up	+4.0 g	-3.2 g
Down	+2.8 g	-2.4 g

Structural limits of the flight model. MSFS applies them only with its aircraft stress damage option on. There is no g warning: watch the PFD G meter. Less than 0.2 g for more than about 1.5 seconds gives AMAD and AMAD OIL PRESS LOW.

Related pages: High Altitude and the Cruise Climb · Fuel System · Engine Start and Cockpit Controls

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Miltech Simulations U-2

Cockpit and Walkaround Interactions

Things you can click in the cockpit and around the aircraft that are not on the EFB: the canopy, the gear pins, the wheel chocks, the walkaround checks and the lighting.

- **Canopy** - click the CANOPY LATCH placard on the right sill. On the ground only, and only with the CANOPY SEAL OFF.
- **Gear pins** - click the main or tail gear pins in the walkaround; one click removes both. The red flags on the pogos cannot be clicked: the runway crew pulls those pins - see Takeoff.
- **Wheel chocks** - click them away here, or use Wheel Chocks Off / On on the Ground tab. They don't follow the parking brake.
- **Walkaround checks** - stopped with the engine off, click an aileron, an elevator or the rudder for a movement check: it swings for about 4 seconds and the tooltip then reads Checked. The flaps and trim tabs have an inspect click. Take the elevator and rudder clips off first; the ailerons need GUST CONTROL FAIRED.



On the ground with everything fitted: chocks, intake and AOA vane covers, exhaust cover and the control-surface clips.

1. **Wheel chocks**
2. **Intake cover (left)**
3. **AOA vane cover (left)**
4. **Exhaust cover**
5. **Elevator clip**

6. **Rudder clip**



The same from behind: exhaust cover, elevator and rudder clips.

1. **AOA vane cover (left)**
2. **Exhaust cover**
3. **Elevator clip**
4. **Rudder clip**

Related pages: Electronic Flight Bag (EFB) · Cockpit Panels · Chase Car and Ground Support Equipment

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Miltech Simulations U-2

Overview - Cockpit

Our rendition of the U-2S cockpit, panel by panel. Every picture on this page is rendered from the aircraft's 3D cockpit model, so each switch, knob and label is exactly where you will find it in the simulator.

Main Instrument Panel



Main instrument panel with the control column removed.

1 **Master Caution** Lights for every new warning or caution; press it to reset. Warnings →

2 **AOA Indexer** Three approach symbols on the glare shield, lit from .55 AOA. AOA →

3 **FIRE / O'HEAT Lamps** Engine fire and overheat warnings. Warnings →

4 **Up-Front Control Display** Radios, transponder, destination points, timers, and the keypad for MFD entries. UFCD →

5 **Center MFD** Multi-Function Display. Any of the three MFDs can show any page. MFDs →

6 **SFD and EW Panel** Standby Flight Display; EW REC / RPT lamps and EW CONT switch; autopilot ROLL / PITCH sync indicators. SFD →

7 **Left MFD** Usually the map or the fuel / engine page. MFDs →

8 **Right MFD** Usually navigation or the sensor pages. MFDs →

9 **Gear Handle and Cabin Air** Landing gear handle, RAM AIR, REFRIG BYPASS, TURBINE BYPASS and the CABIN HEAT knob. Cabin →

10 **Audio Panel** MASTER VOL, the TRANS SEL transmitter selector, CALL / RCD and the COMM CNTL BACKUP switch. UFCD radios →

11 **Lights Panel** Standby AOA gauge, PANEL / UFCD-SFD / INSTRUMENT light knobs and their circuit breakers. AOA →

12 **Warning Panel** Warning and caution lamps, behind the control column. Warnings →

13 **Standby Engine Gauges** N2, EGT and fuel flow, independent of the MFDs. Engine →

14 **Fuel Panel** Boost pumps, sump-tank and cross-transfer, dump switches and the dump / transfer lamps. Fuel →

15 **Electrical Panel** Battery, external power, generators, inverter and TR. Power →

Left Console



Left console seen from above, forward at the top. The side-wall panels are at the left of the picture.

1 **Throttle Quadrant** Throttle with the OFF / IDLE stop and the speed-brake switch on its grip, flap lever, aileron trim, friction and vernier. Engine →

2 **Engine Control Panel** FUEL SHUTOFF and EMERGENCY START SYS (guarded), ENG MODE, GUST CONTROL. Engine →

3 **Oxygen Panel** OXY SYS 1 / 2 switches and the system pressure gauge. Oxygen →

4 **ARC-210 Backup Radio** VHF / UHF control head - the simulator's COM 3. UFCD →

5 **Audio Volume Panel** COMM 1, COMM 2, HF, TACAN, ILS, AOA and THREAT volume knobs. Audio Panels →

6 **Lights and Spoiler Panel** Exterior and cockpit lights, cockpit fan, seat adjust, landing light, SPOILER and LANDING / LET DN, ZEROIZE. Lights → Spoilers →

7 **Left Circuit Breakers** DC essential and emergency circuit breakers (left side wall).

Right Console



Right console seen from above, forward at the top. The side-wall panels are at the right of the picture.

1 **Backup Control Display Unit** INS alignment, destination points and steering - the back-up to the MFDs. BCDU →

2 **PME Power Panel** RECORDER and MSN RCD switches (MSN RCD ON for the EW threat tone); PME-A / B / C and CHBDL have no function. PME →

3 **AFCS Panel** Autopilot power, engage, axis switches, mode buttons, PITCH MACH wheel and PUSH TO TURN. AFCS →

4 **Mark IV Panel** MK IV MASTER and MODE for the camera, the A-D lights and the viewsight hand control. Mark IV →

5 **Avionics Power Panel** MASTER LT / FIRE tests, PITCH TRIM, AFCS sensitivity knobs, UFCD / AVP / SFD / BCDU / INS switches. Power →

6 **IFF and Face Heat** IFF ON / HOLD / OFF and the FACE HEAT knob. Power →

7 **Anti-Fog and Heaters** WINDSHIELD ANTI-FOG, HATCH HTR, TEMP PROBE / PITOT HEAT. Cabin →

8 **Right Circuit Breakers** AC and essential circuit breakers (right side wall).

Related pages: Electrical and Avionics Power · Engine Start and Cockpit Controls · Multi-Function Displays (MFDs) · Up-Front Control Display (UFCD) · Glossary

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Miltech Simulations U-2

Aircraft Displays

The displays and control units in the U-2S cockpit: the three MFDs, the standby flight display, the up-front control display and the backup control display unit.

1 Multi-Function Displays (MFDs)	2 Standby Flight Display (SFD)	3 Up-Front Control Display (UFCD)	4 Backup Control Display Unit (BCDU)
Pages Power Alerts and ACK Editing Values The U-2S is equipped with three identical Multi-Function Displays (MFDs) - left, center and right.	What It Shows Power-Up Controls The Red Max-Speed Band The Standby Flight Display (SFD) is a small self-contained instrument that keeps working when everything else is dark.	Layout Power and Self-Test The Golden Rules of Data Entry The Special Keys HOM - Home Page The Up-Front Control Display (UFCD) is your quick-access panel for radios, transponder, destination points and timers.	Layout Power-Up RT Page (AVP Running) How to Read a Page Entering Data The Backup Control Display Unit (BCDU) is the small green-screen computer with the alphabet keypad.

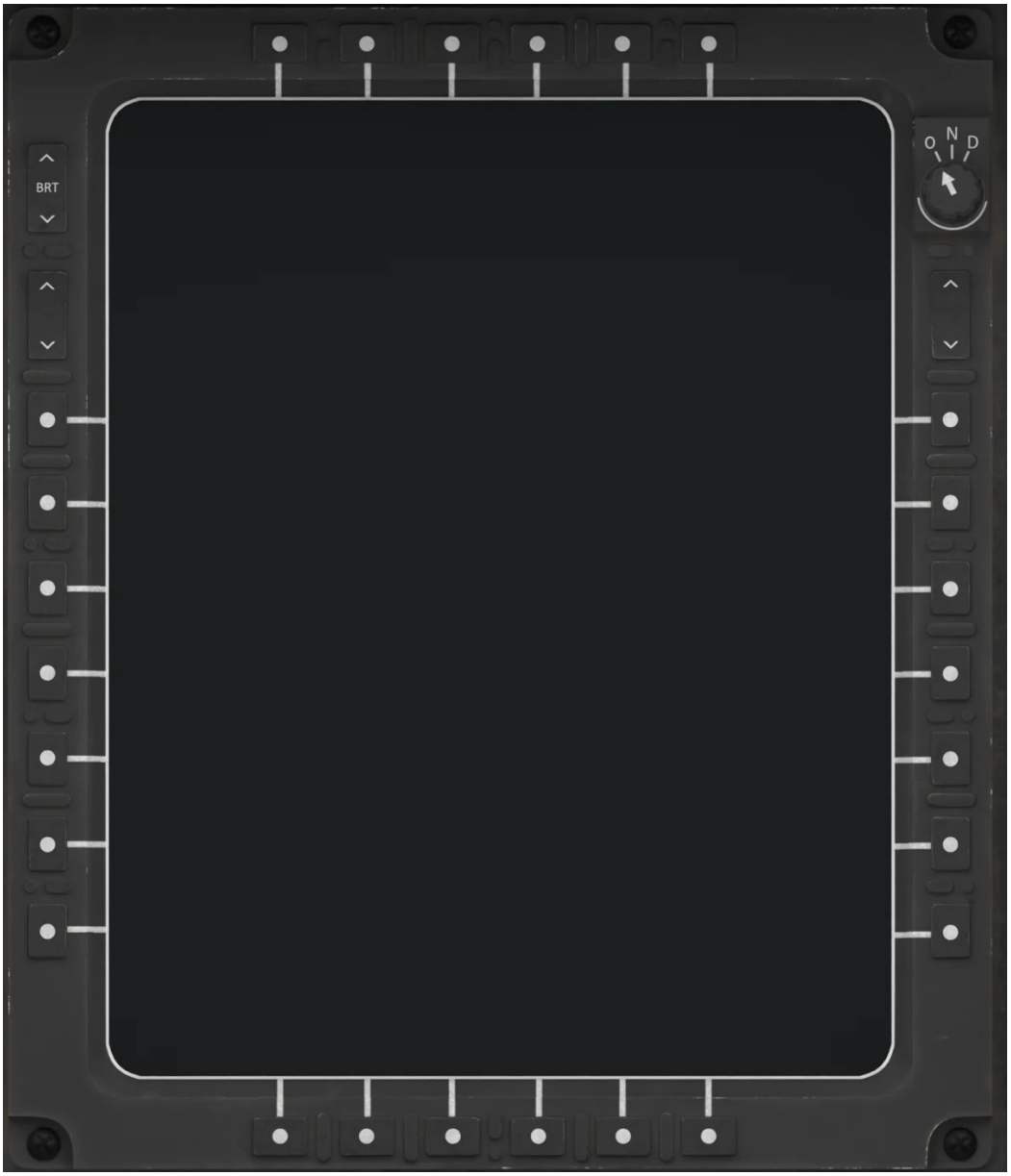
Related pages: Overview - Cockpit · Aircraft Systems · High Altitude and the Cruise Climb

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Miltech Simulations U-2

Multi-Function Displays (MFDs)

The U-2S is equipped with three identical Multi-Function Displays (MFDs) - left, center and right. Each MFD is a portrait LCD surrounded by a bezel of push buttons and rocker switches. Any display can show any page, so you can arrange the cockpit to suit the phase of flight: PFD in the middle, fuel on the left, navigation on the right, for example.



Center MFD, rendered from the cockpit model. All three MFDs are identical.

1. **Top Keys (T1-T6):** Select the sub-page of the current menu. The sub-page names are shown along the top of the screen, the active one in green.
2. **Bottom Keys (B1-B6):** The main menu - FLT COM NAV SYS PME STAT. Always available. The active menu is green.
3. **Left Side Keys (L1-L7):** Soft keys. Their function is the legend drawn next to them on the current page. A gray legend is not available.

4. **Right Side Keys (R1-R7):** Soft keys, same logic.
5. **INC/DEC Rockers (one each side):** Change the selected value, or turn the page on multi-page displays. On most pages both do the same thing; on the MAP page the left rocker is always the map scale and the right rocker serves the selected function.
6. **BRT Rocker:** Screen brightness, 15-100 %. Remembered per display.
7. ◉ **OFF / NIGHT / DAY Knob:** Power knob for this display. OFF blanks the display (keys are dead), NIGHT halves the brightness range, DAY is the normal position. Every turn from OFF to NIGHT or DAY - even a quick flick - runs the display's 9-second power-on test (see Power below).
8. **Alert Line:** The bottom strip of *every* page shows the two most recent alerts, the newest on the left. The rules above and below it take the color of the most serious active alert and disappear when there is none (SYS / CAL draws its own cyan rules in that place). When an alert is showing, L7 becomes ACK.

> Note
> The INC/DEC rocker is deliberately slow (one step per press; held, about two and a half steps a second - on the MAP page it speeds up once you keep holding). For large changes, use the UFCD knobs or keypad - see Up-Front Control Display (UFCD) / Using the UFCD keypad for MFD entries.

Pages

The MFDs can display six menus, selected with the bottom bezel keys. Each menu has its own sub-pages on the top keys:

MFD - Bottom Keys (main menu)

B1 FLT	B2 COM
T1 **PFD** T2 **MAP** T3 EW T4 EWMAP T5 **EFA** checklists	T1 **CNI** T3 **COM1** presets T4 **COM2** presets T5 HF: INOP
B3 NAV	B4 SYS
T1 **DATA** T2 **DPS** T3 **FIX** + detail T4 **RPLAN** + PLAN T6 **INIT** (INS)	T1 **PERF** T3 **CNSUM** T6 **CAL** (on the ground)
B5 PME	B6 STAT
T1 LINK (data link status) T3 SYR (camera status; OBC with the Q-bay camera) T4 **CAM** T5 ASR (ASARS status) T6 **RDR**	T1 **ICAW** T2 **HIST** T3 FAULT T4 BUS T5 LOAD T6 VERS

MFD menu branch map. Bottom keys select the menu, top keys the page.

1. FLT - Primary Flight Display (PFD)
2. FLT - Map, Traffic and Checklists (MAP, EW, EWMAP, EFA)

3. COM - Communication Pages (CNI, COM1, COM2, HF)
4. NAV - Navigation Pages (DATA, DPS, FIX, RPLAN, INIT)
5. SYS - System Pages (PERF, CNSUM, CAL)
6. PME - Mission Equipment (CAM, RDR)
7. STAT - Status Pages (ICAW, HIST, FAULT, BUS, LOAD, VERS)

All three displays start on the PFD.

Power

Each MFD needs two things: power for the display itself, and the Avionics Processor (AVP switch, right console), which draws the pages.

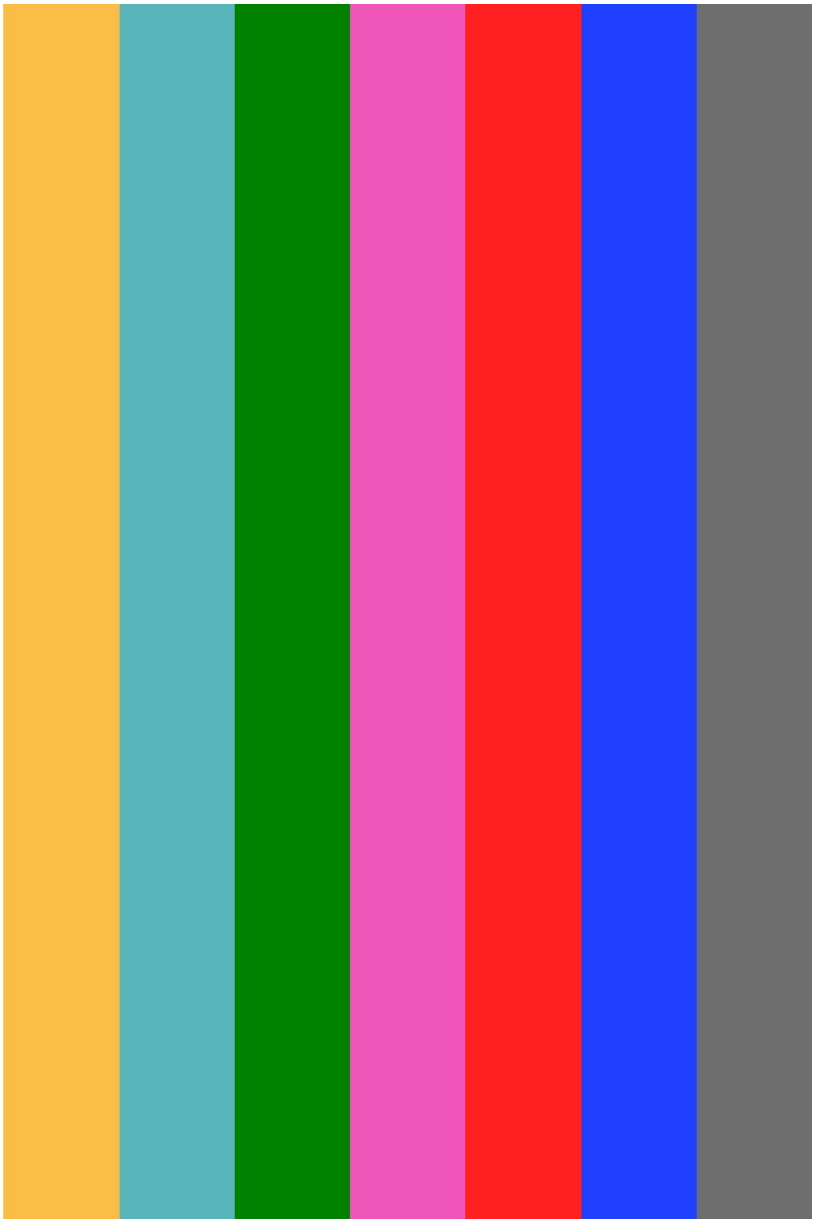
- **Display power** comes from the essential DC bus through the display's own OFF / NIGHT / DAY knob - battery or ground power is enough. Without power, or with the knob in OFF, the display is dark.
- **Power-on test:** when a display gets power it runs a 9-second test - raster, color bars, grid, character set, then an L MFD POWER ON BIT list (C MFD / R MFD on the others) whose items turn to PASS, ending in BIT COMPLETE. Keys are ignored while it runs.

It runs every time the knob goes from OFF to NIGHT or DAY, even for a quick flick, and when bus power comes back after more than 5 seconds without it. A shorter dropout, like the hand-over from ground power to the generator, does not restart it. A flight that loads with the displays already powered (runway or air start) skips it.

The test does not wait for the AVP, and the three displays come up slightly out of step.

- **AVP:** after the test the display shows DISPLAY BUS OR AVP FAILURE until the AVP is up - 7 seconds after you switch it on, or 2 minutes with the EFB option **Avionics startup time** set to *Realistic*. Then the pages appear.

Example MFD bitbars



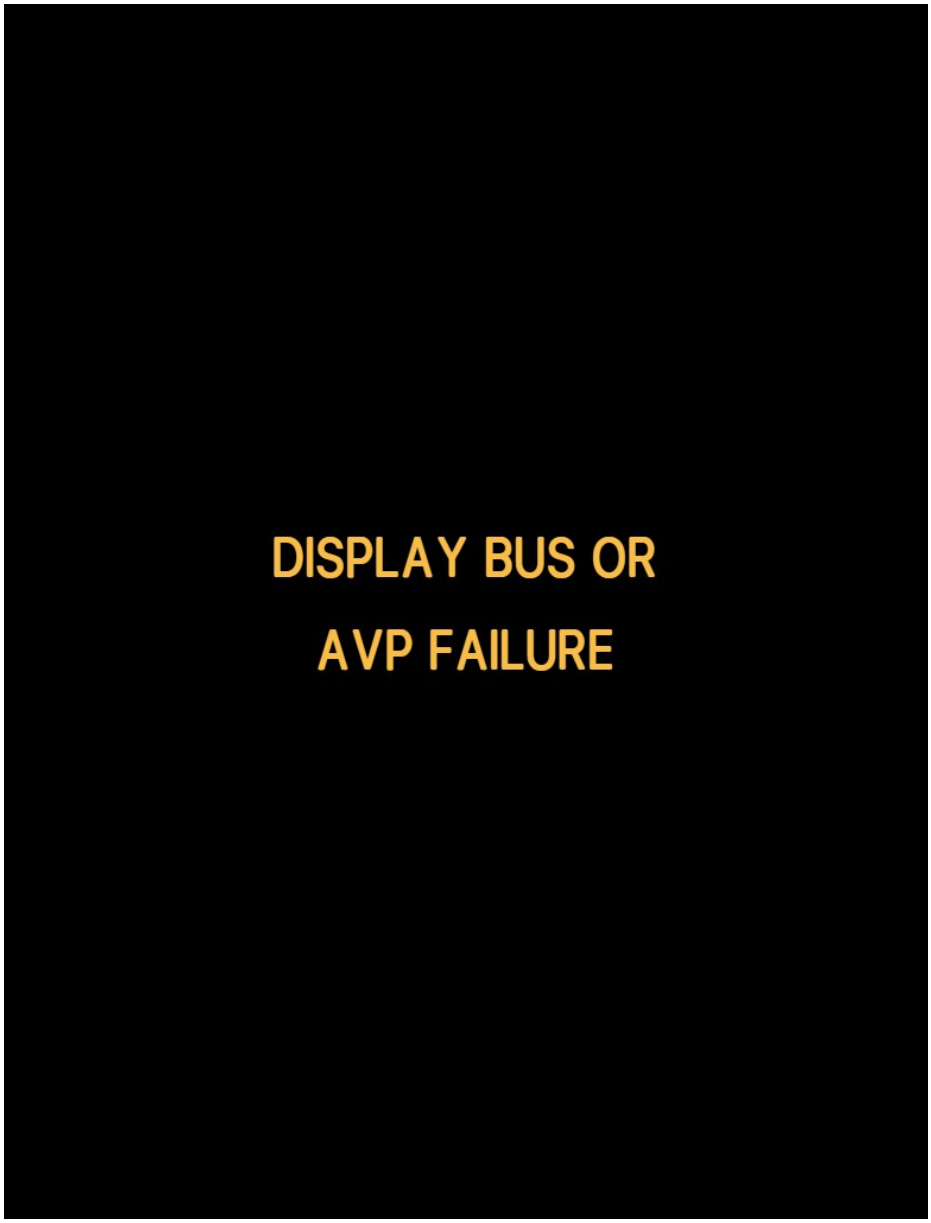
The colour-bar step of the display power-on test, about one second after the display is switched on.

Example MFD bit



The end of the display's power-on test: every item of the L MFD POWER ON BIT list reads PASS, followed by BIT COMPLETE.

Example MFD avp



With the display powered but the AVP not running, the MFD shows only DISPLAY BUS OR AVP FAILURE.

Caution
After every AVP start you must set the altimeter once - see Primary Flight Display / Red ALT box. From Cold and Dark the three MFD power knobs are OFF: turn each one to DAY.

Alerts and ACK

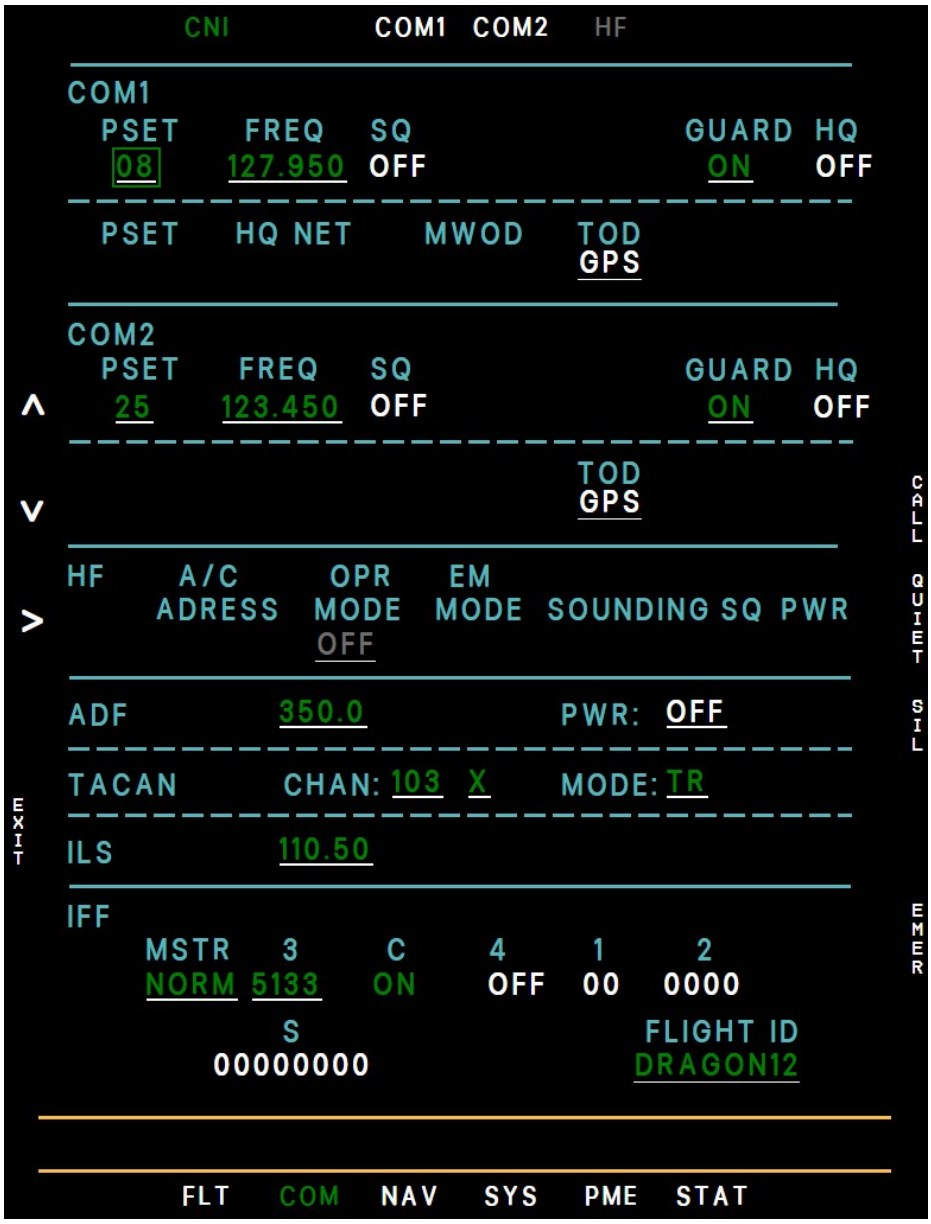
The alert line uses three colors: red = warning, yellow = caution, cyan = advisory. L7 ACK acknowledges the newest alert on all three displays at once. A small arrow under ACK means more alerts are waiting. Acknowledging only clears the line - the alert stays on the STAT/ICAW page until its cause is gone.

Editing Values

- **Direct fields** (PFD heading, altitude, baro, course, speed bug; fuel bugs): press the soft key, a box appears, change the value with INC/DEC, the UFCD knobs, or UFCD PAD + digits + ENT. PFD fields close by themselves after 15 seconds.

- **Pages with an EDIT key** (NAV DATA, NAV INIT, COM CNI): press EDIT. The left keys become L1 up, L2 down, L3 next field and L5 EXIT. A green box marks the selected field.

Example MFD cniedit



A page in EDIT mode (COM/CNI): the left keys become up / down arrows, next field and EXIT, and a green box marks the selected field.

1. **Selected field (green box)**
2. **Up (L1)**
3. **Down (L2)**
4. **Next field (L3)**
5. **EXIT (L5)**

Related pages: Primary Flight Display (PFD) · Up-Front Control Display (UFCD) · Warnings and Alerts · Electrical and Avionics Power

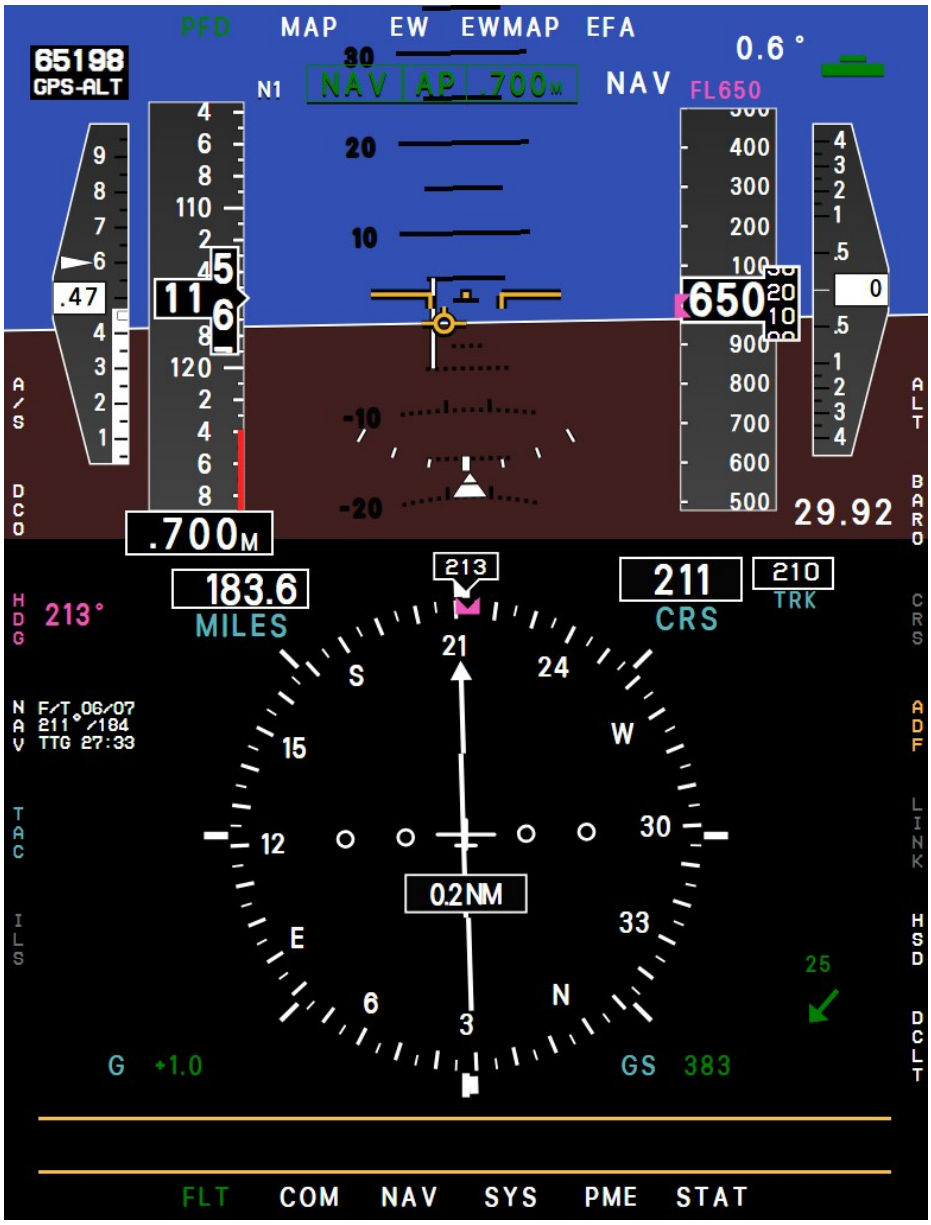
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Miltech Simulations U-2

Primary Flight Display (PFD)

This page contains all the basic instrumentation necessary to fly the U-2S. Select it with B1 FLT then T1 PFD.

Example PFD



1. **AOA Gauge:** Normalized angle of attack (1.00 = stall) with digital readout. White tick at .45 = best range, white triangle at .60 = max endurance. See Angle of Attack (AOA).
2. **Airspeed Tape** (Knots): Reads 30 to 275 kt. Below 30 kt the readout shows dashes and the tape rests at zero; it jumps to 30 when the airspeed comes alive. The red bar marks your current maximum speed. The digits turn red when you exceed it. With the EFB option **Stall speed tape** on, a yellow bar runs up to the stall speed for your weight, flaps, lift spoilers and g, in free air: right over the runway the ground effect lets the wing fly several knots below it.

With the ASARS-2 nose a big sideslip at low speed makes it read low (the SFD too), and the AOA high.

3. **Mach Number**

4. **Pitch Reference Symbol and Artificial Horizon:** With pitch ladder. When the horizon leaves the display, a dashed "ghost horizon" stays at the edge to show which way is up.
5. **Flight Path Marker (FPM):** Shows where the aircraft is actually going, not where the nose points. Requires the INS in NAV.
6. **Bank Scale and Roll Pointer**
7. **Altitude Tape** (Feet): The readout shows thousands in large digits. On the tape the 1,000s and 10,000s digits are larger than the three digits after them. Above 45,000 ft a GPS-ALT readout appears top left.
8. **Vertical Velocity Indicator** (x1000 ft/min)
9. **Altimeter Setting**
10. **Steering Source:** The source you selected with L4-L6 / R4, in its color: NAV, TAC, ILS (magenta) or ADF (green). With overfly selected it reads OFLY instead. To its right is the pitch trim. The flap symbol sits in the top-left corner with the flap angle: with GUST CONTROL UP it reads -7 (the flaps are 6.25° up), and while the flaps run between faired and the gust position it shows whole degrees, -1 to -6; above 45,000 ft with the flaps up the GPS-ALT readout takes its place.

The trim readout is in degrees, nose-up positive, and a tab grows above the bar for nose-up trim and below it for nose-down. The stabilizer travels from 3.5° nose-up to 1.5° nose-down. With the autopilot flying pitch the trim may run past these stops; the readout stops at 3.8° and -1.8°.

11. **Heading Readout** (Magnetic)
12. **MILES:** Distance to the steer-to destination point (NAV) or TACAN station, in tenths up to 999.9 NM. Shows ---- when there is nothing to measure to.
13. **CRS:** Selected course, 001 to 360 (north reads 360, never 000). TRK next to it is your ground track.
14. **NAV Block:** Steering mode and DP numbers, bearing/range and time to go to the steer point. Hidden while the INS is not in NAV.
15. **TACAN Data:** Bearing/DME to the tuned station.
16. **Cross-Track Deviation:** How far you are off the course line. During a direct steer it is measured from the planned turn and line to the DP (see Navigation System).
17. **Wind:** Arrow relative to the nose, and speed, shown while the flight path marker is. During an in-flight alignment it is replaced by AQ (alignment quality, counting down from 300). About 80 seconds into the alignment (sooner with a shorter EFB alignment time) a magenta **CHG HDG 45°** appears below it: a heading change of about 45° helps the alignment, and the cue goes out once you have turned 40° or more. The turn is optional - the alignment finishes on time either way.
18. **G Meter**
19. **Ground Speed**

The letters at the top left of the attitude display (N1 in the picture) are advisories. First comes the INS status letter - see Inertial Navigation System (INS). Then the GPS mode digit, the same mode the NAV/DATA page shows (7 = free inertial, without GPS updating).

An O follows while overfly or an orbit adjustment is armed. 21 seconds before a turn point, and before the last DP of the file, the L or N flashes, and the O flashes once the point has been overflown. When the autopilot is engaged, a green AP box with the active mode appears at the top of the attitude display.

Warning
Red ALT box: Each time the AVP comes up after being switched on, the altitude tape is blank with a red ALT box and the advisory RESET BARO (not when a flight starts with the avionics already running). Set the

altimeter (R2 BARO, or the SFD knob) and the tape appears.

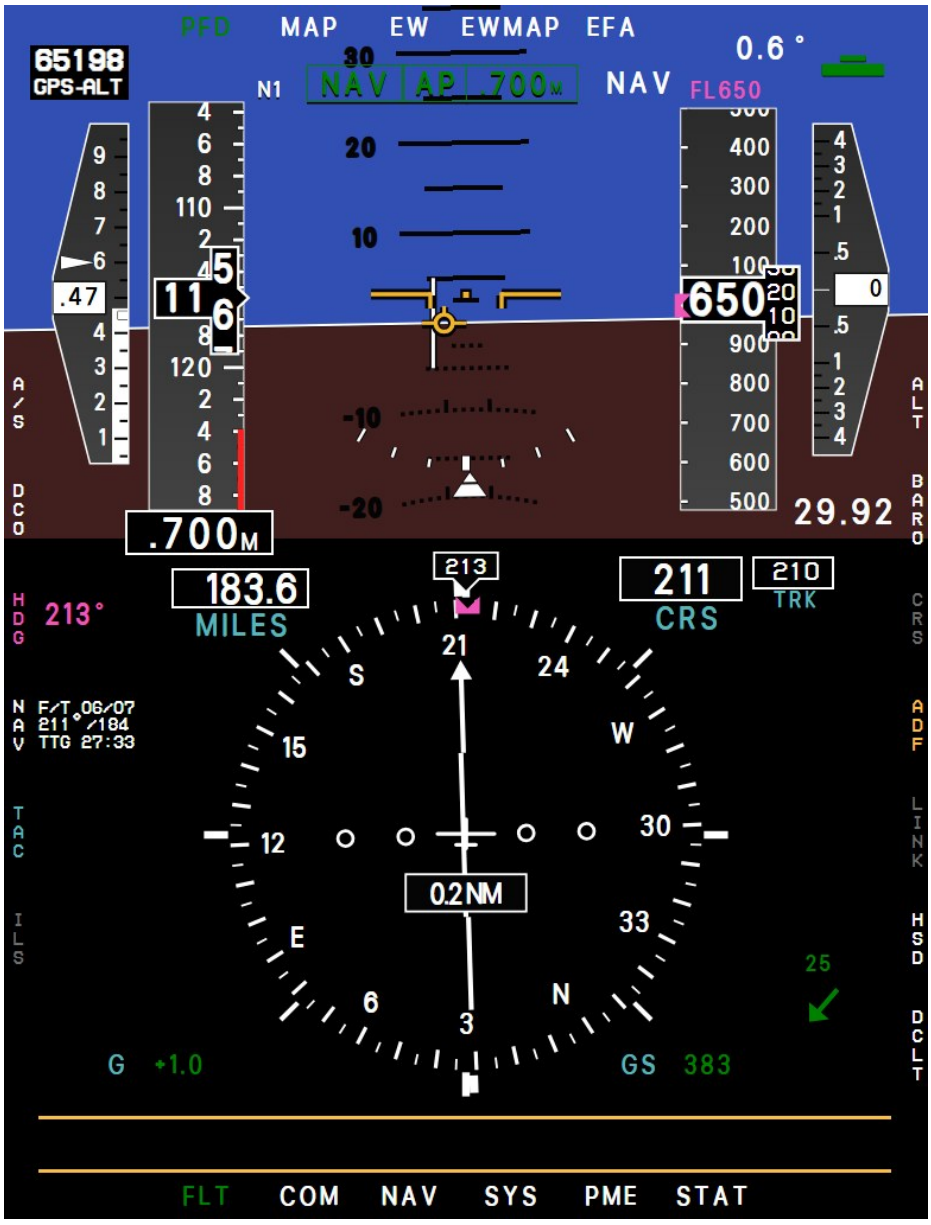
Warning
Red ADI flag: Without INS attitude the horizon is blank with a red ADI flag and the compass rose loses its numbers. Fly on the Standby Flight Display until the INS is aligned.

The other red flags on the attitude display appear only for a real failure, and only with the steering source that uses them: TAC at 9 o'clock (TAC selected and the TACAN failed or switched off on the audio panel, or no INS attitude), GS at 3 o'clock (ILS selected and the ILS receiver failed) and CRS at 12 o'clock (NAV selected with a failed INS, or ILS selected with a failed ILS receiver).

Without valid air data the speed and altitude go blank too. With the air data unit unpowered (it is on DC ESS SEC, so ESS DC SHED takes it) the airspeed tape shows a red IAS box, the Mach window is empty and the altitude tape shows the red ALT box, with IAS FAIL and ALT FAIL.

A pitot iced up with PITOT HEAT off takes the airspeed and Mach only. The overspeed and altitude alerts worked out from them stay quiet meanwhile. Fly on the SFD.

Example MFD pfd



The PFD in cruise at 65,000 ft: the attitude display with the airspeed, Mach, altitude and vertical speed scales on top, and the HSI with heading, course, distance and steering data below.

1. **AOA**
2. **Airspeed**
3. **Mach**
4. **Autopilot modes**
5. **Altitude**
6. **Altimeter setting**
7. **Heading**
8. **MILES**
9. **CRS**
10. **NAV block**

Soft Keys

Key	Legend	Function
L1	A/S	Airspeed bug (65-300 kt). Inside, L2 / L3 switch the airspeed (ALIM) and Mach (MLIM) limit monitors on - they give AIRSPEED DEVIATION / MACH DEVIATION when you stay outside the speed window for more than 5 seconds in flight (never on the ground).
L2	DCO	Drift cut-out: centers the FPM laterally in a crosswind.
L3	HDG	Heading marker (the autopilot heading). **Double-press** to sync it to your present heading.
L4 L5 L6 R4	NAV TAC ILS ADF	Select the steering source. ILS is gray until a localizer is tuned. ADF is green while the ADF is switched on and yellow (not selectable) while it is off. You tune the ADF yourself - COM/CNI page, ADF row, or the BCDU ADF page; see Communication Pages. With a station received you get a green bearing pointer and the relative bearing next to the ADF legend; with none the bearing reads --- and the advisory ADF SIGNAL comes on. ADF steering has no flight director bars.
L7	ACK	Acknowledge alert.
R1	ALT	Altitude bug (100 ft steps) - your reminder altitude. You get APPROACHING SET ALT 1,000 ft before it, and ALTITUDE DEVIATION if you later drift more than 200 ft off. (The autopilot's ALT mode holds the altitude at the moment you press ALT, not this bug. With ALT on, a second press of R1 closes the field and sends the bug to the autopilot as its new altitude.)
R2	BARO	Altimeter setting. While open: R1 sets standard (29.92), R3 ALRT sets the transition-level reminder, R4 switches inHg / hPa, on all three MFDs; the SFD then shows its own setting in hPa as well.
Key	Legend	Function
R3	CRS	Course for TACAN / ILS / ADF; each source remembers its own course. With TACAN, **double-press** for "direct to the station". With ILS the course is set to

Key	Legend	Function
		the localizer course once each time you tune a new ILS frequency - you can change it afterwards. Gray with NAV selected (the course is computed for you).
R5	LINK	INOP
R6	HSD	Puts the moving map under the HSI on this display, at the map scale all three MFDs share (see MAP). The compass rose then shows only the 150° arc ahead, and the bearing pointers stay on it: the head shows within 75° of the nose, the tail when the bearing is more than 105° off the nose. The MILES, CRS and TRK boxes keep their black background over the map.
R7	DCLT	Declutter, green while on: removes the flight director bars, the airspeed and altitude bug fields (the bugs stay on the tapes) and the bearing pointers of the sources not selected. While it is on, the first press of L4 NAV, L5 TAC or R4 ADF brings that source's pointer back instead of selecting it (a second press selects it), and a new bug value brings its field back; the legend then turns white. R7 again ends it.

After each change to the airspeed bug, the limit monitors, the heading marker or the altitude bug, the number shows black on white for 3 seconds, and goes back at once when the field is deselected. A selected field closes after 15 seconds untouched; typing on the UFCD pad counts as touching it.

Your sim keys and hardware set the same selections: the heading bug keys move the heading marker, the course keys the course of the TAC, ILS or ADF source (with NAV selected they do nothing), the autopilot altitude keys the altitude bug and the autopilot speed keys the airspeed bug. With ALT or MACH engaged these keys also change what the autopilot holds - see AFCS System.

Flight Director

The flight director bars are steering commands, color-coded by source: white NAV, cyan TACAN, magenta ILS. Fly so that the bars cross on the FPM. The horizontal (pitch) bar only appears with ILS, when both the localizer and the glideslope are received. ADF steering has no flight director.

Related pages: AFCS System (Autopilot) · Angle of Attack (AOA) · Standby Flight Display (SFD) · Inertial Navigation System (INS)

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Miltech Simulations U-2

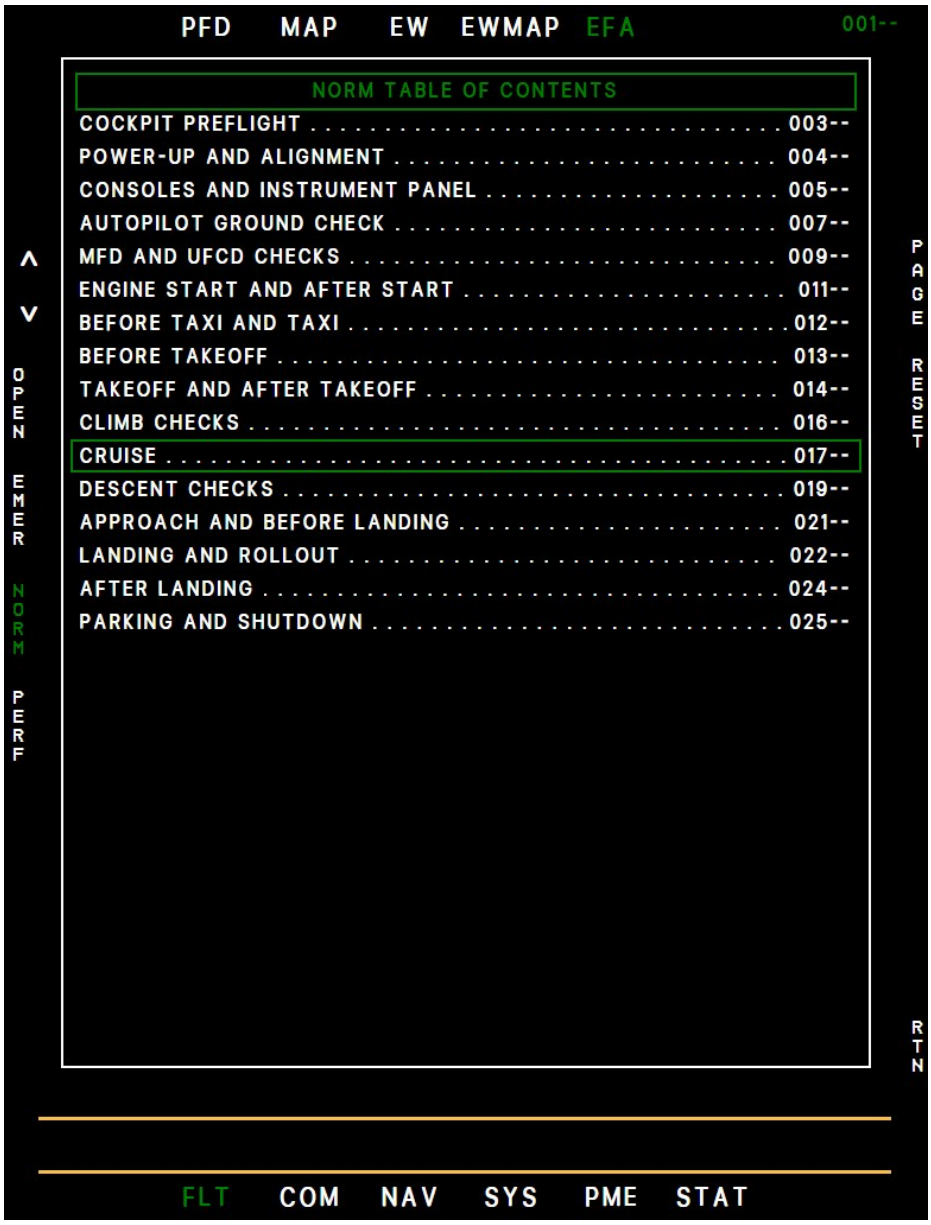
Map, Traffic and Checklists

Three functions of the MFD flight pages: the EFA checklist reader, the moving MAP, and the EW system with its EW and EW HISTORY pages.

EFA - Electronic Flight Aid

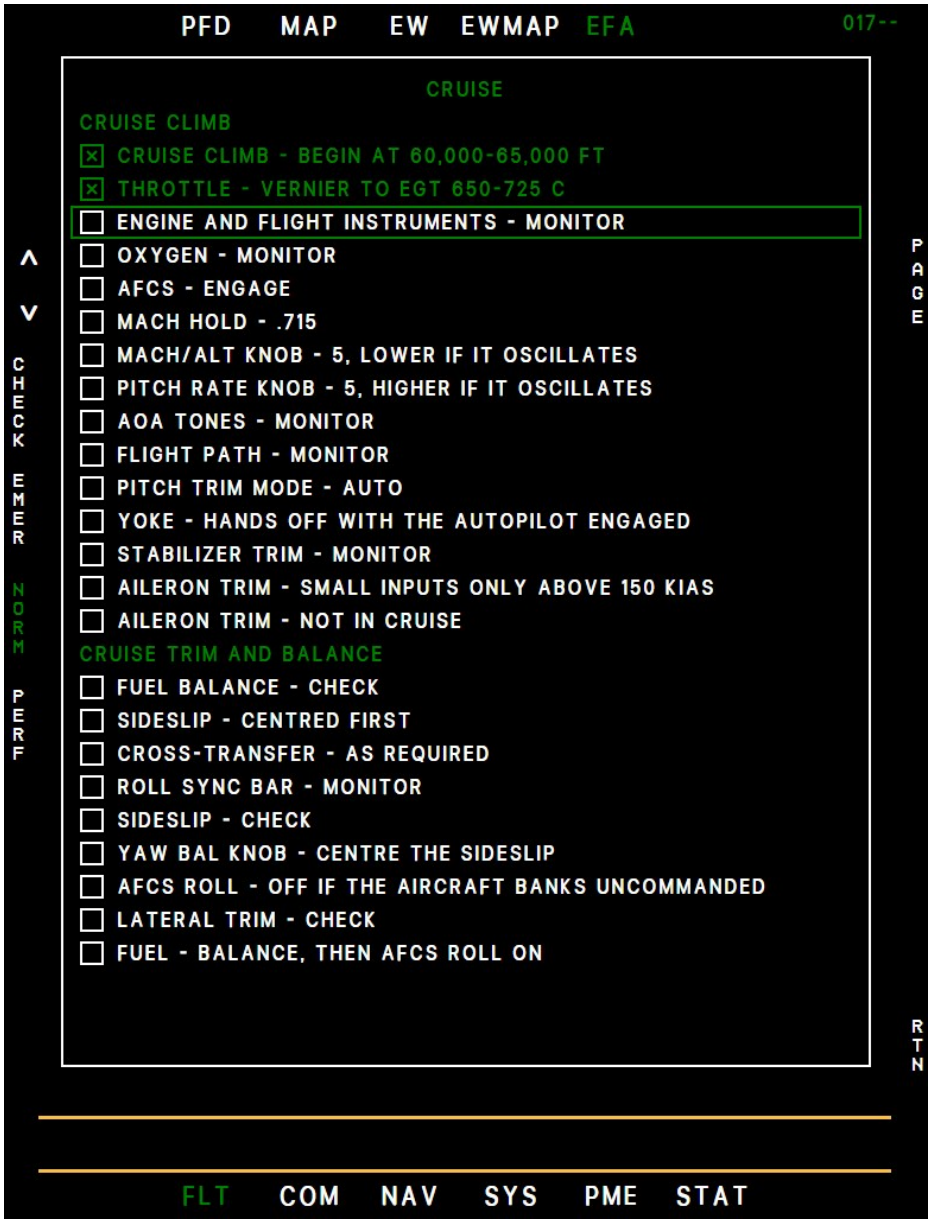
A built-in checklist reader. Page 000 is the PERF front page, 001 the table of contents of the normal checklists, and each checklist follows with a check box per step, so you can tick off what you have done. After them come the emergency checklists, with their own table of contents: engine cutoff, airstart and a stuck pogo, the three the simulation brings about by itself.

Example MFD efatoc



The EFA contents page (001): the normal checklists, with the green box on the one L1 OPEN will open.

Example MFD efa



The EFA checklist reader with the CRUISE checklist open: ticked steps carry a check mark and the green box marks the next step.

- **Left rocker** moves the selection box - over a checklist on the contents page, over a step inside a checklist. **Right rocker** turns the page.
- L1 OPEN opens the selected checklist; inside it L1 reads CHECK (or UNDO) and ticks the step, moving the box on.
- L2 EMER opens the emergency contents, L3 NORM returns to the normal contents (from PERF or EMER, to the normal page you had open), L4 PERF goes to the front page. R1 RESET on the contents page asks RESET ALL? in yellow beside R1 NO and R2 YES; the contents stay on screen. YES clears all ticks, any other key or rocker cancels.
- In the emergency section R5 TOC shows the emergency contents and R6 NORM the normal contents; R7 RTN returns to the page you had before. STAT/ICAW R3 SEL opens an alert's checklist when the EFA has one.

MAP

A moving map of the area around the aircraft, with land, sea, roads, cities, state borders and airports, and the U-2 symbology drawn on top of it. It is reached with B1 FLT, T2 MAP.

Key	Legend	Function
Left rocker	-	Map scale: 10, 25, 100, 200 or 400 NM - the distance from the top to the bottom of the map - shown top right, in green. 100 when the flight loads. Hold the rocker to step quickly.
L1	NORTH	North-up (green) or track-up (white). Track-up puts the aircraft a quarter of the way up the display.
L2	DS	Direct steer: pick a DP number with the right rocker - any loaded DP of the ACTIVE file, or 00, the position the INS was aligned at - and press R1 ENT. An empty number is not sent. A dashed cyan line shows the proposed track; once sent it is solid.
L3	OFLY	Overfly the next DP instead of turning early (F/T steering only). Confirm with YES. Yellow when on.
L4	AMP	Amplified data: pick a file with R2 and a DP with the right rocker, R1 ENT, and read its position, bearing/range, time to go and fuel at the point. The files include TP, the targeting points; it is skipped without an imaging sensor. AC shows the aircraft's own data.
L5	RCTR	Recenter the map on a chosen DP or TP (R2 picks the file). R1 ENT to apply.
L6	SMBL	Symbol options: airports (ICAO), 15/30 NM range rings (RNGS), bullseyes, emergency fields, the ground track line (GTL), fix points (FPTS), how many DP labels to show (5 / 10 / 99), and a dimmer (BRT).
R4	SCRL	Scroll the map with the arrow keys (R1 up, R2 down, R4 right, R5 left, a quarter of the scale per press). R3 EXIT leaves the map where it is - RCTR, then AC, brings it back to the aircraft. Not available while overfly is on.
R5	ROZ	Restricted operating zones: a table of up to 24 circular zones (radius, position, display on/off, color) you can enter with the rocker or the UFCD pad. Zones show as colored rings on the map.

All three MFDs share the map settings: the scale, NORTH / track up, the SMBL options and the map BRT. Change one on any display and the other two follow; the HSD map under the HSI uses the same scale. DS, AMP, RCTR, SCRL and ROZ, and a recentered or scrolled map, stay on the display where you used them.

What you see on the map:

- Green cross: your aircraft. Small magenta boxes: airports - every airfield, soft, water and private ones included, but no heliports or closed fields. The search covers the whole map and finds more at the wider scales, up to 900 at 400 NM; ICAO adds their identifiers.
- Magenta: the ACTIVE route with direction arrows. Legs are drawn on the great circle NAV flies, and each turn as a curve on the radius flown, from a small circle at the turn point, so the aircraft follows what you see. Two turns close together join up: the next turn starts where the last one ends.

DP numbers are on the left and names on the right of the "+". The next DP is green. While a direct-steer line is up, its DP shows no turn and the legs meet at the DP.

- Cyan dashed: a storage file under review (AMP), or the track of a direct steer you are still choosing. Cyan solid: a direct steer once it is sent, on every MFD, from whichever panel sent it (MAP, NAV/DPS, NAV/DATA, UFCD or BCDU). The line follows the aircraft until the nose or the ground track is within 2° of the DP, then stays in place as the course flown. It flashes 21 seconds before the turn and goes out as the turn begins.
- Yellow dashed: the overfly line. Green triangles: bullseyes. Red double circles: emergency fields. Black X: recorded fixes.
- Ground track line: where you will be in 5 minutes at the present bank.
- Thin pink line from the aircraft: the simulator map's own trend vector, a prediction at the present turn rate. It is not the route.
- Cyan crosshair in a box: where the camera looks and what its picture covers, while it is open (Mark IV Camera Panel).
- Yellow hollow triangles: targeting points, with their number below on the left and, with ICAO on, their name on the right. The TP picked on AMP or RCTR is green; without an imaging sensor they are gray. A magenta line shows a direct steer to a TP.
- Cyan fan: the radar's coverage while it radiates, with its cursor (placed by the hand control), and in SPOT a cyan square around the patch.
- A pending datalink upload appears as file UPLD under AMP, with ACPT / REJ.

EW System

Our rendition of the U-2S electronic warfare (EW) system uses the simulator's other air traffic - AI and multiplayer aircraft - as stand-ins for threat radars. Only aircraft moving faster than 20 kt count, so parked and taxiing traffic is ignored. You control it with the EW CONT switch at the top right of the main panel, next to the SFD.

The REC and RPT lamps beside it and a tone in your headset warn you of a close threat.

EW CONT	Function
OFF	The EW system is off. The EW page shows EWS OFF / EW CONT OFF. While the AVP runs, 5 seconds in OFF (or without power) bring the advisory EW NO RESPONSE; it goes out once EW CONT is in REC or RPT.
REC	Receive: threat detection. Contacts on the EW pages, the REC lamp and the threat tone.
RPT	Repeat: detection plus self-protection jamming. As REC, and the RPT lamp flashes while a threat is being jammed.

The EW system needs essential AC and essential DC power - ground power or a running engine. Without it the EW page reads EWS OFF / NO POWER. EW CONT is OFF after a Cold and Dark start; a runway start and the EFB *Ready for takeoff* preset put it in RPT for you.

Startup Self-Test

Each time EW CONT leaves OFF, the EW system runs a startup self-test before it reports anything: 30 seconds with the EFB option **Avionics startup time** on *Fast* (the default), 5 minutes on *Realistic*. While it runs, the EW page shows EWS STARTUP BIT and the time remaining (m:ss), and STAT/FAULT EW shows STARTUP BIT IN PROGRESS.

- **Shortcut:** with the EW system up, switch EW CONT to OFF for 1 to 3 seconds and back on - it comes straight back without the self-test.

- Less than a second in OFF changes nothing; a running self-test simply carries on.
- Anything else - more than 3 seconds off or without power, or 1 to 3 seconds while the self-test was still running - starts the full self-test again.
- A flight that loads with EW CONT already on skips the self-test.

Threats, Lamps and Tone

Color	Contact	Symbol on the EW page
Red - threat	Within 5 NM and 1,000 ft of your altitude	Red wingform above the track number
Yellow - caution	Within 15 NM and 2,000 ft	Yellow wingform above the track number
Cyan	Any other contact, out to 400 NM	Cyan wingform above the track number

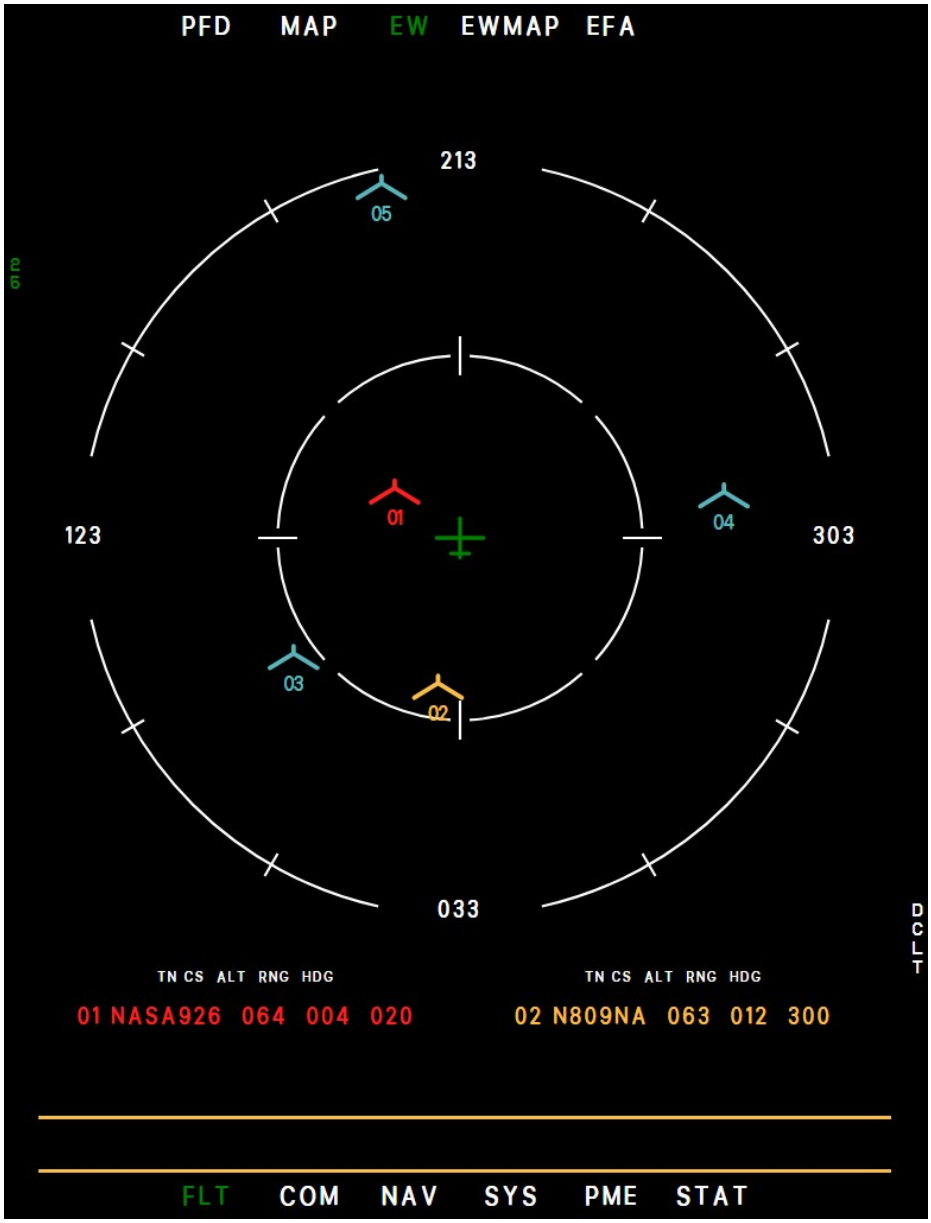
- REC is lit while at least one red threat is tracked.
- RPT flashes (0.2 s on, 0.2 s off) while RPT is jamming a red threat. REC stays lit with it.
- The threat tone sounds once for each new red threat, and only with MSN RCD ON (PME power panel, right console; ON after a runway or in-flight start). The same aircraft sounds again only after it has been out of the red zone for 60 seconds. The volume is the THREAT knob times MASTER VOL, in four steps; either knob at its stop silences it.
- MASTER LIGHT TEST lights both lamps.
- Only red threats light the lamps and sound the tone, and threats put no messages on the MFD alert line. The EW system's own state does: EW NO RESPONSE (see EW CONT above) and EW IBIT TIMEOUT for a STAT/FAULT BIT that could not finish. The BCDU EW key stays inoperative.

EW Page

B1 FLT, T3 EW: a heading-up compass rose with you in the center and the outer ring at the selected range. While the EW system is off or in its self-test the page shows only its status box, black like the CAM and RDR status boxes, with the range and DCLT legends beside it: EWS OFF with EW CONT OFF or NO POWER below it, or EWS STARTUP BIT with the time remaining.

The box goes away when the system is up. It comes back as EWS IBIT IN PROGRESS while a STAT/FAULT BIT runs, with no contacts meanwhile.

Example MFD ew



The EW page at the 25 NM range: contacts around the aircraft in the colour of their threat level, with the yellow and red ones listed in the box below the rose.

1. **Range (NM)**
2. **Heading (up)**
3. **Own aircraft**
4. **Red threat**
5. **Yellow caution**
6. **Cyan contact**
7. **Threat list**
8. **DCLT (R6)**

- The nearest 25 contacts inside the range are drawn with the airborne-threat symbol: a small wingform above the contact's two-digit track number, in the colors of the table above.

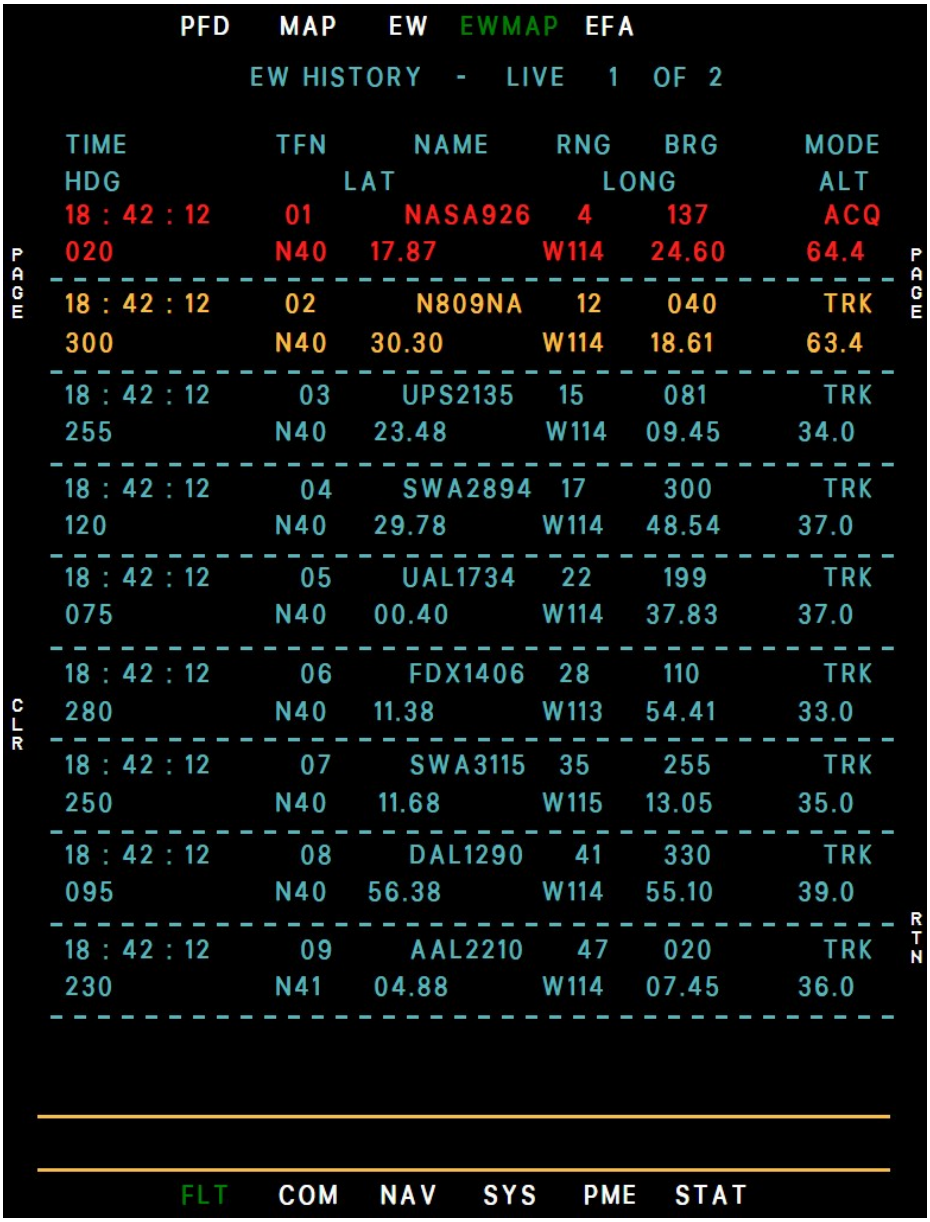
- The box below the rose lists up to four yellow and red contacts, red first, then by range: track number, callsign, altitude in thousands of feet, range and heading (legend TN CS ALT RNG HDG).
- INC/DEC rocker: range 25, 50, 100, 200 or 400 NM (100 when the flight loads), shown down the left side. It wraps from 400 back to 25.
- R6 DCLT steps through all symbols / no legend / yellow and red only. The legend is green while declutter is on.

EW HISTORY Page (EWMAP)

T4 EWMAP opens the page titled EW HISTORY. In our rendition it is a live list, not a recording: every contact the EW system tracks right now, nearest first, nine to a page (LIVE and the page count at the top).

Each row is in the color of its threat level and shows TIME (Zulu), TFN (the track number used on the EW page), NAME, RNG, BRG, MODE (ACQ inside 5 NM, TRK beyond), HDG, LAT, LONG and ALT (thousands of feet).

Example MFD ewmap



The EW HISTORY page: every contact the EW system tracks, nearest first, nine to a page, in the colour of its threat level.

1. **LIVE list**
2. **Page count**
3. **Time (Zulu)**
4. **Track number**
5. **Name**
6. **ACQ (inside 5 NM)**
7. **Altitude (1000 ft)**
8. **CLR (L4)**
9. **RTN (R6)**

- INC/DEC rocker: turn the pages.
- L4 CLR, then L4 YES (or L5 NO) empties the list; the contacts come back with the next update.
- R6 RTN returns to the page you came from.

Both EW pages show contacts only while the EW system is up.

Related pages: Navigation System (INS Steering) · Targeting Points · Checklists

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Miltech Simulations U-2

Navigation Pages (NAV)

The NAV pages show and change the route that the INS steering computer flies. They are DATA, DPS (destination points), FIX, RPLAN (route planning) and INIT (INS initialization).

Warning
How navigation works in this aircraft - please read.
The U-2S has its own INS steering computer. It flies the **ACTIVE destination point (DP) file**: the flight director, the MILES / TTG read-outs, the map track and the autopilot NAV mode all follow it. The MSFS flight plan is not used for INS steering.
DP files are shared between the MFD, the UFCD and the BCDU - enter a route on any of them. Files: **ACTIVE** (the one flown), **STORE 1-4** (spare routes, 99 points each; a route sent from the MSFS EFB lands in STORE 1 by itself), **EMER** (16 emergency fields) and **BULL** (10 bullseyes).
The INS must be in NAV. Without it the steering computer has no position and the autopilot refuses NAV mode.

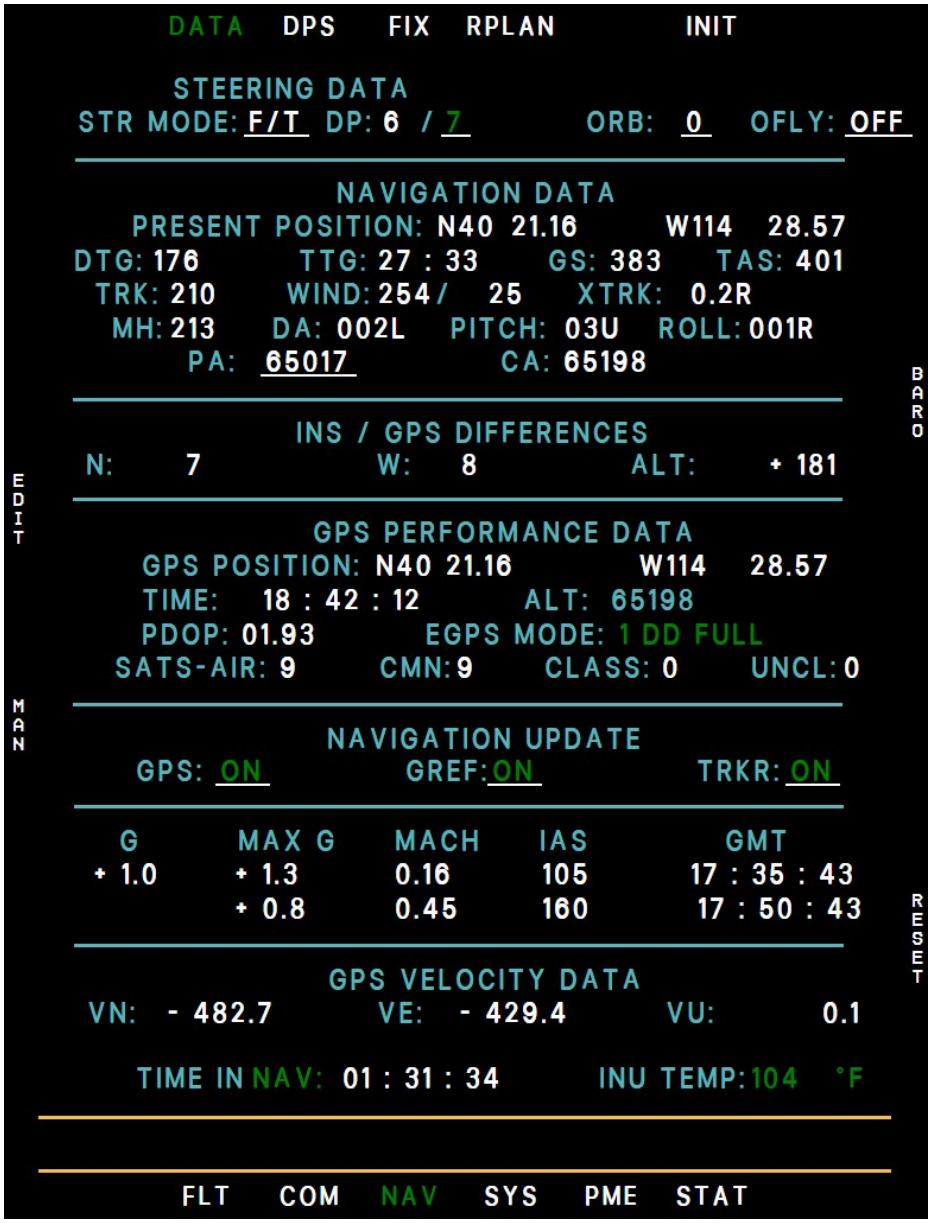
How the steering computer flies each mode - F/T turns, direct steer, overfly, orbits and the T/T family - is explained on its own page: Navigation System (INS Steering).

DATA

The top block, STEERING DATA, shows and sets the steering. Press L2 EDIT and step through the mode, the DP / course / distance fields that belong to it, then ORB and OFLY. Steering values (mode, DPs, course, distance, orbits) are staged: the new value shows in reverse video and is only sent when you press R1 ENT.

In F/T a new TO DP sent this way is a direct steer from present position. Outside a staged edit, R1 BARO switches the INS altitude to the barometric loop (green while on).

Example MFD data



NAV/DATA in cruise: steering data, navigation data, INS/GPS differences, GPS performance, the navigation update switches, the G-load log, GPS velocities and the INS time in NAV.

1. **Steering mode and DPs**
2. **Present position**
3. **Time to go**
4. **INS/GPS differences**
5. **EGPS mode**
6. **Navigation update**
7. **G-load log**
8. **Time in NAV**
9. **INU temperature**
10. **EDIT (L2)**

Next to the STEERING DATA heading the steering computer tells you, in magenta, when it is not flying your selection as entered: 128 MAX (intercept distance limited to 128 NM), 400 MAX (more than 400 NM out - direct steer instead), ZONE 1 / ZONE 5 (too close to the destination or to its inbound line - direct steer instead) or OVERSHOOT TURN (a turn of more than 140°).

The message stays while its condition holds and comes with the NAV STEERING advisory - see Navigation System.

- **Navigation data:** INS present position, distance and time to go to the turn point, ground speed, true airspeed (dashes without valid air data), track, heading, wind, cross-track, drift, pitch, roll and the INS altitude.
- **INS/GPS differences:** north/south and east/west in feet, and INS minus barometric altitude. A position difference turns cyan above 1,000 ft (2,000 ft in a bank of more than 5°); the check rests for 5 minutes after GPS aiding comes back. Dashes without a GPS solution.
- **GPS performance:** GPS position, time and altitude, PDOP, the satellite counts and the EGPS MODE - 1 DD FULL in normal use (3 AUTO FULL with GREF off), 7 FREE when the INS runs free inertial (GPS updating off or GPS failed), 0 NO EGPS while the receiver starts up (the first minute after INS power-on, and in standby).
- **Navigation update:** GPS, GREF and TRKR ON / OFF (EDIT). With GPS updating off the INS drifts - see Inertial Navigation System.
- **G load:** present, maximum and minimum G with the Mach, airspeed and time at which they occurred; R6 RESET restarts the log. GPS velocities north, east and up are below it.
- **Footer:** TIME IN ALN / IFA / NAV from the INS (INS MODE: STBY before an alignment starts), and INU TEMP (green, cyan from 115 °F, yellow from 125, red from 135; blank for the first 20 seconds after INS power-on).

L4 MAN opens the manual position update - see Inertial Navigation System / Manual Position Update.

DPS - Destination Points

Table of the selected DP file - ACTIVE, STORE1-4, EMER, BULL, TP - with name, position and turn radius (on TP the target's size). Twelve rows per page, 99 DPs per file (EMER 16, BULL 10, TP 10).

The EMER file is listed nearest first (SORT column). The bottom block shows the nearest emergency field (or the one you pick with DSPL) with bearing, range, time and fuel on arrival, and bullseye 1 (or the one you pick) with its range and your bearing from it. Positions are the INS position.

Example MFD dps



NAV/DPS with the ACTIVE file: the eight destination points of the route with position and turn radius, the TO DP in green, and the nearest emergency field and bullseye at the bottom.

1. **Steer-to DP**
2. **Selected file**
3. **TO DP (green)**
4. **Turn radius**
5. **Nearest emergency field**
6. **Bullseye**
7. **FILE (L1)**
8. **DS / ANAV (L3)**
9. **STORE (R3)**

- L1 FILE: next file (ACTIVE, STORE 1-4, EMER, BULL, UPLD while a datalink upload is pending, and TP, which is gray and skipped without an imaging sensor). R4/R5: scroll. R1 TOP: the page with the TO DP.
- L2 EDIT: L1/L2 pick the row, L3 steps LAT, LONG, TURN (DIA on the TP file), L5 EXIT. Type with the UFCD pad (latitude as DDMMmm, longitude as DDDMMmm) or use INC/DEC. R1 DEL blanks the row, R2 UNDO restores it. Names are entered on the UFCD or BCDU.
- On the ACTIVE file the TURN column shows a turn that does not fit between its DPs in yellow, with the smaller radius it is flown on. The file keeps your TR, and that is what EDIT shows on the row - see Navigation System.
- L4 CLR: L1/L2 pick a point, L4 ENT clears it, L5 EXIT. On a store, EMER, BULL or TP file R2 ALL clears the whole file (R1 YES).
- L5 DSPL (EMER and BULL files): L1/L2 pick which emergency field or bullseye the bottom block shows. L5 EXIT; on EMER the block then returns to the nearest field.
- With ACTIVE shown: R2 picks the store target ST1-ST4 and R3 STORE copies the route into it (R2 YES). With a store file shown: R2 LOAD copies it into ACTIVE (R1 YES, TO = DP 1).
- On the EMER and BULL files R2 IMPORT jumps to the LOAD page to fill them from SimBrief or the INS Planner; on the TP file it jumps to the TD file.
- TP file: the 10 targeting points, always all ten slots. DIA is the target's size in feet, entered with EDIT by pad (1 to 99,999) or INC/DEC (10 ft a step).
- Pending upload (UPLD file): L6 ACPT (choose the store with L4, then L5 YES) or L5 REJ (L4 YES). Uploaded points cannot be edited.
- L3 DS - direct steer (ACTIVE, EMER and TP files). On ACTIVE the TO DP number appears next to the right INC/DEC rocker: pick the DP with INC/DEC - any loaded DP, or 00, the position the INS was aligned at - and press R1 YES (R2 NO or DS again cancels).

On EMER a cursor starts on the nearest field: L1/L2 move it, R1 YES steers there and makes the EMER file the ACTIVE file. On TP a cursor starts on the first TP in use: L1/L2 move it, R1 YES steers there. While the autopilot flies the route in NAV, DS and LOAD read ANAV in cyan and do nothing - disengage NAV first.

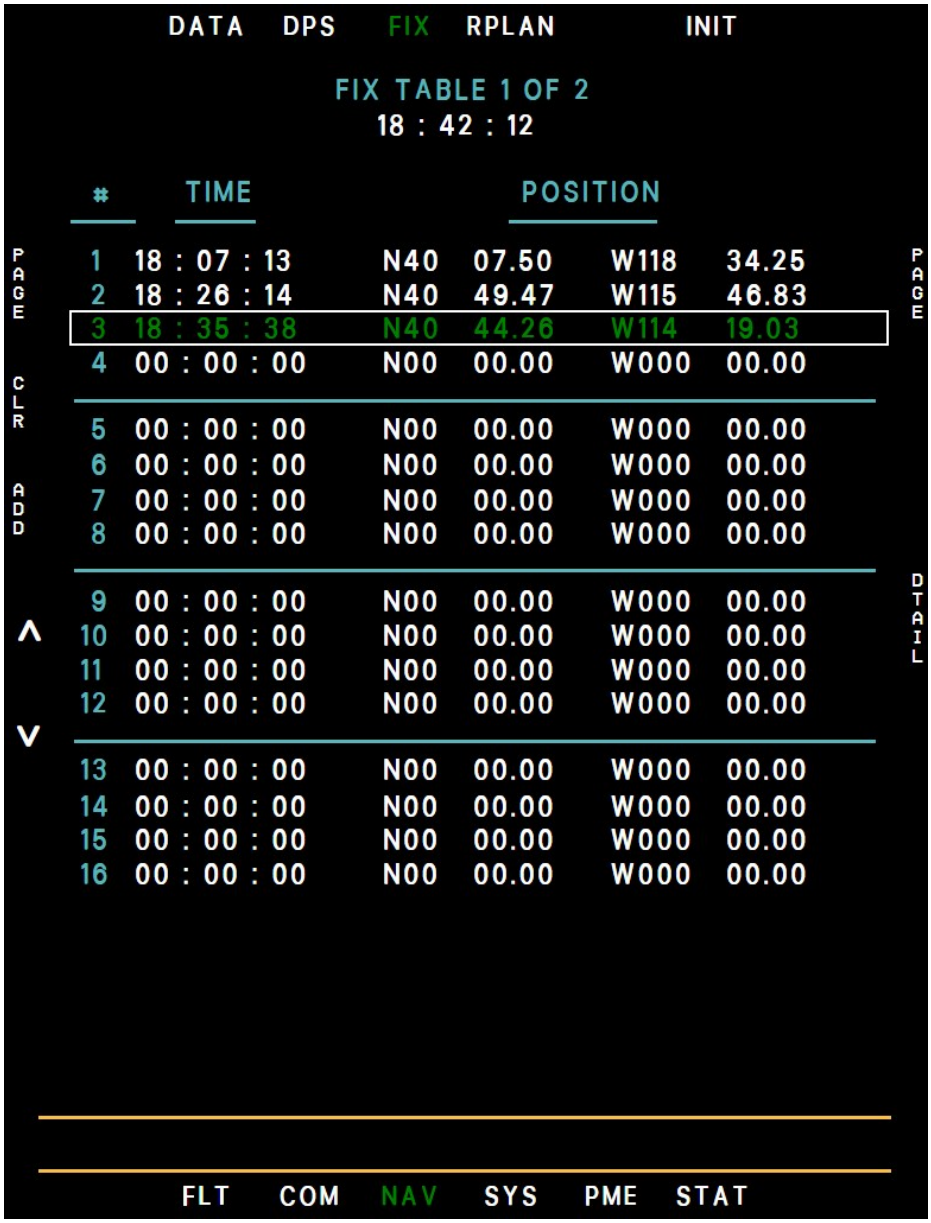
Direct steer also works from the MAP page, NAV/DATA, the UFCD and (AVP off) the BCDU - see Navigation System.

FIX

A log of up to 32 position fixes. A fix is recorded with L2 ADD on this page, the UFCD FIX key, the BCDU FIX key or NAV/DATA MAN → FIX, and automatically at every ALERT interval of the UFCD flight-time counter (default every hour, together with the ALERT TIME advisory).

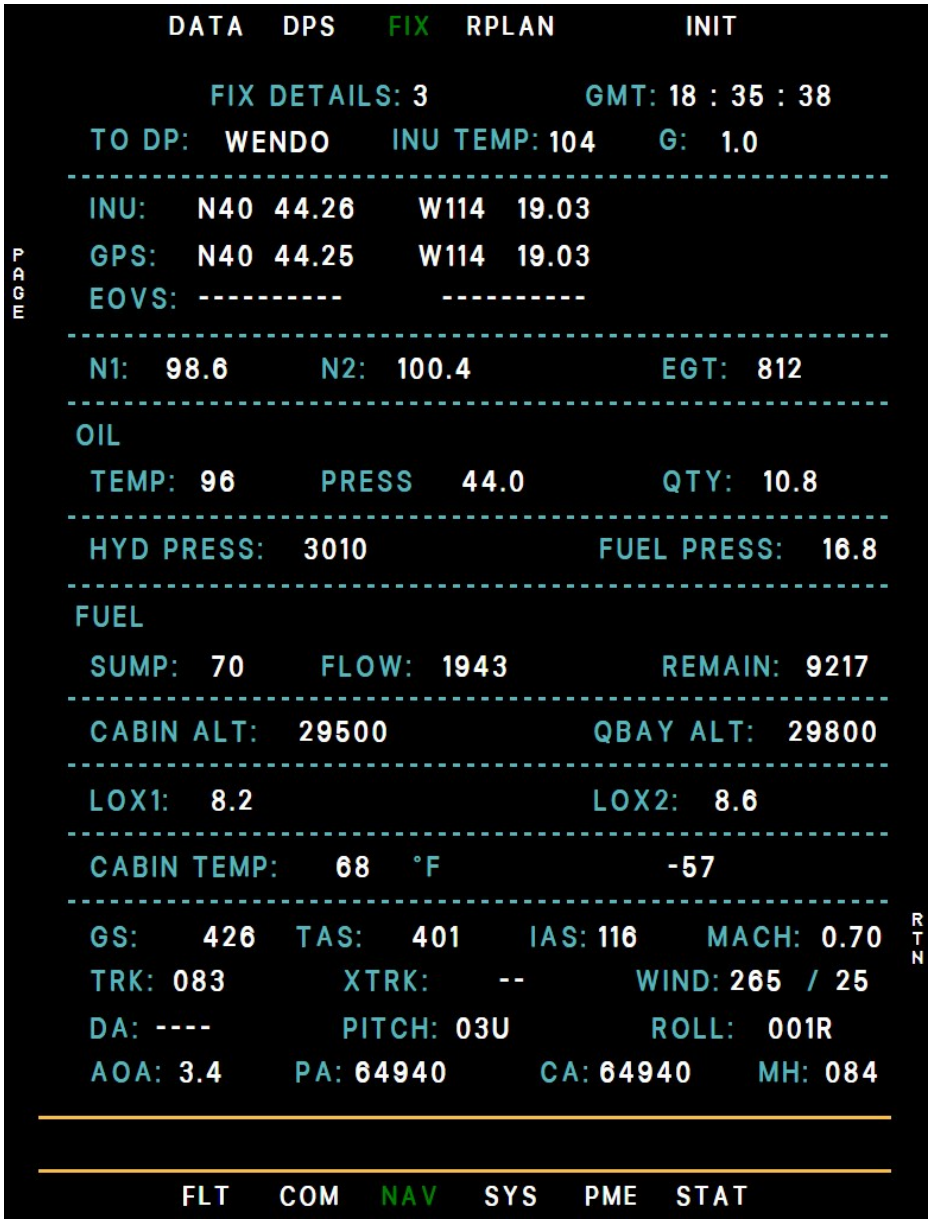
It appears on the table at once, and as a black X on the map. L3/L4 scroll, INC/DEC turns the page. R3 DTAIL opens a complete snapshot of the aircraft at that moment - engine, fuel, cabin, speeds, winds. The table is cleared at takeoff; when it holds 32 fixes no more are taken until you clear it with L1 CLR (L2 YES).

Example MFD fix



The FIX table with three position fixes of this flight - two taken with the UFCD FIX key, one recorded automatically at one hour of flight time.

Example MFD fixdetail

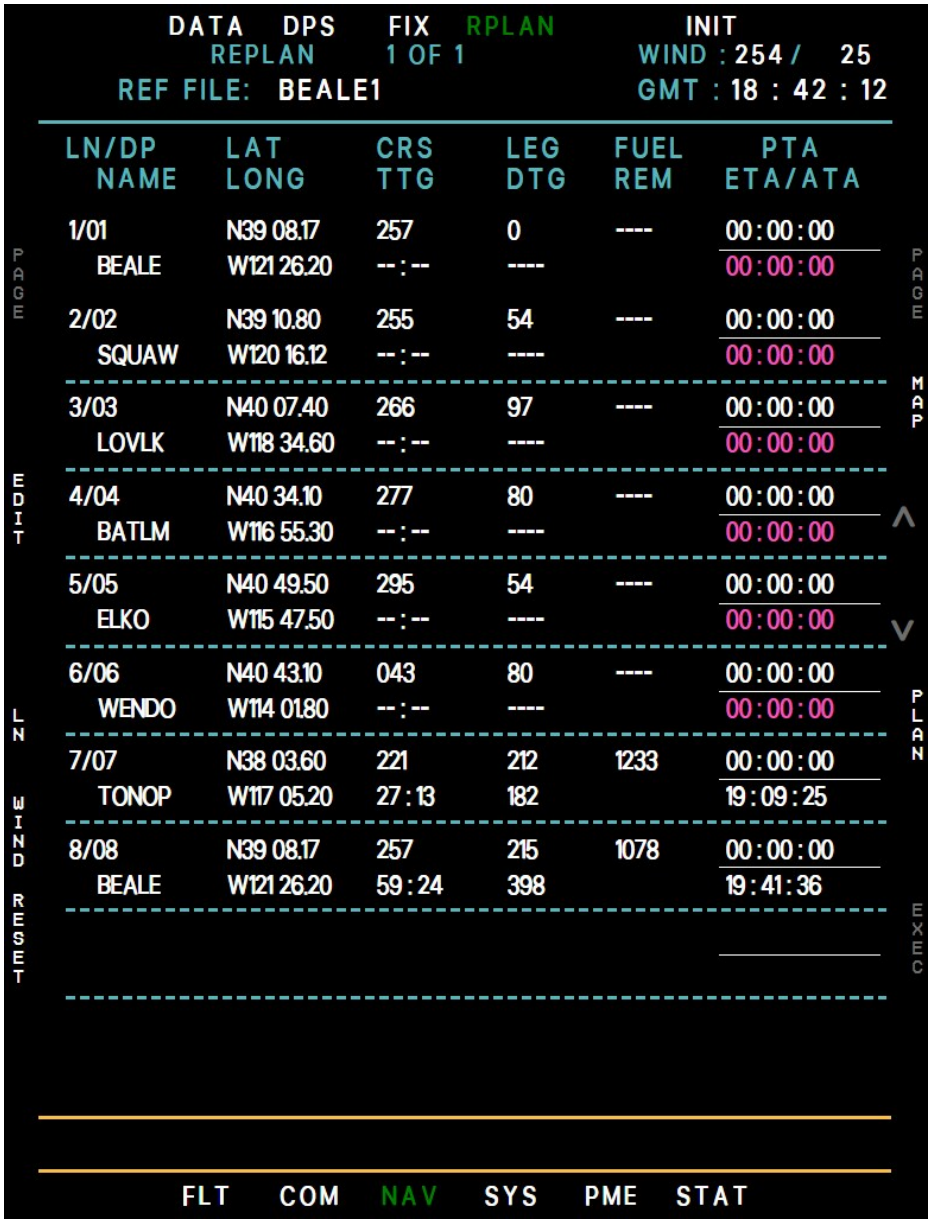


FIX DETAIL: the snapshot of the aircraft at the automatic fix - position from the INU and the GPS, engine, oil, fuel, cabin, oxygen, speeds and wind.

RPLAN - Route Planning

Shows the active DP file as a flight log: leg distance, time and distance to go, ETA, and **fuel remaining at each point**, counted from the fuel totalizer (SYS/PERF TOTAL) and colored against your fuel bugs.

Example MFD rplan



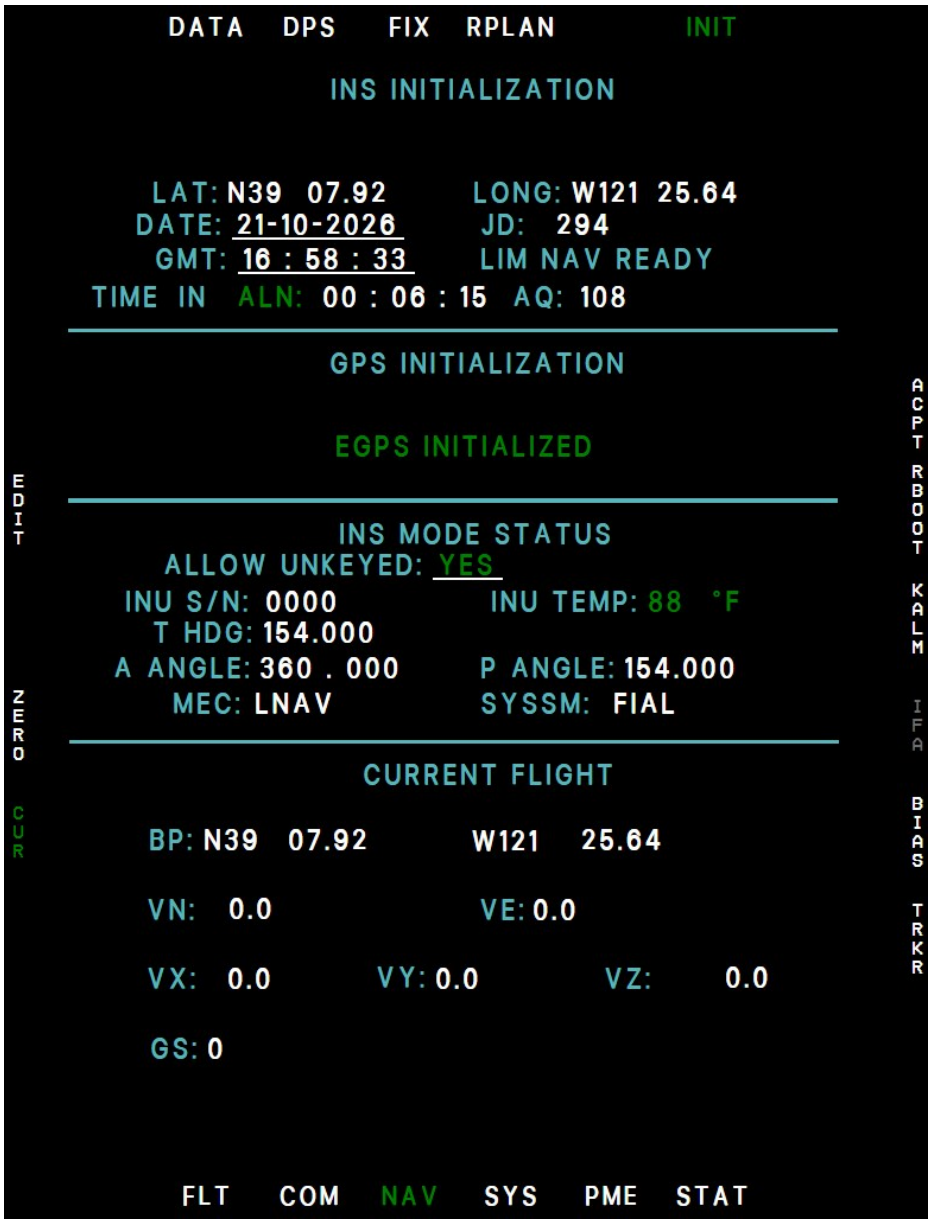
RPLAN shows the active route as a flight log: course, leg and distance to go, time to go, fuel remaining and ETA at each DP; passed points have their ETA/ATA in magenta.

1. **Reference file**
2. **Wind**
3. **Passed DP (magenta)**
4. **TO DP line**
5. **Time to go**
6. **Fuel remaining**
7. **ETA**
8. **EDIT (L2)**
9. **WIND (L5)**
10. **PLAN (R4)**

- L5 WIND applies the current wind to the predictions (green while on).
- L2 EDIT enters a planned time of arrival (PTA) per point: L1/L2 pick the point, INC/DEC changes it by a minute, L3 EXIT.
- R1 MAP previews the route on the MAP page, in straight lines (green while previewing). R2/R3 or INC/DEC page through the lines.
- L4 LN highlights a line (L3/L4 move it). L5 ENT shows the predictions as if you flew from that line (cyan), L6 EXIT leaves.
- With a line highlighted, R6 EXEC then R6 YES hands the plan to the steering computer, which flies it: a direct steer from present position to that line's DP, then the lines in plan order - including reverse sequence, out-of-sequence points and direct-steer steps - to the last line. After the last line it steers direct to the next DP of the file, or starts the right turn if there is none. The executed start line is green, and the ACTIVE file itself is not changed.
- An executed replan ends when you make a new steering entry, load a new ACTIVE file or reach its end; the advisory RPLAN DISABLE then shows until the next EXEC. L6 RESET (L5 YES) withdraws an executed replan without that advisory and returns the plan to the ACTIVE file in sequence.
- R4 PLAN opens the plan builder: a list of steps, each SEQ (the file from a START to an END DP, up or down) or DS (a direct steer to a DP). L2 EDIT, L3 ADD, L4 DEL and L5 RESET build it, INC/DEC changes the boxed field, R2 ENT recalculates, R1 MAP previews and R6 RTN returns. The REPLAN lines then follow your plan.

INIT - INS Initialization

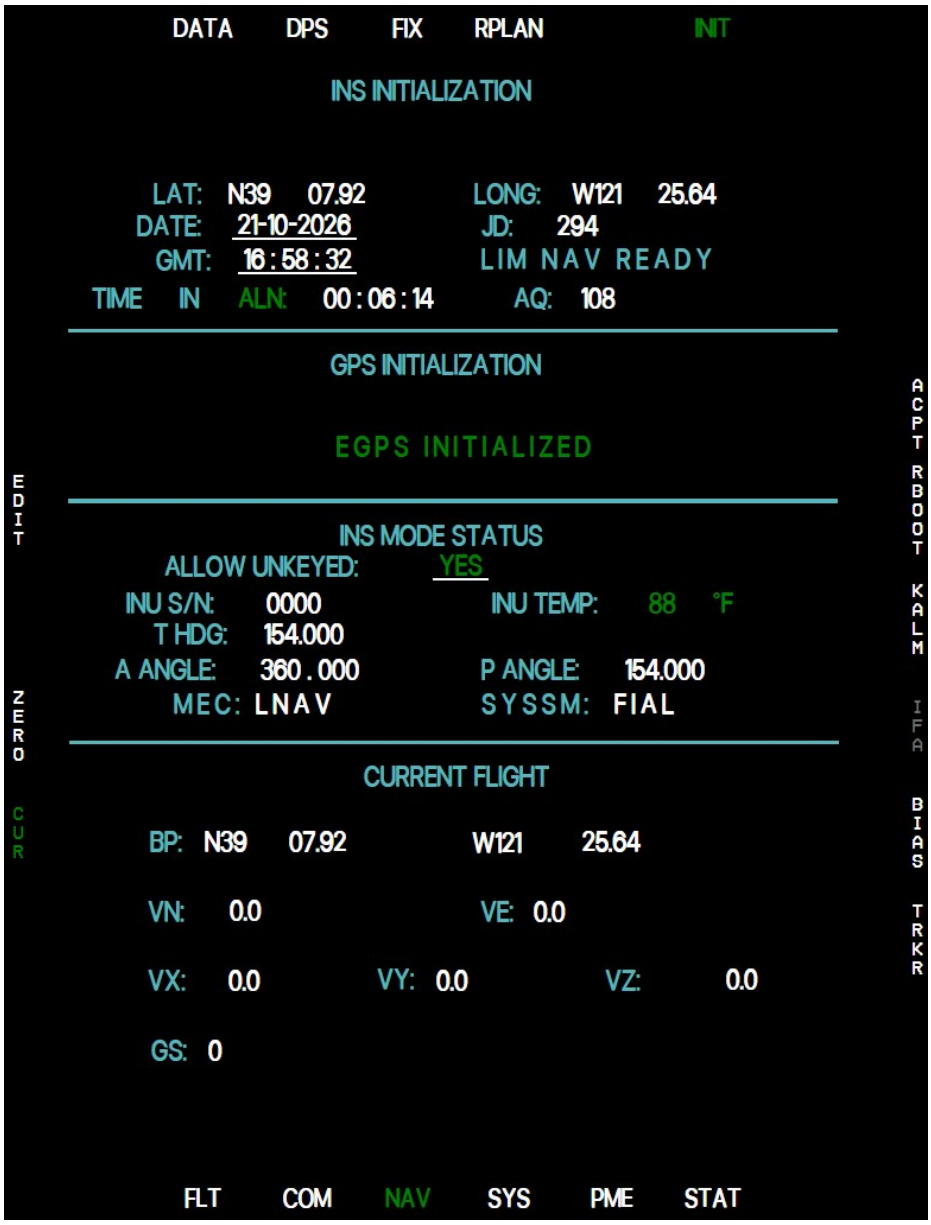
Example NAV INIT page



1. **Position:** The alignment position you gave the INS (while in standby or aligning), otherwise the live INS position.
2. **Date and GMT**
3. **Status:** ENTER POS / LOAD, ACFT MOVED, LIM NAV READY or FULL NAV READY.
4. **Time in Mode and Align Quality (AQ):** TIME IN ALN / IFA / NAV from the INS, or INS MODE: STBY before the alignment starts. AQ counts down from 300 during alignment - lower is better. During an in-flight alignment CHG HDG 45° appears in magenta next to AQ partway through: turn about 45°. The turn is optional - the alignment finishes on time either way - and the cue goes once you have turned 40° or more.
5. **INU Temperature**
6. **ALN / ACPT (R1):** ALN starts the ground alignment, confirm with R2 YES. When a READY state is reached the legend changes to ACPT - press it and confirm with R2 YES to go to NAV.

7. **IFA (R4):** In-flight alignment, available in the air with the INS aligning or navigating. Confirm with R3 YES (R4 NO).
8. **EDIT (L2):** Boxes the date, GMT and ALLOW UNKEYED fields. The date and time always follow the simulator clock, and in our rendition these entries have no effect. There is no position entry on this page - see below.

Example MFD init



NAV/INIT during the ground alignment at Beale: the alignment position, date and time, LIM NAV READY with the time in alignment and AQ, and ACPT offered at R1.

The INS gets its alignment position from the INS switch in LOAD. The MFD has no LAT/LONG entry: to type a position by hand, use the BCDU NAV INIT page, which is only available with the AVP off (BCDU backup control).

In the GPS INITIALIZATION block the EGPS line reads EGPS OFF, EGPS INITIALIZING ... or EGPS INITIALIZED; during the alignment MEC and SYSSM show its phase.

L5 CUR shows the INS position and velocities in the bottom block; R5 BIAS and R6 TRKR show reference data (display only). L4 ZERO, R2 RBOOT and R3 KALM ask for confirmation but do not change the navigation in our

rendition. All legends are gray until the INS is powered. The full alignment procedure is in Inertial Navigation System (INS).

Related pages: Navigation System (INS Steering) · Inertial Navigation System (INS) · Up-Front Control Display (UFCD)

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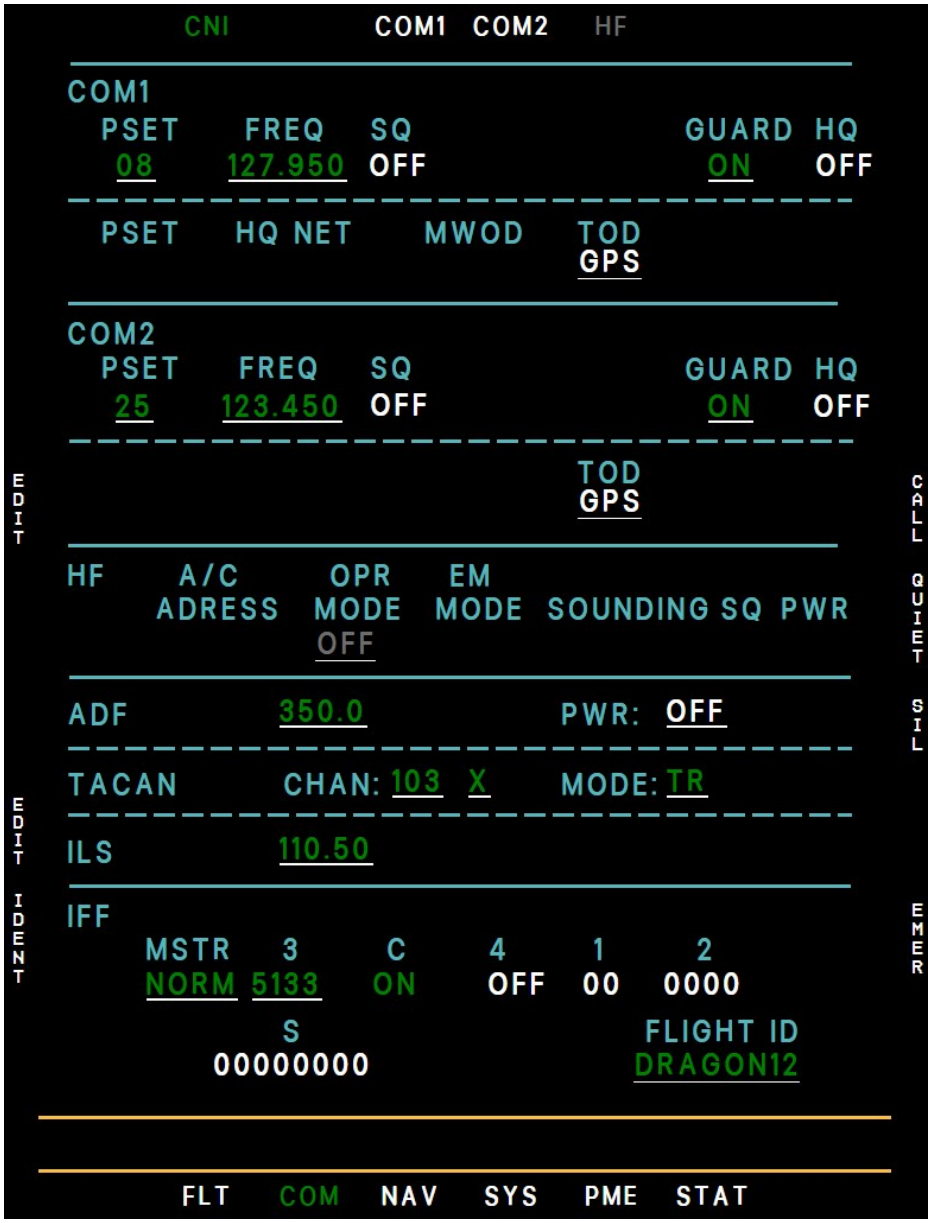
Communication Pages (COM)

The COM pages show all radios and navigation receivers on one page (CNI) and hold the COM 1 and COM 2 preset lists.

CNI

A one-page summary of COM 1, COM 2, ADF, HF, TACAN, ILS and IFF. The radios mirror the UFCD, which is usually quicker to use; the ADF is tuned only here or on the BCDU ADF page.

Example MFD cni



COM/CNI: one-page summary of COM 1, COM 2, HF, ADF, TACAN, ILS and the IFF.

1. **COM 1 frequency**
2. **COM 2 frequency**

3. **HF (not fitted)**
4. **ADF**
5. **TACAN channel**
6. **ILS frequency**
7. **IFF master**
8. **Mode 3 code**
9. **EDIT (L2)**
10. **EMER (R6)**

- L2 EDIT walks through the radio fields - COM 1 and COM 2 (preset, frequency, guard), ADF, TACAN (channel, X/Y, mode) and ILS; L5 EDIT the transponder. Preset 00 tunes that radio to guard, 121.500 (INC/DEC one step below 01, or 0 on the UFCD pad). -- means a frequency that is not one of the presets, such as one entered on the UFCD. COM frequencies are VHF channels from 118.000 to 136.990, the 8.33 kHz ones included; INC/DEC steps one channel and stops at the ends of the band.
- **↔ GUARD:** switches that radio's separate guard receiver on or off - the same as GRD: on the UFCD COM page. It never retunes the radio; only preset 00 does. ON is green, magenta while the UFCD G key mutes guard for 30 seconds, and white while guard stays muted until G is pressed again.
- **ADF:** frequency in kHz, 190 to 1749.5 in 0.5 kHz steps as the real ADF-206, set with INC/DEC or the UFCD pad (whole kHz, or with the tenths digit: 3655 is 365.5 kHz, 11470 is 1147.0), and PWR ON / OFF. The ADF does not tune itself - tune an NDB in range.

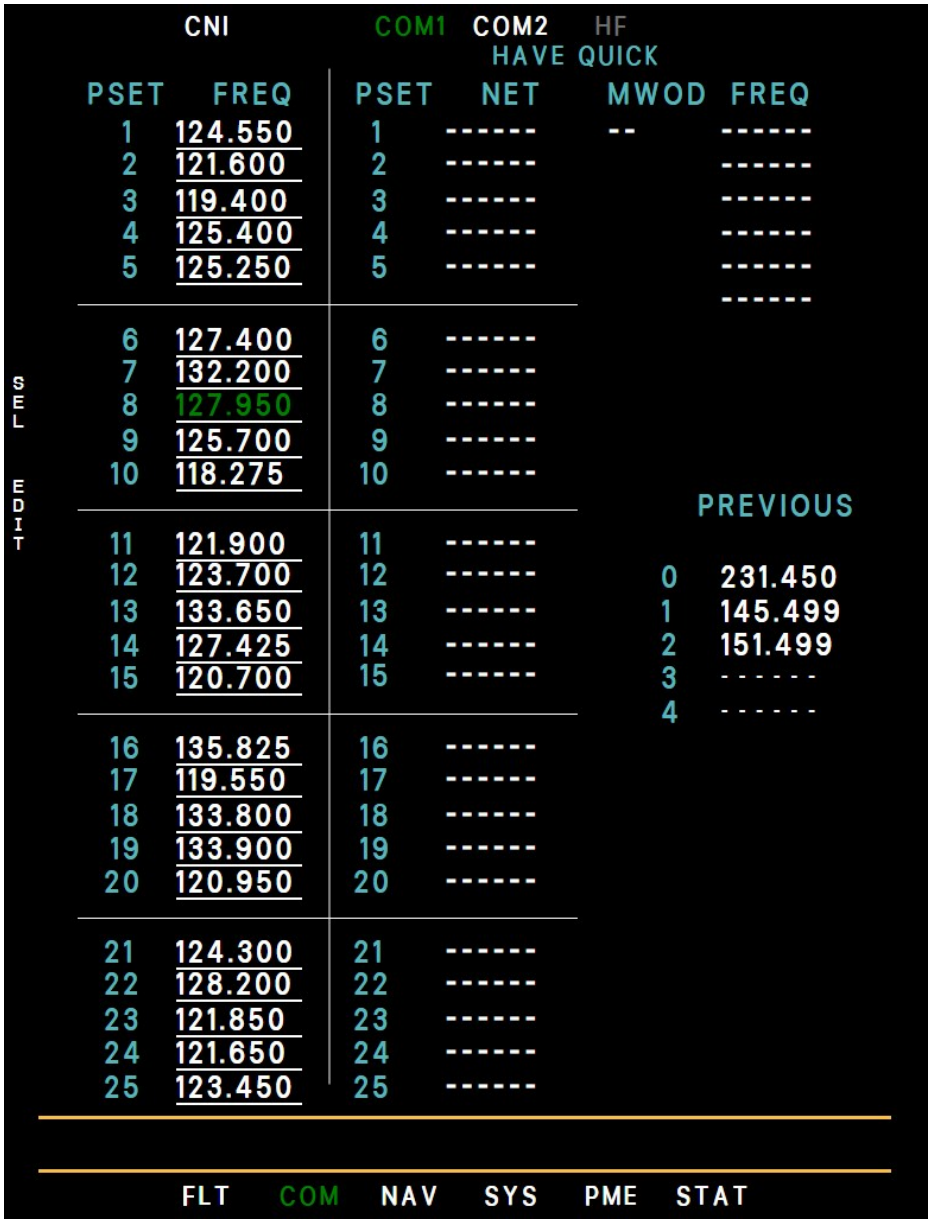
It starts every flight switched on: with no bearing from the tuned station for 5 seconds you get the ADF SIGNAL advisory, so tune a station or set PWR to OFF. To reach the ADF row: L2 EDIT, then L2 (down) twice for the frequency and L3 for PWR.

- **TACAN:** channel, X/Y and mode (TR, R, AR, AT). With the TACAN knob on the audio panel at its stop the TACAN is off: MODE reads OFF, channel and X/Y are blank and the cyan TACAN FAULT advisory shows. A yellow TACAN FAULT is a real failure.
- **ILS:** the frequency the ILS receiver is tuned to. INC/DEC steps through the 40 localizer channels from 108.10 to 111.95 (108.10, 108.15, 108.30, 108.35 ... 111.95) and wraps around; a frequency typed on the UFCD pad must be one of them (1095 = 109.50). In EDIT, L1 (up) from the first row jumps straight to the ILS row. The BCDU ADF and ILS pages have the same settings.
- L6 IDENT: transponder ident.
- R6 EMER then R7 YES: squawks 7700 (the EMER legend turns yellow). Press again to return to your previous code.
- The HF radio is not fitted: its block reads OFF in gray and the HF tab has no page. HAVE QUICK and COMSEC are not modeled. IFF Modes 1, 2, 4 and S are shared with the UFCD page. Only Mode 4 does anything: switched ON without a code it gives IFF MODE 4 RPLY FAIL (see the UFCD IFF page). The FLIGHT ID shown here is fixed.

COM1 / COM2 Presets

25 presets per radio. L1 SEL picks one (L1/L2 up and down, L3 next column) and L5 ENT tunes it. L2 EDIT changes one with INC/DEC (one 8.33 kHz channel a step) or the UFCD pad (a frequency that is not a channel is refused): L5 ENT stores it (and retunes if it is the preset in use), L4 EXIT leaves without storing.

Example MFD com1



The COM 1 preset page: 25 VHF presets with the one in use in green, the (unused) HAVE QUICK columns and the previous frequencies.

1. **Preset 1 (KBAB ATIS)**
2. **Preset in use**
3. **HAVE QUICK**
4. **Previous frequencies**
5. **SEL (L1)**
6. **EDIT (L2)**

Note
The preset lists are real VHF frequencies: COM 1 holds Beale AFB and US frequencies (preset 1 = KBAB ATIS 124.550, 2 = Beale Ground 121.600, 3 = Beale Tower 119.400 ... 25 = air-to-air 123.450), COM 2 the deployed bases (Fairford, Akrotiri, Osan, Al Dhafra).
To make your own list permanent, edit presets.json in the MFD folder of the package (VHF channels from

118.000 to 136.990, the 8.33 kHz ones included; any other value keeps the built-in preset); changes made in the cockpit last for the current flight only.

Related pages: Multi-Function Displays (MFDs) · Up-Front Control Display (UFCD) · Quick Answers

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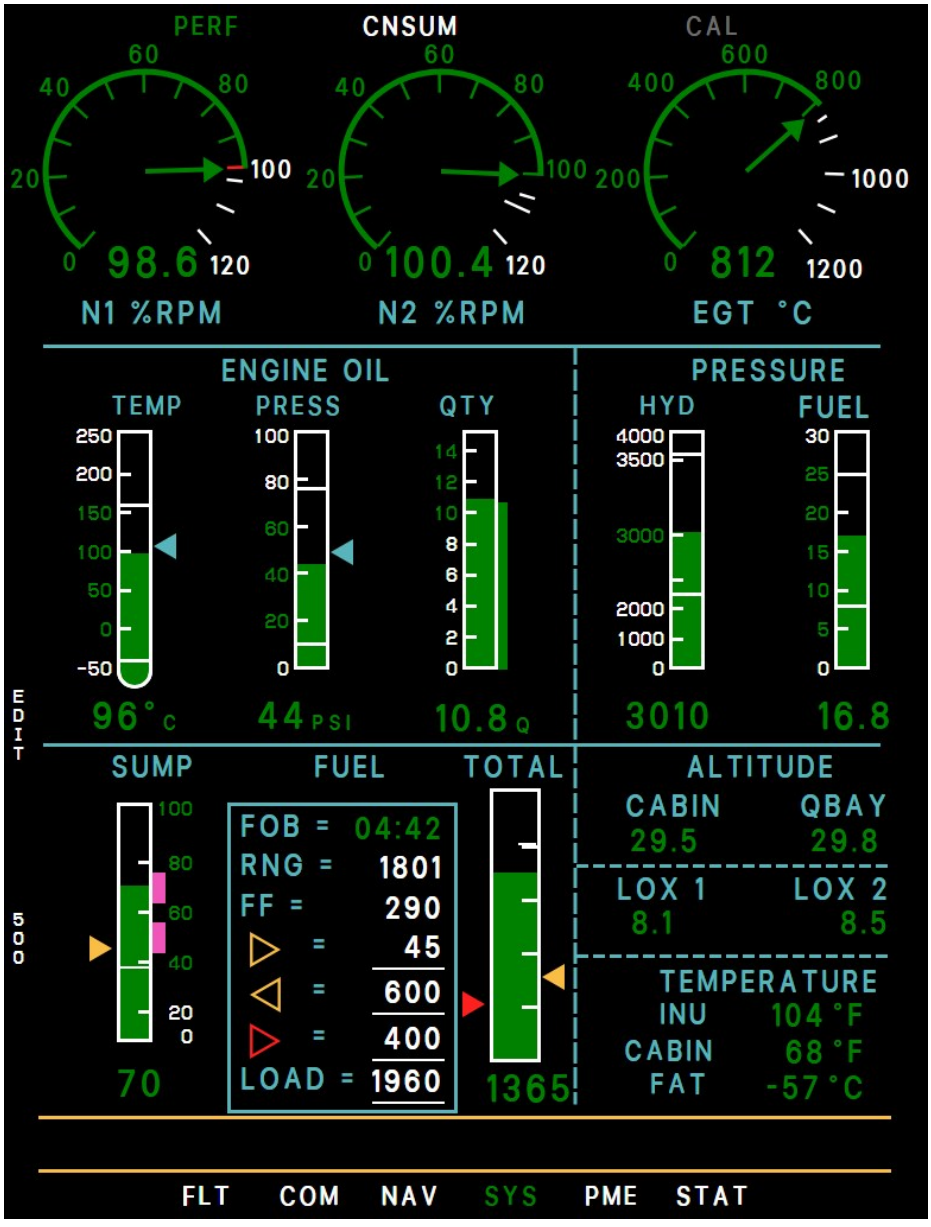
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System Pages (SYS)

The SYS pages hold the fuel and performance data (PERF), the consumables (CNSUM) and the calibration page (CAL).

PERF

Example SYS PERF page



1. **N1** (% RPM): Red above 100 %.
2. **N2** (% RPM): Red above 106.3 %.
3. **EGT** (°C): Red above 842 °C. Climb power above 45,000 ft is 650 - 725 °C - see Power and EGT.
4. **Engine Oil:** Temperature, pressure and quantity. The cyan pointers mark the highest value of this flight. The quantity tape is a 15-minute average, the thin strip inside shows the actual value. The reading swings as the oil moves in the climb and descent; the real quantity does not change.

5. **Hydraulic Pressure** (psi): Red with HYD PRESS LOW or HYD PRESS HIGH: 5 seconds below 2,850 on the ground with the engine running (2,800 in the air), or above 3,250.
6. **Fuel Pressure** (psi): 15-19 with both boost pumps, 11-15 on one. Yellow below 8 or above 25.
7. **Sump Tank Quantity** (Gallons): About 70 (50 when feeding from the outboards) - the magenta bands. Red at 38 or less.
8. **Fuel Data:** FOB = endurance (h:mm) of the TOTAL count at the present fuel flow, RNG = range (NM), FF = fuel flow (gal/h). Below are your three fuel bugs (sump, yellow total, red total) and LOAD.
9. **Total Fuel** (Gallons): The fuel totalizer, the same count as the window of the GPH gauge. It starts at the fuel in the tanks, counts down with the fuel flow and is set again with LOAD or 500, so fuel lost any other way (a leak, a dump) does not show in it. On a long cold flight it reads a little high as the fuel shrinks. Turns yellow / red below your bugs.
10. **Cabin and Q-Bay Altitude** (x1000 ft)
11. **Liquid Oxygen Quantity** (Liters), systems 1 and 2. A converter's reading turns red below 1 liter.
12. **Temperatures:** INS unit, cabin (°F) and outside air (°C). The outside air temperature comes from the probe through the air data unit: dashes without it, or while the probe reads out of range - its heater (PITOT HEAT) takes it there in about a minute standing still, with APCU FAULT.
13. **EDIT (L4):** Each press selects the next item: sump bug, yellow bug, red bug, LOAD; the EDIT legend stays up while you step. Change with INC/DEC (sump 1 gal, bugs 5 gal, LOAD 10 gal) or the UFCD pad. While editing the sump bug, L5/L6 set 35 or 65. A new LOAD only counts after L5 YES; L6 NO drops it. L3 EXIT.
14. **500 (L6):** Asks 500?, written down the left side between L5 YES and L6 NO, and hides EDIT until you answer. YES sets LOAD and the TOTAL count to 500 gallons, NO cancels; other keys do nothing meanwhile.

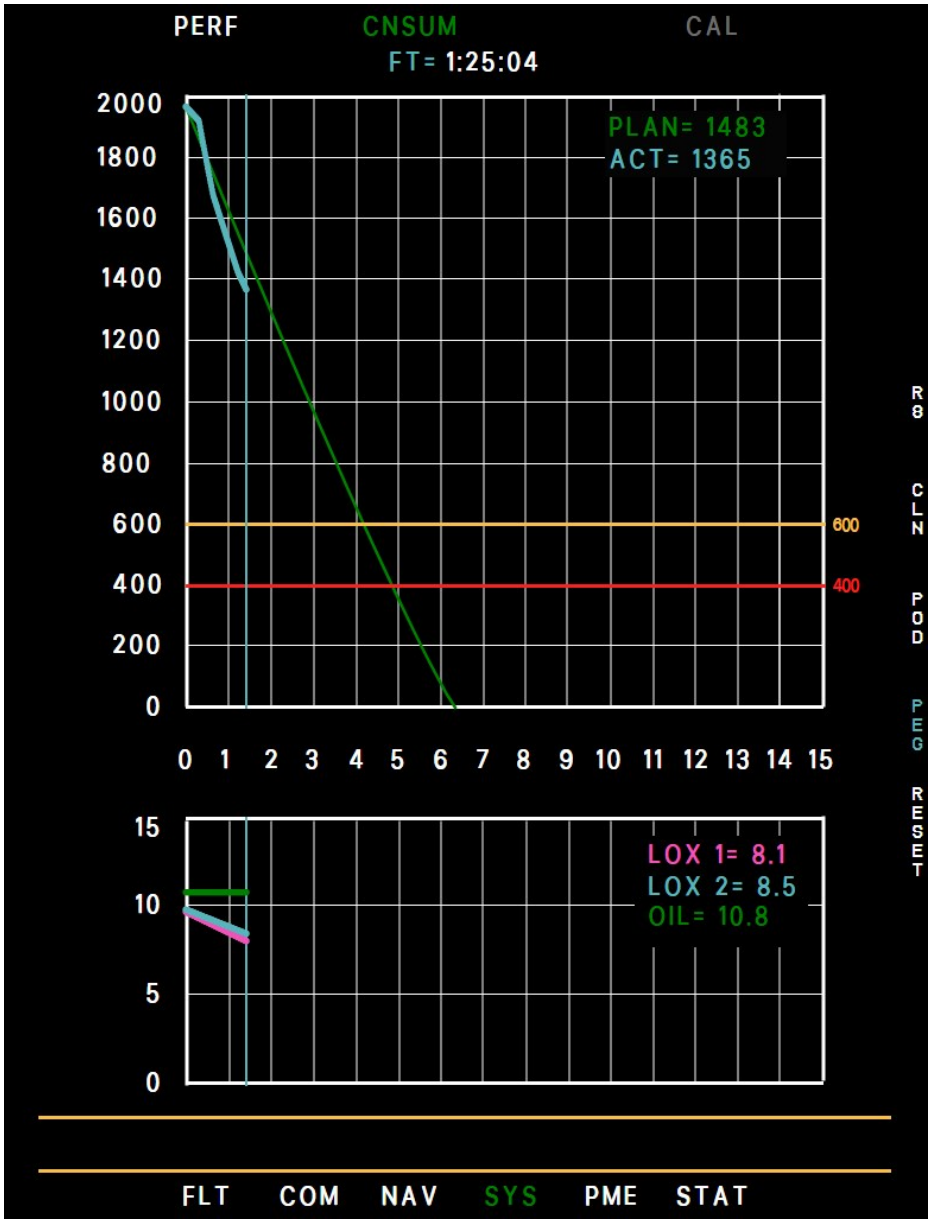
Note
LOAD sets the totalizer, not the fuel in the tanks. A LOAD you enter (or 500) becomes the TOTAL count, and the TOTAL tape is scaled to it. LOAD takes a fuel load on the ground (and the fuel at an air start); in flight it stays put unless you set it, so LOAD minus TOTAL is the fuel you have used. To put fuel in the aircraft, use the MSFS Fuel and Payload window.

Caution
The fuel bugs start switched off on every flight, and the aircraft has no built-in "low total fuel" warning - so set them. Falling below a bug gives you CHECK SUMP QTY or CHECK TOTAL FUEL.

CNSUM - Consumables

Plots fuel, oxygen and oil over a 15-hour timeline against a planned burn curve. R1 selects the planned load, R2-R4 the aircraft configuration (CLN / POD / PEG), R5 RESET restarts the trace. The plan curve is a generic estimate.

Example MFD cnsum



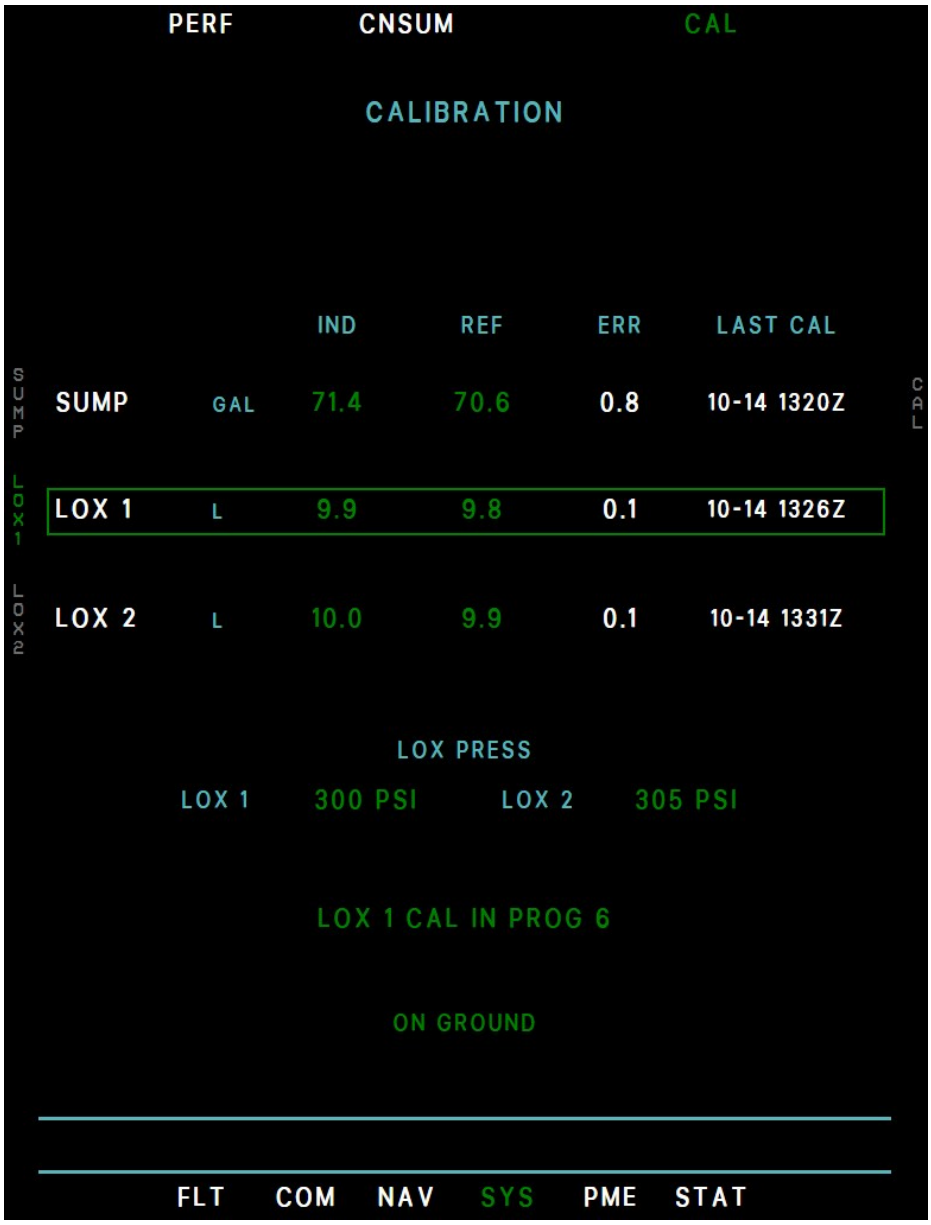
SYS/CNSUM: fuel used so far (cyan points) against the planned burn curve (green) with the fuel bugs, and the two LOX systems and the engine oil below.

1. **Time since start**
2. **Planned fuel**
3. **Actual fuel**
4. **Yellow bug**
5. **Now**
6. **LOX / oil**
7. **Planned load (R1)**
8. **Configuration**
9. **RESET (R5)**

CAL - Calibration

A maintenance page for the sump and liquid-oxygen quantity indications, reached with T6 CAL from PERF or CNSUM. It can only be selected on the ground: in the air the CAL tab is gray (a CAL page already open at takeoff stays until you leave it). The bottom of the page shows ON GROUND or AIRBORNE.

Example MFD cal



SYS/CAL on the ground: indicated and reference quantities of the sump and both LOX systems with their last calibration, and a LOX 1 calibration in progress.

1. **Indicated**
2. **Reference**
3. **Difference**
4. **Last calibration**
5. **Selected row**
6. **LOX pressures**

7. **Calibration running**
8. **ON GROUND**

- One row each for L1 SUMP (gallons), L2 LOX 1 and L3 LOX 2 (liters): the indicated quantity (IND), the system's own quantity (REF), their difference (ERR, yellow when it is more than 3 gal or 0.2 l) and the date and time of the last calibration. The two LOX converter pressures are shown below.
- Select a row with its left key (green box), press R1 CAL and confirm with R6 YES - any other key cancels. The calibration takes 8 seconds (CAL IN PROG); the keys do nothing meanwhile, and leaving the page cancels it. CAL COMPLETE then shows with the new LAST CAL time, on all three MFDs.

Note
In our rendition a calibration records its date and time; it does not change the indicated quantities.

Related pages: Fuel System · Electrical and Avionics Power · Engine Start and Cockpit Controls · Warnings and Alerts

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Mission Equipment (PME)

What each sensor is and which one to fit is under Sensors. This page is how you use them.

The U-2S carries one imaging sensor at a time - the ASARS-2 radar nose, the SYERS-2A camera nose, or the optical bar camera (OBC) in the Q-bay behind the cockpit, which flies with the Standard nose only - and the PME pages are where you use it.

Which pages work depends on what is fitted on the EFB Aircraft tab: with the ASARS-2 nose the RDR and ASR pages are live; with the SYERS-2A nose, or the Standard nose and the OBC, it is CAM and SYR (it reads OBC with the Q-bay camera).

The tab of a sensor that is not fitted is gray and its page cannot be selected. All of them are run from the Mark IV panel on the right console: its MODE knob also powers the radar, and its hand control aims the camera and moves the radar cursor.



The PME power panel, inboard on the right console: the RECORDER and MSN RCD switches. PME-A, PME-B, PME-C and CHBDL have no function.

PME power panel

1. **RECORDER** - RCD ALL / OFF / RCD VOICE. RCD VOICE is momentary: it disables the transmitters and springs back to OFF after 1.5 s. Nothing is actually recorded in the sim.
2. **MSN RCD** - ON / OFF. The mission recorder: it must be ON for the EW threat tone. It is ON after a runway or in-flight start.
3. **PME A** - ON / OFF. No function in the simulator (SIGINT is not simulated).
4. **PME B** - ON / OFF. No function in the simulator (SIGINT is not simulated). The radar is powered from the Mark IV MODE knob.
5. **CHBDL** - ON / OFF GROUND. No function in the simulator.
6. **PME C** - ON / OFF. No function in the simulator (SIGINT is not simulated).

Sensor power - what has to be on

1. Fit (EFB Aircraft tab)	2. Power	3. Operate
ASARS-2 nose for the radar page SYERS-2A nose, or Standard nose with the Q-bay OBC, for the camera page	Radar: MODE STBY starts the warm-up SYERS-2A: MK IV MASTER ON, then MODE STBY starts the boot OBC: DRIFTSIGHT ON, MK IV MASTER ON starts the boot, then MODE OFF runs the self-test 30 seconds; with the EFB option *Sensor warm-up time* on *Realistic* 12 minutes for the radar, 4 for the SYERS-2A, 90 seconds for the OBC. Then STBY	Radar: MODE 1-5 is PWR, radiates once airborne SYERS-2A: MODE 1-5 opens it, from 1,000 ft above the ground OBC: MODE 1-5 after the self-test, photographs at or above 5,000 ft L4 TEST works on the ground (radar and SYERS-2A)

Note
Both pages build their pictures from online map data while you fly: satellite imagery for the camera, terrain elevation for the radar. When a sensor gives no picture, its page shows a black screen with a status box telling you why, with the reason in cyan.
On the RDR page the first line is yellow; on the CAM page it is white for a normal step and yellow for what needs your attention.

Status Box	Meaning
SYERS-2A OFF / OBC OFF	MK IV MASTER OFF: switch it ON. NO POWER: the aircraft has no electrical power. SYERS-2A only: MK IV MODE STBY TO START: turn MODE to STBY. SHUT DOWN - CYCLE MK IV MASTER: MODE went to OFF after the start - switch MASTER OFF and ON again.
ASARS-2A OFF	MK IV MODE STBY TO START: turn MODE to STBY. NO POWER: the aircraft has no electrical power.
NO CAMERA FITTED / ASARS-2A NOT INSTALLED	That sensor is not fitted - change the nose or the Q-bay on the EFB Aircraft tab.
WARMING UP + m:ss	The radar warm-up or the camera boot counting down. The OBC adds ADM BOOT - A LIGHT FLASHING.
SYERS-2A STBY	MK IV MODE 1-5: turn MODE from STBY to 1-5.

Status Box	Meaning
OBC STBY	MK IV MODE OFF FOR THE SELF-TEST, THEN 1-5: MODE is in STBY. Turn it OFF for the self-test; once that has passed, 1-5 works straight from STBY. NO SELF-TEST - MK IV MODE OFF FIRST: MODE went to 1-5 without a passed self-test. PHOTOGRAPHY ABOVE 5000 FT: it opens by itself when you climb through 5,000 ft. MK IV DRIFTSIGHT OFF (first line yellow): switch DRIFTSIGHT ON.
OBC SELF-TEST	FRAME 1 OF 5 and on: the self-test is running. OBC SELF-TEST GO with C LIGHT - MK IV MODE 1-5: it has passed.
OBC MAX FRAMES	1600 FRAMES - A LIGHT: the film has run out and the OBC is not photographing. While it is open it stays on its last frame instead, with the tag MAX FRAMES.
ASARS-2A STBY	MK IV MODE 1-5: turn the Mark IV MODE knob to 1-5 for PWR. PWR WHEN AIRBORNE: it radiates after takeoff. SSA OFF is added while MK IV MASTER is off. OVERTEMP - COOLING: the transmitter has overheated (cooling failure) and stays in STBY until it has cooled down.
SYERS-2A INHIBITED / OBC INHIBITED	BELOW 1000 FT AGL: the camera does not image within 1,000 ft of the ground (AGL DATA UNAVAILABLE while the height above ground is unknown).
GIMBAL LIMIT	ROLL BEYOND STOPS or PITCH BEYOND STOPS: the line of sight is past the gimbal stops - more than 90° from the wings or 15° in pitch. Level the wings or the nose, or bring the camera back with the hand control. Never with the OBC, which has no gimbal. On the RDR page: more than 20° of bank or 10° of pitch, in any mode. No picture is taken meanwhile; once you are back within 19° and 9° the last pictures are on the scope again until new ones replace them.
NO GROUND IN VIEW	LOOK BELOW THE HORIZON: the line of sight does not meet the ground - bring it back down with the hand control.
ASARS NO RESPONSE	NOT ANSWERING ON THE 1553 BUS: a radar failure, with the advisory ASARS NO RESPONSE on the alert line.

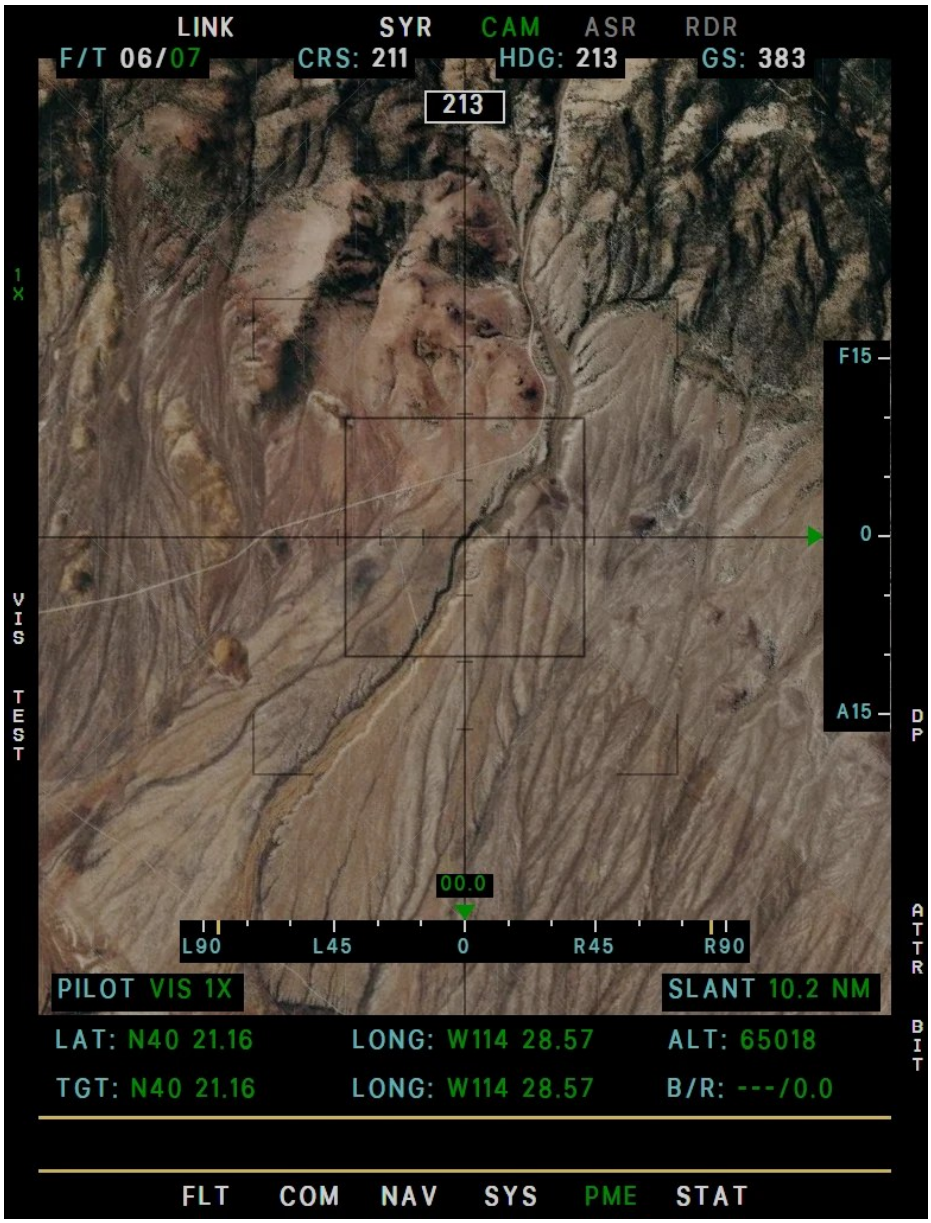
Caution

Camera open or radar sweeping, but no picture: the simulator cannot reach the map servers. The page itself does not say so; the EFB Datalink tab does - its **Datalink Console** lists the error (for example CAM, *No data from image server*, or RDR, *No data from terrain server*).

Check that the PC is online, then any VPN, antivirus web protection or web filter - some of them block these servers (one VPN's threat protection blocks the radar's elevation server in web browsers, for example). Allow mt0.google.com to mt3.google.com (camera imagery, radar SPOT imagery and the TP object read), tiles.openfreemap.org (camera road lights, radar airfields and buildings, the TP object read), s3.amazonaws.com (terrain elevation for the radar and the camera) and ic.imagery1.arcgis.com (radar land cover), or switch the filter off.

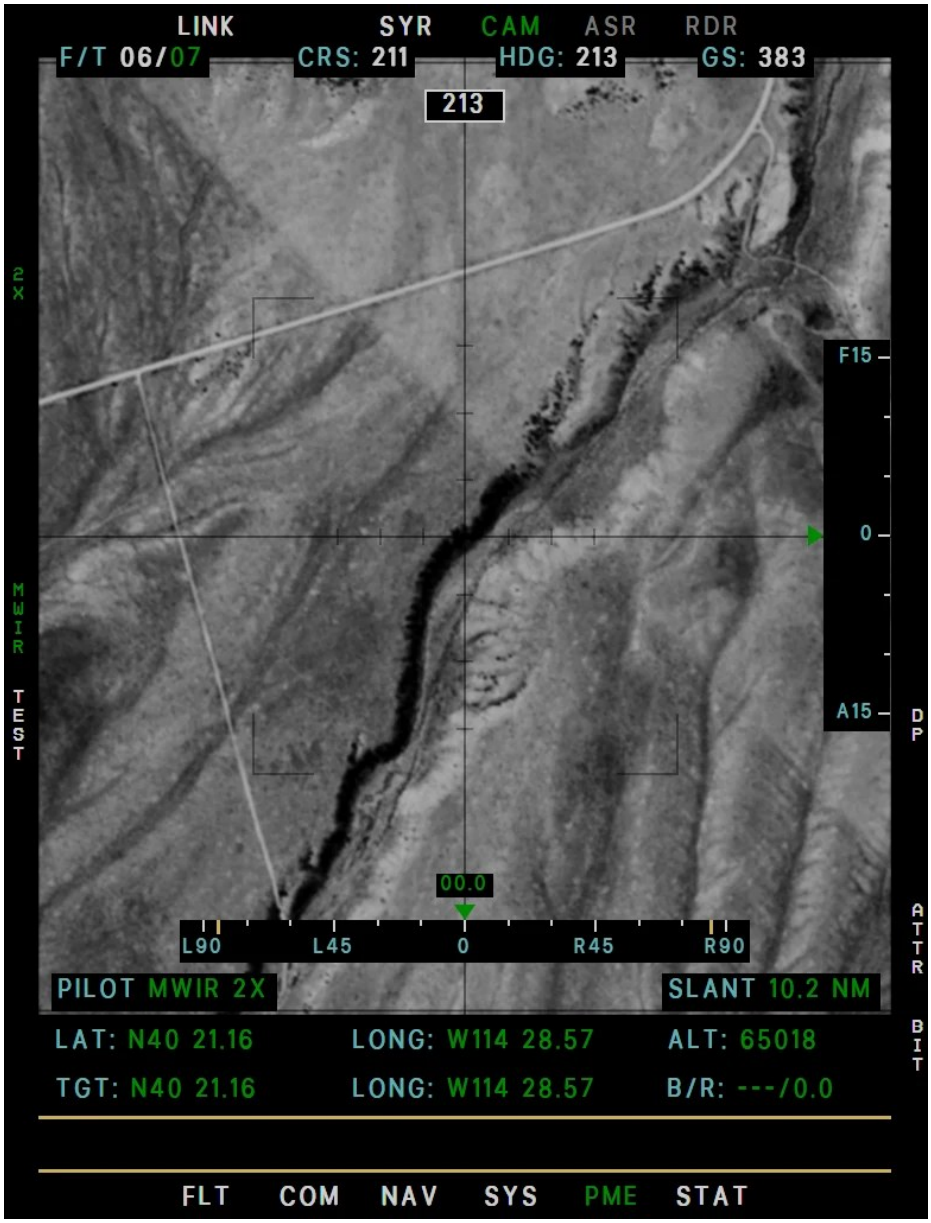
CAM - SYERS-2A and OBC Camera

Example PME CAM page



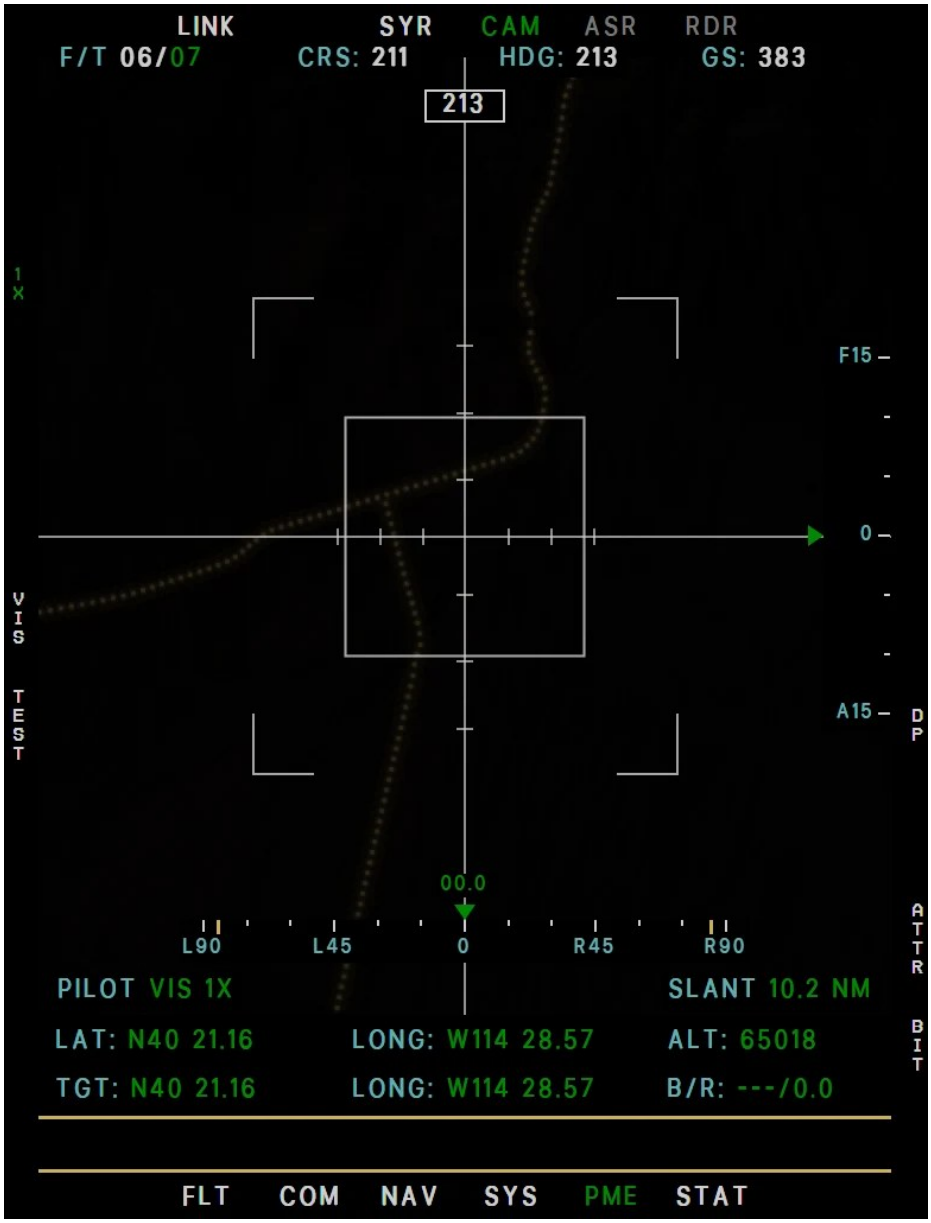
The CAM page with the SYERS-2A open at 62,000 ft: VIS band, 1× zoom, the flight row and heading box at the top, the roll and tilt scales, and the mode line and position rows at the bottom.

Example CAM page, MWIR band



The same spot in the MWIR band at 2×: black and white, twice the magnification.

Example CAM page at night



At night: the picture darkens and real roads show their street lighting.

A reconnaissance view of the ground, built from online satellite imagery, with a reticle whose center box is one mile on a side on the ground, so it grows as you zoom in. You aim it with the viewsight hand control on the Mark IV panel.

Looking straight down the picture is flat and heading-up; looking out to the side you see the ground at an angle - near ground large, far ground small, haze in the distance and sky beyond the horizon - with the ground at the bottom of the picture.

The picture darkens at dusk, and at night it shows street lighting along real roads - the EFB option *CAM road lights* (Settings tab) is on at every flight start; switch it off if the frame rate suffers.

The page reads like the RDR page:

- **Top row.** Steering mode and DPs, CRS, HDG and GS, in black boxes over the picture. The box under it in the middle shows the magnetic heading. During a DP slew DP: names the point and its file.

- **Roll and tilt scales.** Roll runs along the bottom of the picture, 90° each way with yellow marks at the 85° reach of the hand control, and the value rides over its green caret, for example R60.0. Tilt runs up the right edge, 15° each way, F forward and A aft. A caret turns amber from 80° of roll or 10° of tilt.
- **Mode line.** On the left PILOT on the hand control, AUTO in a DP slew or TEST, with the band and zoom. On the right SLANT, the distance to the point the camera looks at.
- **Data rows.** LAT, LONG and ALT are your own. TGT, LONG and B/R (magnetic bearing / NM from you) are the ground under the crosshair.

Start the SYERS-2A on the Mark IV panel: MK IV MASTER ON, MODE STBY for the boot (30 seconds, 4 minutes on *Realistic*), then 1-5. The feed appears at once, at any height, looking straight down. The OBC has its own sequence - see Starting and Stopping the Camera.

Key	Legend	Function
Left rocker	zoom, e.g. 4X	Zoom 0.5× to 73× in steps (0.5, 1, 2, 3, 4, 6, 8, 12, 16, 24, 32, 48, 64, 73), and on to 90× in SWIR and MWIR, only while the camera is open; green then. The distance to the point the camera looks at caps it: about 4× at 1,000 ft, 13× at 5,000 ft, 22× at 10,000 ft and 32× at about 14,000 ft. From there the whole range is open: above 32× the MFD magnifies the picture, so it gets softer. Also on key bindings - see Keybinds Guide. The OBC goes up to 15×.
L3	VIS / NIR / SWIR / MWIR / MSI	Band: visible, near infrared, short-wave and mid-wave infrared, multispectral. NIR, SWIR and MWIR are black and white, MSI is false color. SWIR and MWIR magnify twice as much at the same zoom, with a coarser picture. Green when not VIS. Not with the OBC.
L4	TEST	Self-test of about 19 seconds once the boot is done (MODE STBY or 1-5), at any altitude: the picture opens in VIS - on the ground as seen from 3,000 ft - the zoom sweeps to 8× and back to 1×, then your zoom comes back. The mode line reads TEST. L4 again cancels it. Not with the OBC: it has no legend there, and its self-test is MODE OFF.
L5	LOCK / PAUSE	SYERS-2A, from STBY up: LOCK. Unlocked, the default (white legend), the camera keeps its angles to the aircraft, so the picture moves with you. Locked (green) it holds the spot on the ground it is looking at and turns by itself to keep it, until it reaches its fore / aft stop. A DP slew (R4, then R1 ENT) locks it by itself; unlocking ends a slew. OBC: PAUSE, while it is open: holds the picture on every MFD, with the tag PAUSED under the heading box and the legend green. The zoom and the hand control still work on the held picture, and the film keeps running. L5 again shows the live picture; so does the camera closing.
R4	DP	DP slew, camera open: pick the file with R2 (ACT, ST1 to ST4, TP), step through its points with the right rocker, and R1 ENT points the camera at the point and locks on it (the SYERS-2A's LOCK turns green); the mode line reads AUTO. A number in amber is out of reach for now (85° to the side and 15° fore / aft) and ENT waits until it comes in. With the OBC only 45° to the side counts: it turns left or right toward the point, which comes into the picture as you pass it. R4 again ends the slew; so does moving the hand control, and the SYERS-2A then stays locked on that ground.
R6	ATTR	Opens the CAM ATTRIBUTION box with the imagery, road-data and effects credits. R6 again, or leaving the page, closes it. The full list is on the EFB Datalink tab, under Attributions.

Key	Legend	Function
R7	BIT	Opens STAT → FAULT with SYERS (or OBC) selected: its status color and current faults. The SYERS-2A's own self-test is L4 TEST, the OBC's is MODE OFF.

Pointing the camera, the SYERS-2A lock, the SYERS-2A nose and the camera symbol on the MAP are under Mark IV Camera Panel.

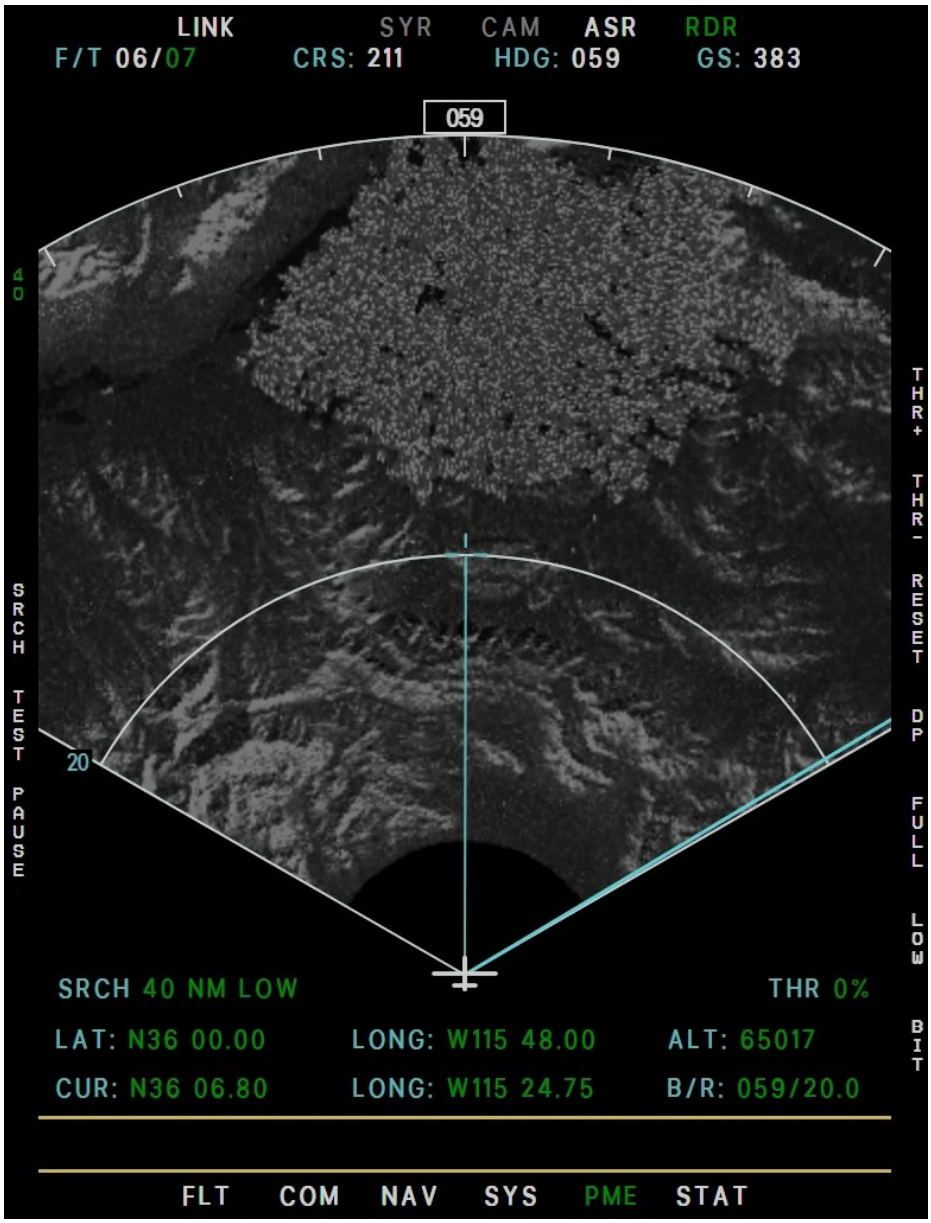
OBC. The optical bar camera in the Q-bay (EFB Aircraft tab, Q-bay: OBC camera, 1,050 lb; Standard nose only) has its own start on the Mark IV panel - see Starting and Stopping the Camera - and the pages then read OBC.

It has one band, so no L3, and no L4 TEST. Its picture is a live feed in a black-and-white film look with grain. Detail falls off as you look out to the side, and the exposure follows the slit width of the MODE position against the height of the sun.

- **Mode line.** On the left OPR with the coverage and zoom, for example MONO 55% 1X. On the right LENS, the lens temperature - its heaters bring it to 75 °F in about 5 minutes once the camera has power, amber outside 73 - 77 °F - and FRAME.
- **Film.** FRAME counts the frames used, self-test included: one every 1.2 s with SHUTTER VELOCITY on 1, every 0.7 s on 2 - 4, up to 1,600, kept until you change the camera. At 1,600 FRAME turns yellow, the tag MAX FRAMES appears and A lights steady. The camera stays open on its last picture; the zoom and the hand control still work on it.
- **Looking around.** The camera itself cannot move: the hand control looks left and right on the feed, up to 45°, on a roll scale of that size. There is no tilt scale. The zoom goes up to 15×, and L5 PAUSE holds the picture.
- **From outside.** The camera sits lens up when off (MASTER off or MODE OFF) and lens down in STBY, and the bar spins when on, one turn per frame.

RDR - ASARS-2A Radar

Example PME RDR page



The RDR page operating in SRCH at 40 NM, LOW resolution, over Las Vegas: the city a bright speckled return, the ranges around it lit from your side, water and radar shadow black.

A ground-mapping radar scope built from real terrain elevation and land cover: a ±60° fan ahead of the aircraft, swept every few seconds, with the terrain lit from your side and water black. The picture reads like a real synthetic-aperture image: two-look speckle, farmland as a patchwork of fields with crop rows, tree crowns with their radar shadows on the finer scales, and star-shaped sidelobe streaks around the strongest built-up returns.

The top row shows the steering mode, course, heading and ground speed; the bottom rows your position and the cursor's position and bearing / range.

1. ASARS-2 nose fitted, MK IV MODE on the Mark IV panel to STBY. The radar warms up (30 seconds, 12 minutes on *Realistic*), then STBY. With MODE OFF it stays off.
2. MK IV MODE 1 - 5 is PWR, STBY is standby. You can select it during the warm-up or on the ground. Once airborne the sweep starts. The RDR page has no power key.

3. MK IV MASTER ON powers the SSA recorder. With it off the radar works the same, but the page shows SSA OFF in the STBY box, and SSA OFF at the top of the scope while it radiates.
4. Below 5,000 ft above the ground the scope reads ASARS-2A MAP DISABLED BELOW 5000 FT AGL.

Key	Legend	Function
Left rocker	-	In SRCH the range: 10 / 20 / 40 / 80 / 160 / 240 / 320 NM, limited by the resolution (LOW 320, MID 160, HIGH 80 NM). In SPOT the patch size: LOW 10 / 20 / 40 NM, MID 5 / 10 / 20 NM, HIGH 0.1 / 0.25 / 0.5 / 1 / 2.5 / 5 / 10 NM. A new SPOT size starts a new image at once; the picture on the scope stays until the new one replaces it (RESCAN).
R1 / R2	THR+ / THR-	Threshold - suppresses the weakest returns; the value shows beside the keys.
L2	-	No function. The radar's power is the Mark IV MODE knob.
L3	SRCH / SPOT	SRCH (search) = the full fan. SPOT = a small high-resolution patch on the ground around the cursor, starting at the size nearest a quarter of the range, imaged again every 15 seconds or so and held still while you look. A new spot - SPOT entered from SRCH, or the cursor moved more than about 1 % of the patch - shows IMAGING, counting down the time to form its picture, 3 to 30 seconds - longer for a farther or finer patch. The same spot taken again - the 15-second refresh, a new size or a new resolution - shows RESCAN, counting down to the next picture (0 while it is being taken). Either way the old picture stays until the new one replaces it. The top right of the scope shows the mode, range or patch size and resolution.
L4	TEST	10-second self-test: two sweeps through the display colors and symbols, then TEST COMPLETE - PASS, or BIT FAIL - ASARS FAULT with a fault. It works on the ground once the radar has warmed up. L4 again cancels it.
L5	PAUSE	Freezes the picture.
Hand control	-	The cursor has no keys on the page: the viewsight hand control on the Mark IV panel places it in SRCH and moves the patch in SPOT, from where the patch is and the same distance on the scope at every patch size. The cursor is also drawn on the MAP page.
R3	RESET	Clears the picture. SRCH sweeps a new one in, SPOT images again at once.
R4	DP	(SRCH, radar operating) Puts the cursor on a destination point or a targeting point: pick the file with R2 (ACT, ST1 - ST4, TP), step through the points in range with the right rocker, R1 ENT. Route DPs are drawn in magenta on the scope, store-file DPs in cyan, TPs always as yellow boxes. Moving the hand control ends the DP and the cursor goes back to where the lever puts it.
R5	FULL / LEFT / CNTR / RGHT	(SRCH) Sweep the whole fan or only its left, center or right third.
R6	LOW / MID / HIGH	Resolution of the current mode. In SRCH a finer resolution reaches less far and sweeps more slowly; in SPOT it gives a smaller, sharper patch that takes longer to image, and a new step starts a new image at once.
R7	BIT	Opens STAT → FAULT with ASARS selected: its status color and current faults. The radar's own self-test is L4 TEST.

GIMBAL LIMIT appears over the picture when a SPOT patch is more than 55° off the nose, or out of the fan or range - turn towards it. The last picture stays under it, and a new one is taken once the patch is back in reach. Past 20° of bank or 10° of pitch it fills the page in any mode, because the radar has reached its stops; no picture is taken meanwhile, and back inside, the pictures you had are on the scope again until new ones replace them. The MAP page draws the radar's coverage fan while it radiates, and a cyan square around the SPOT patch.

TPs show on the scope as yellow boxes the size of the target - see Targeting Points.

Detail in SPOT. The closer the picture, the more it shows:

- **10 NM and closer:** real airfields and buildings, from OpenStreetMap data. Runways, taxiways and aprons are black, the grass around them smooth and dark, buildings bright with sidelobe streaks. Parked aircraft are bright crosses.
- **2.5 NM and wider:** a very faint gray layer of the camera's satellite imagery adds roads and airfields.
- **1 NM and closer:** the picture is built from that imagery. Raised objects are speckled bright bodies with a bright edge toward the radar and a black shadow behind, flat roofs are dark, pavement is black and buildings lean toward the radar. From 0.5 NM parked aircraft are aircraft shapes with radar shadows.
- **Every SPOT step:** a faint dark grain over the whole picture.

Parked aircraft come from the live traffic (AI and multiplayer), not from aircraft in the scenery, and aircraft in the air are left out: there is no moving-target mode. The close steps show the real-world photo, so they can differ from the simulator's scenery. If the imagery server cannot be reached they fall back to the plain radar picture.

Example RDR SPOT 2.5 NM



SPOT 2.5 NM HIGH over an airport: black runways and taxiways, smooth dark grass, bright speckled terminals and buildings.

Example RDR SPOT 0.5 NM



SPOT 0.5 NM HIGH on the same airport, built from the aerial imagery. The yellow box is a 300 ft TP.

LINK, SYR, ASR

LINK shows the data-link (DDL2) status: it reads connected only while the EFB datalink (Datalink tab) is on. SYR (T3; it reads OBC with the Q-bay camera) and ASR (T5) are the status pages of the camera and the ASARS-2 radar - temperatures, pressures and BIT results, dashes while that sensor is off or not fitted.

On the camera page MODE shows the Mark IV MODE knob - OFF white, STBY cyan, 1 to 5 green - and SENS MODE the band (VIS during TEST). With the OBC the page is OBC STATUS: HC MODE is the MODE knob, HC VEL the SHUTTER VELOCITY position, SENS MODE reads STBY, TEST or OPR, SLIT WIDTH is the width of the MODE position in thousandths of an inch, COV the coverage and CYCLE RATE the seconds per frame.

Related pages: Sensors · Mark IV Camera Panel · Targeting Points · Datalink Portal

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Miltech Simulations U-2

Status Pages (STAT)

The STAT pages show the condition of the aircraft: the active alerts (ICAW), the alert history (HIST), unit faults and data buses (FAULT, BUS), file loading (LOAD) and the versions and credits (VERS).

ICAW

Example MFD icaw



STAT/ICAW with three active alerts - a caution in yellow above two advisories in cyan - each with the time it appeared; the alert line at the bottom shows the two newest.

1. **Page**
2. **Caution (yellow)**
3. **Advisory (cyan)**

4. **Time**
5. **Newest alert**
6. **Arrows (R1 / R2)**
7. **Alert line**
8. **ACK (L7)**

All active alerts - warnings, then cautions, then advisories, newest first within each - with the time they appeared, 12 per page (INC/DEC turns the page). The box marks the most recent alert. R1/R2 (arrows) freeze the page and move a cyan arrow over the warnings and cautions (advisories are skipped); R4 EXIT, or 5 seconds without a key press, returns to the live list.

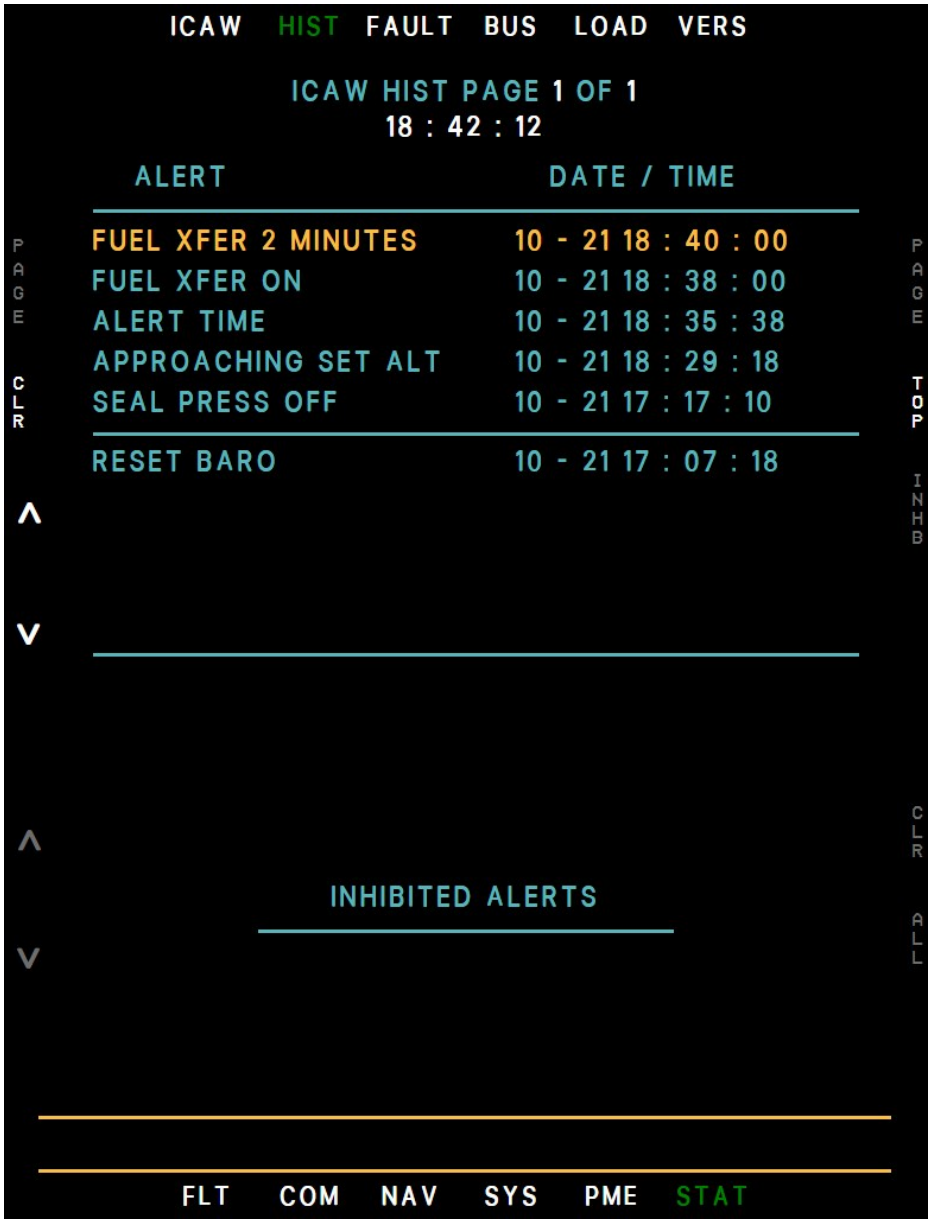
In selection mode R3 SEL opens the EFA checklist linked to the arrowed alert; it is gray, and does nothing, when the EFA has none for that alert. See Warnings and Alerts for the list of messages.

HIST

Every alert of this flight, newest first, with date and time - 15 per page (INC/DEC; R1 TOP returns to page 1). L1 CLR erases the list after L2 YES. The list holds 200 alerts: HIST FILE 80% FULL warns, and at 200 it clears itself (HIST FILE CLEARED).

Two alerts read differently here: DDL2 FAULT from failing telemetry uploads is listed as DDL2 PLATFORM CBIT, and HARD LANDING carries the sink rate of the touchdown.

Example MFD hist



STAT/HIST: every alert of this flight with date and time, newest first, and the list of inhibited alerts below.

1. **Page**
2. **Newest alert**
3. **Date / time**
4. **Oldest alert**
5. **Inhibited alerts**
6. **CLR (L1)**
7. **TOP (R1)**
8. **INHB (R2)**

Here you can also inhibit up to five nuisance alerts: pick a warning or caution with the L2/L3 arrows and press R2 INHB. An inhibited alert still shows on the MFDs and its warning-panel lamp still lights, but neither lights the MASTER CAUTION again.

The inhibited list is at the bottom: the L5/L6 arrows pick one, R5 CLR releases it, R6 ALL releases them all (R7 YES). Lamps without an MFD alert, such as the fuel level lights, cannot be inhibited.

FAULT, BUS

Avionics health pages with built-in tests. FAULT lists the units on three pages (INC/DEC): pick a unit with its side key and the window shows its active faults - the names of its current alerts - and its BIT results. Each unit's name takes the color of its worst active alert: gray = not powered or not fitted (the HF radio, not fitted, shows cyan), white = not reporting (warming up, in a startup self-test, or a unit such as the ADSU or APCU without power on the data bus), green = OK, cyan / yellow / red = advisory / caution / warning.

R6 BIT runs a unit's test (R7 YES); the AVP's runs on the ground only. R7 MX opens the maintenance pages of the AVP (soft reset), the INS (test, memory, post flight records) and the APCU (fault codes, recorder addresses).

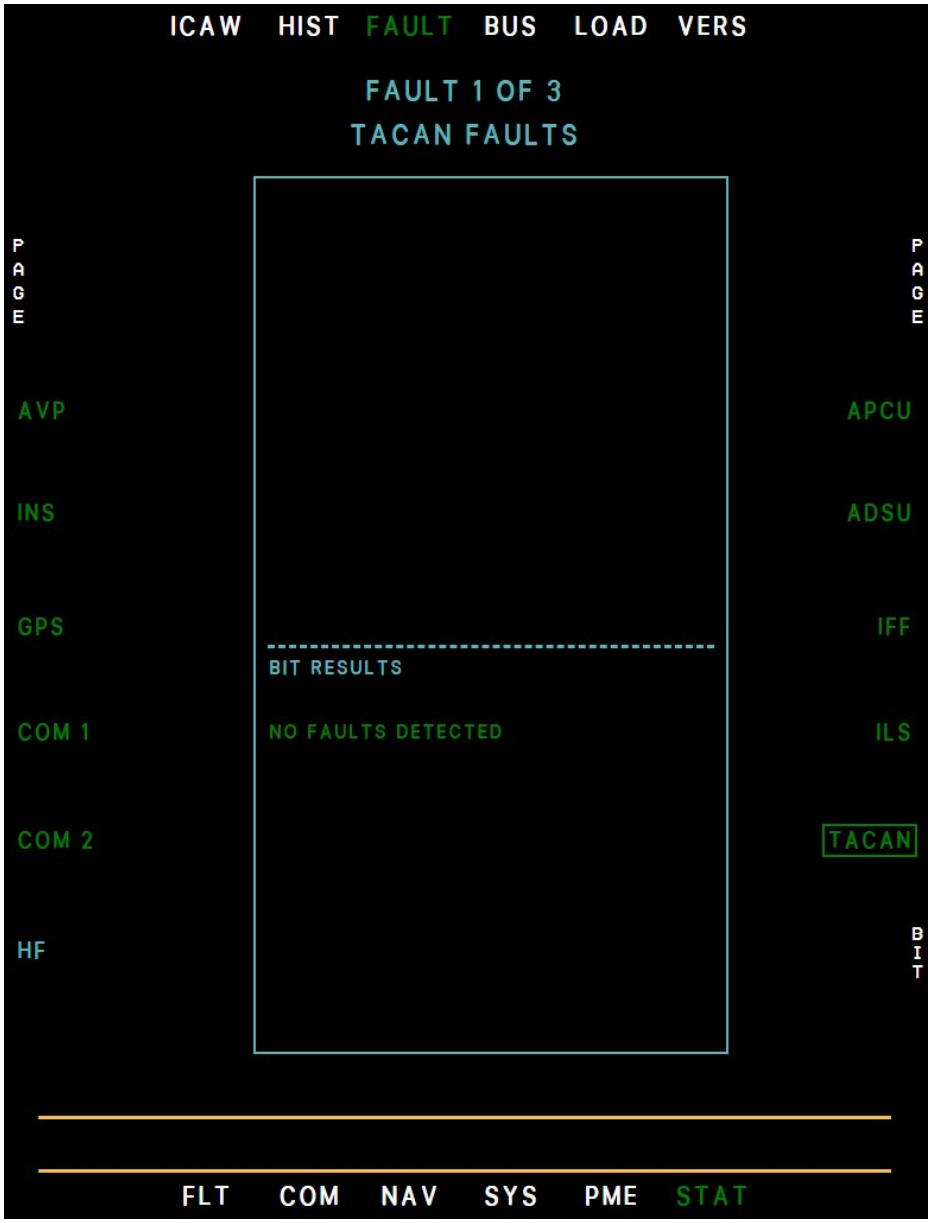
The EW unit (page 2) follows the EW system: gray while EW CONT is off, white during its startup self-test (the window shows STARTUP BIT IN PROGRESS with the time remaining, and the BIT results only afterwards) and with EW CONT on but no power, green once it is up, and cyan with EW IBIT TIMEOUT.

F UFCD, BCDU, DDL2, ASARS and SYERS have their own fault alerts. SYERS (page 2) and OBC (page 3) follow the camera fitted - the other one is gray - and R7 BIT on the CAM and RDR pages opens this page with that sensor selected; DDL2 follows the EFB datalink and is gray with the datalink off.

Apart from the EW the tests always report no faults. The EW BIT runs about 30 seconds with the EW system up (EWS IBIT on the EW page; REC flickers as it starts). Done in REC it lists the drive boxes and jam amplifiers as NRUN, and one that cannot finish within 40 seconds - EW CONT switched off meanwhile, say - reads IBIT NOT COMPLETED and gives EW IBIT TIMEOUT.

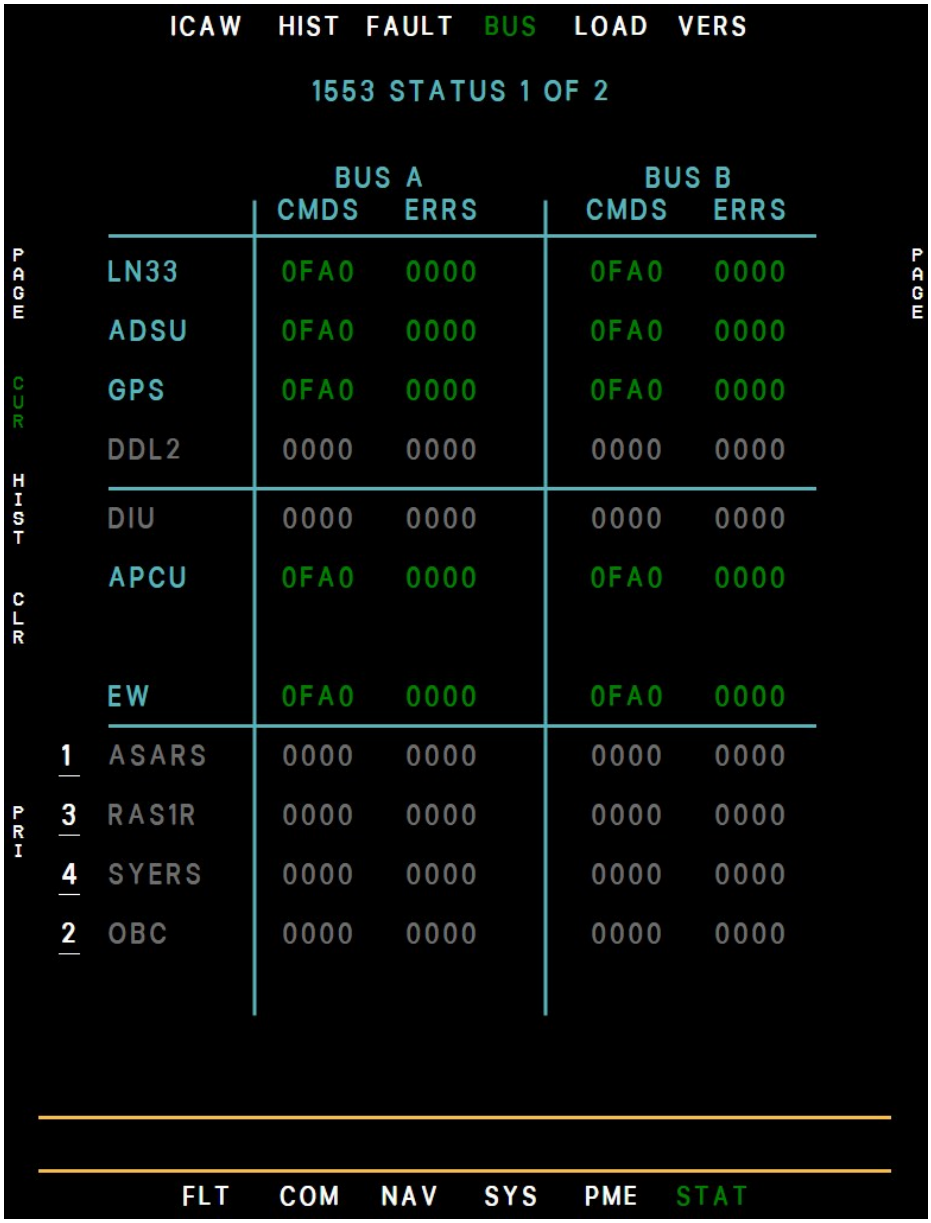
The APCU has no BIT (the autopilot's built-in test is not simulated), only MX; its window lists an APCU FAULT as APCU TEMP PROBE, the temperature probe out of range. Note that BUS is the avionics data bus, not the electrical system.

Example MFD fault



STAT/FAULT page 1: the units in their status colours; TACAN is selected and its BIT has just completed with no faults.

Example MFD bus



STAT/BUS: the 1553 data-bus status of each unit - commands sent and errors on bus A and bus B (hexadecimal); green means no errors, gray not on the bus.

LOAD

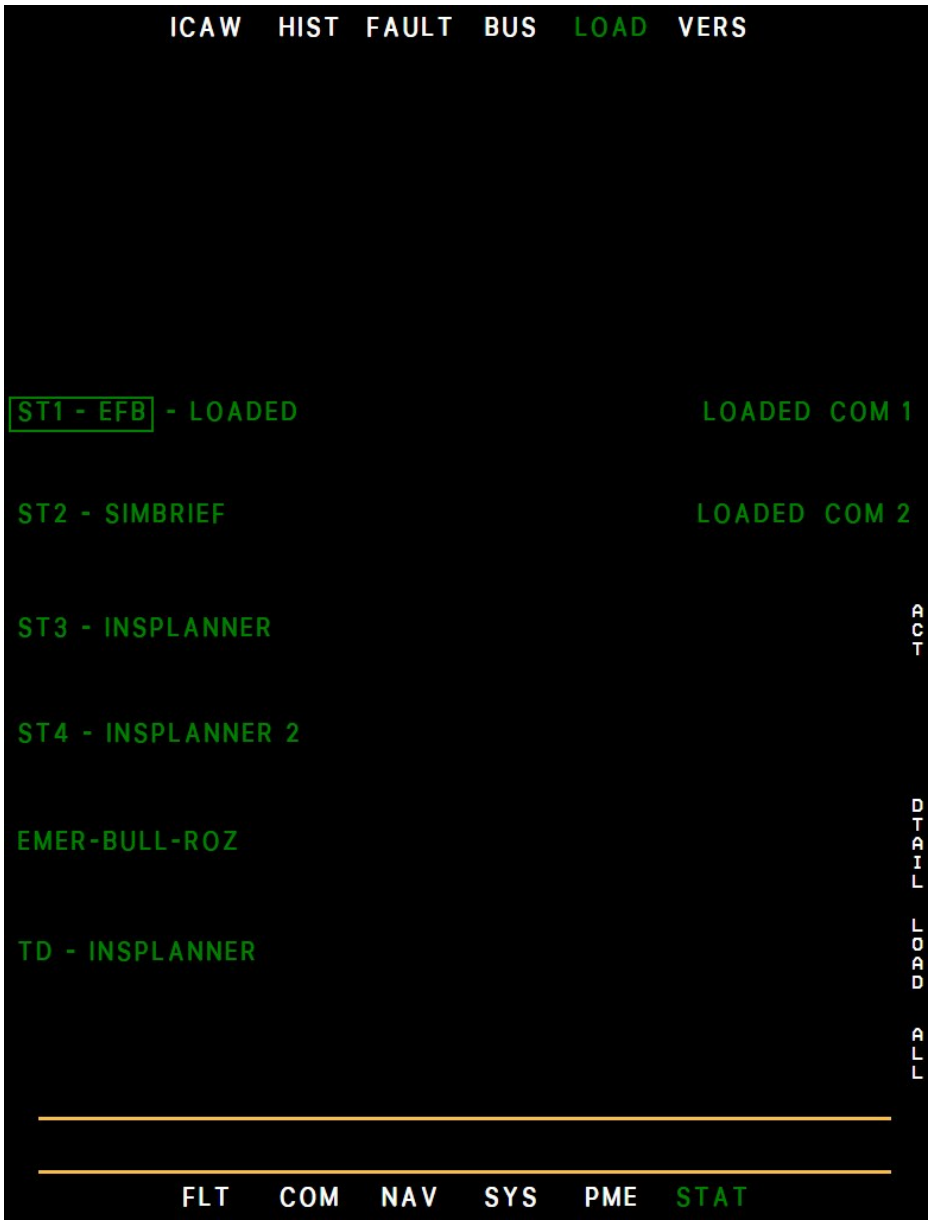
Loads routes into the aircraft. The files: ST1 - EFB (the route sent from the MSFS EFB, which reaches STORE 1 by itself, with or without a MAP page open), ST2 - SIMBRIEF, ST3 / ST4 - INSPLANNER (a 6-digit plan number typed into the ID box), EMER-BULL-ROZ (emergency fields, bullseyes and restricted zones from SimBrief or a planner ID), TD - INSPLANNER (targeting points from a planner ID; gray without an imaging sensor) and COM 1 / COM 2 presets.

Select a file with its side key and press R6 LOAD; R5 DTAIL shows the points first, R3 ACT copies a selected store file into ACTIVE, and R7 ALL loads every file in turn after R6 YES. The status reads LOADED, or LOAD FAILED with the reason (no SimBrief ID, no network, unknown plan...).

For SimBrief, enter your Pilot ID once on the EFB Flight plan tab. With the EFB option *Activate loaded flight plans* on (the default) a loaded route, or one sent from the MSFS EFB, becomes the ACTIVE file at once. While a file on a display's LOAD page has failed to load, the advisory AVP LOAD FAIL is on; it goes out once that file

has loaded.

Example MFD load



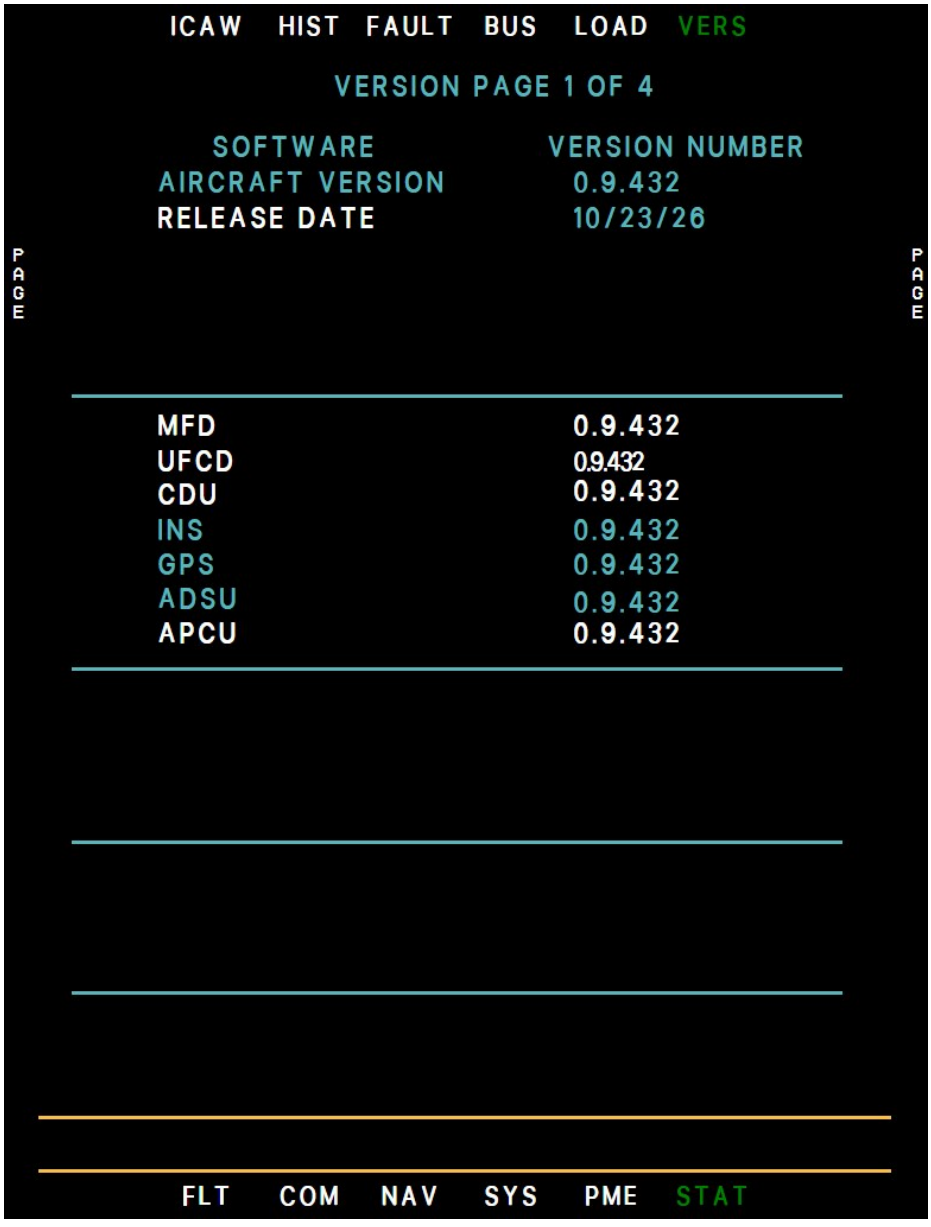
STAT/LOAD after loading the EFB route (ST1) and the COM 1 / COM 2 presets: each loaded file reads LOADED.

1. **Selected file**
2. **Status**
3. **SimBrief route**
4. **INS Planner route**
5. **EMER / BULL / ROZ**
6. **COM presets**
7. **DTAIL (R5)**
8. **LOAD (R6)**
9. **ALL (R7)**

VERS

Page 1 shows the aircraft version and release date and the version of each unit. INC or DEC turns to the credits: the development team with their roles, then the camera map-data attribution, on as many pages as they need (three at present: the heading, the team, the map data; so the title reads VERSION PAGE 2 OF 4 on the first one). The full team list is also under Credits.

Example MFD vers



STAT/VERS page 1: the software version and release date, and the version of each avionics unit.

Example MFD vers, credits



Page 3: the development team (page 2 holds only the MILTECH heading, page 4 the map data).

Related pages: Warnings and Alerts · ICAW Message Dictionary · Emergency Procedures

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Miltech Simulations U-2

Standby Flight Display (SFD)

The Standby Flight Display (SFD) is a small self-contained instrument that keeps working when everything else is dark. It has its own power switch and runs from the emergency DC bus, independent of the AVP and the MFDs.



Top right of the main panel: the SFD, the EW REC / RPT lamps and EW CONT switch, and the autopilot ROLL / PITCH sync indicators. The EW controls are explained under EW System.

1. **EW REC** - Lit while the EW system tracks a red threat: sim traffic within 5 NM and 1,000 ft of you, moving faster than 20 kt.
2. **SFD** - Standby flight display: own attitude sensors, airspeed, altitude, heading and Mach, and its own baro knob. Runs on emergency DC, independent of the MFDs.
3. **EW RPT** - Flashes while EW CONT in RPT is jamming a red threat; REC stays lit with it.
4. **ROLL SYNC** - Shows the load on the autopilot roll servo; centred with the autopilot off. Off centre in cruise points to a heavy wing.
5. **PITCH SYNC** - Shows the load on the autopilot pitch servo; centred with the autopilot off. Off centre with PITCH TRIM in MANUAL: trim until it centres.
6. **EW CONT** - OFF / REC / RPT. REC detects threats (sim traffic stands in for them); RPT adds jamming. A startup self-test runs first (tooltip REC - SBIT). While it is OFF (or unpowered) with the AVP up, EW NO RESPONSE shows. The STAT/FAULT EW BIT takes about 30 seconds (EWS IBIT IN PROGRESS on the EW page).
7. **SFD NAV** - Cycles OFF / ILS / BC: localizer and glideslope bars from NAV 1. Together with TEST it starts the SFD built-in test.
8. **SFD TEST** - Built-in test below 60 kt: hold NAV (mouse: click NAV), then press TEST twice within 2 s. On its own it does nothing.

MAXIMUM SPEED BY ALTITUDE (RED BAND ON SFD AND PFD)

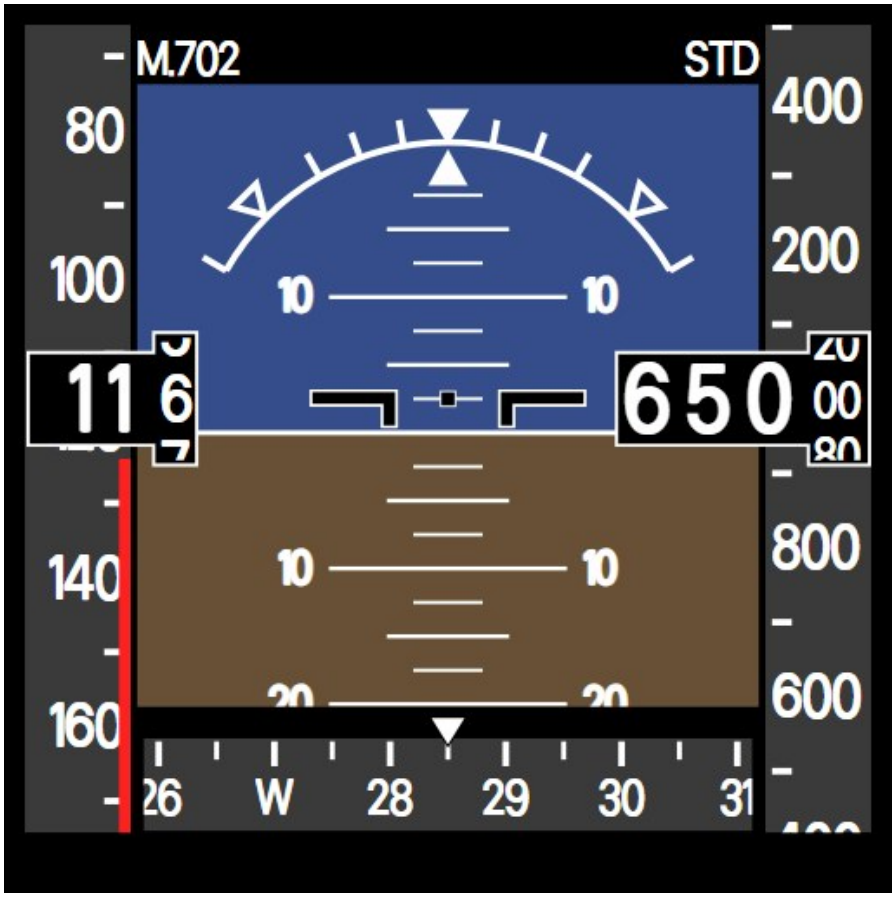
above 49,500 ft	no airspeed limit	Mach 0.75
43,000 - 49,500 ft	181 KIAS	Mach 0.75
30,500 - 43,000 ft	181 KIAS (241 gust control UP)	Mach 0.65
below 30,500 ft	181 KIAS (241 gust control UP)	Mach 0.75

The lower of the airspeed and Mach limit applies. The red band on the speed tape always starts at your current limit.

What It Shows

- Attitude ball with pitch ladder and roll pointer.
- Airspeed tape (left, from 60 knots - the higher speeds are at the bottom), altitude tape (right), heading tape.
- Mach number top-left (M.720, shown from Mach 0.30 - blank below) and barometric setting top-right (29.92 IN or STD; while the PFDs are switched to hPa, the SFD's own setting in hPa, without a unit - for example 1013).
- A **red band** on the speed tape marking your current maximum speed (see below), and with the EFB option **Stall speed tape** on a yellow band up to the stall speed.
- ILS bars from NAV 1, chosen with the NAV button: ILS shows the localizer and glideslope bars, BC the localizer bar only. With no signal, red LOC and G/S flags take their place. The glideslope bar runs behind the altitude readout box, so on the glidepath (within about 0.2°) you will not see it.
- Below 10,000 ft a green hatched box takes the place of the ten-thousands digit of the altitude readout.

Example SFD flight



Cruise at 65,000 ft and about Mach 0.70: airspeed tape on the left, altitude tape on the right, heading tape at the bottom, Mach top left and STD baro top right.

1. **Mach number**
2. **Baro setting (STD)**
3. **Airspeed tape**
4. **Airspeed readout**
5. **Red max-speed band**
6. **Altitude tape**
7. **Altitude readout**
8. **Pitch ladder**
9. **Roll pointer**
10. **Heading tape**

Example SFD climb

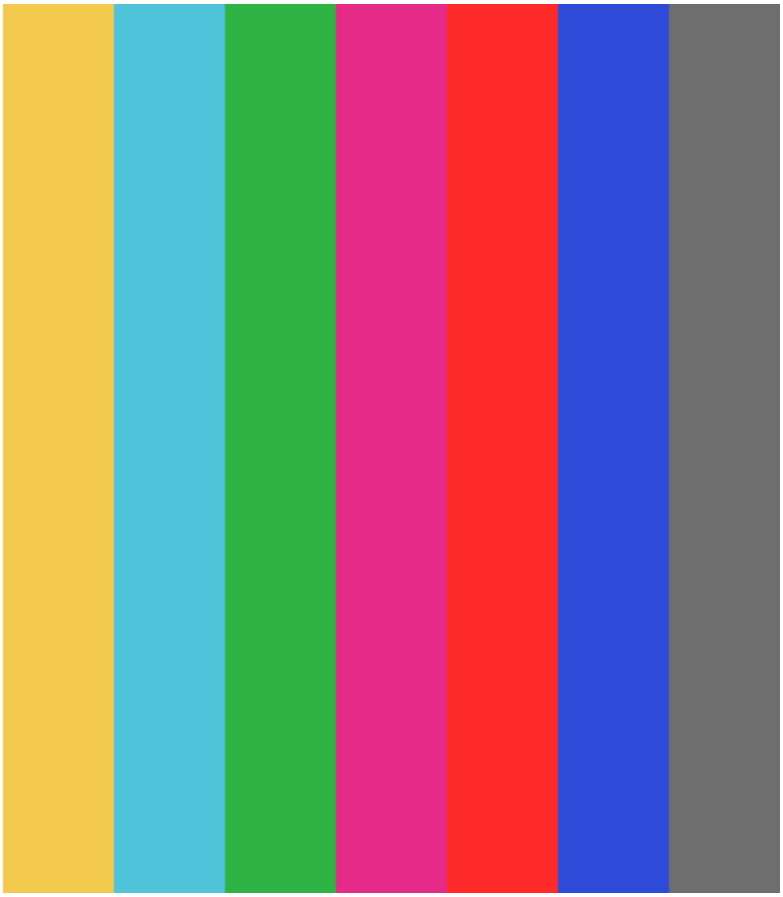


Climbing right turn: the horizon and roll pointer tilt with the 25-degree bank against the fixed roll scale, and the aircraft symbol sits 10 degrees above the horizon.

Power-Up

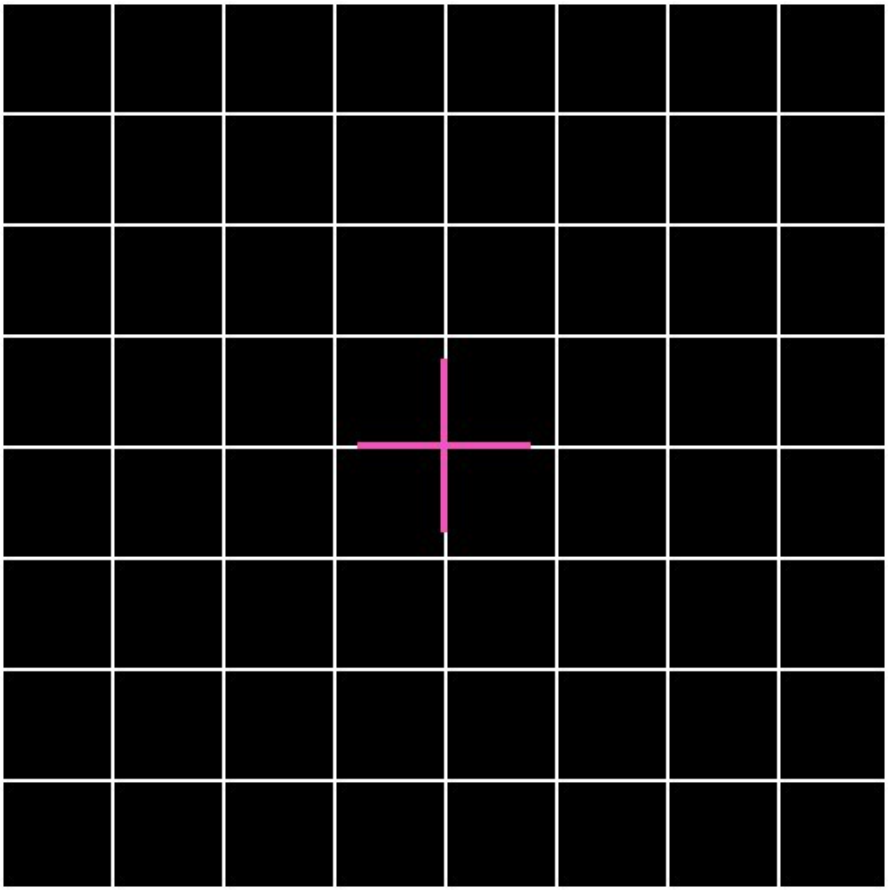
1. Battery on, then SFD switch (right console) ON.
2. A 6-second power-on test runs: white screen, color bars, grid, then an SFD POWER ON BIT list.
3. The attitude area then turns sky blue with the roll scale and the aircraft symbol, but no horizon or pitch ladder yet: ATTITUDE INITIALIZING inside the roll scale and the seconds left under the symbol (10 SECS), for **10 seconds** (or **180 seconds** with the EFB option **Avionics startup time** on *Realistic*). Speed, altitude and heading are usable straight away.
4. **Do not move the aircraft.** Any movement restarts the count - also after takeoff, where it would never finish (see below).

Example SFD powerup bars



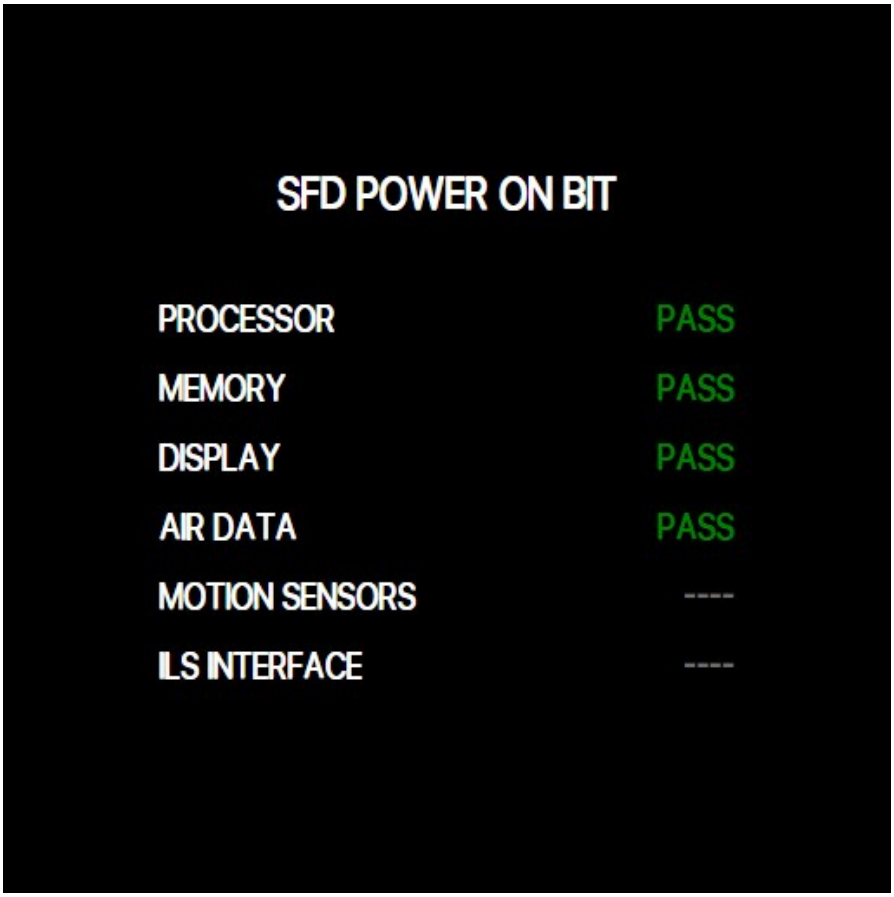
Power-on test, second step: colour bars, after a white screen and before the grid.

Example SFD powerup grid



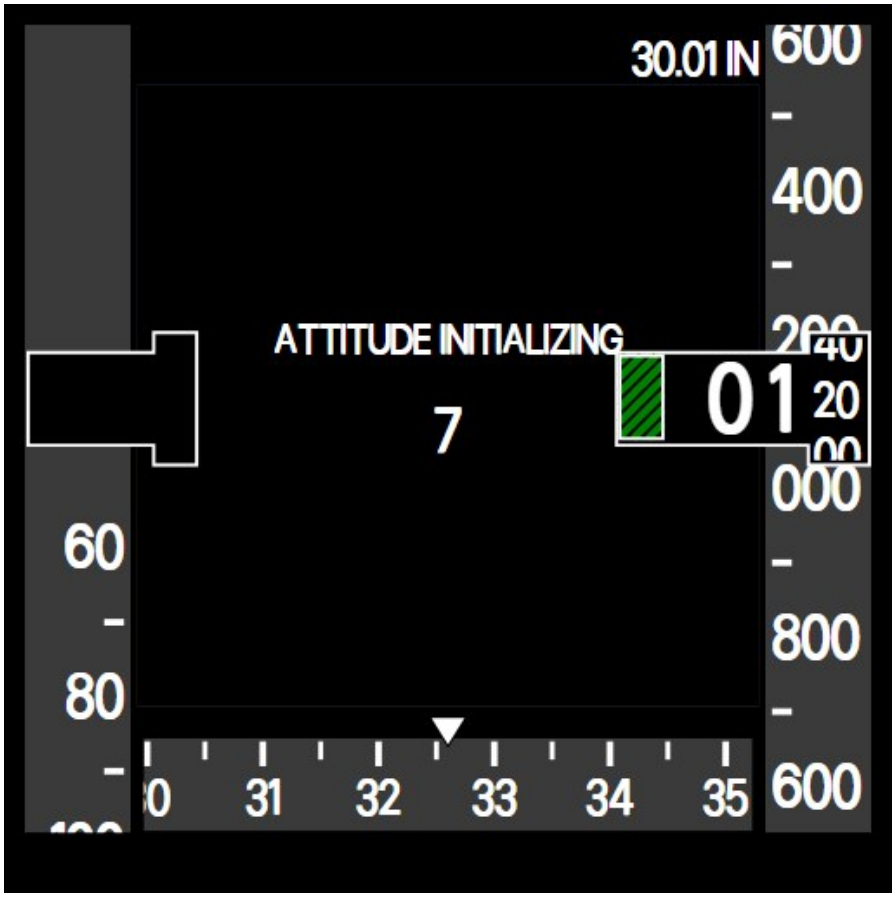
Power-on test, third step: the white line grid with a magenta centre cross.

Example SFD powerup



Power-on test, last step: the SFD POWER ON BIT list fills in PASS item by item before the attitude initialization starts.

Example SFD align

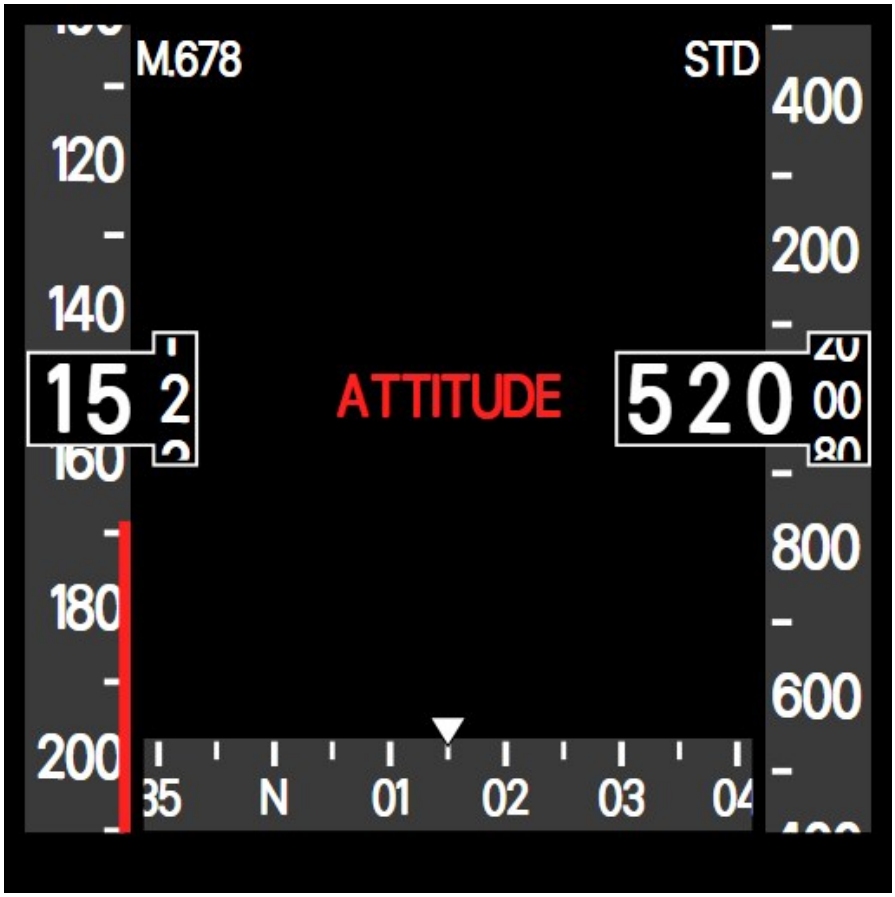


Attitude initialization after the power-on test: ATTITUDE INITIALIZING with the seconds left, while speed, altitude and heading already work.

The SFD has its own motion sensors, so its attitude depends only on SFD power and its own initialization - it does not need the INS. What happens after a power interruption depends on how long it lasted and whether you are flying (60 knots or more, or airborne):

Power off for	On the ground	In flight
Up to 5 seconds	The screen blanks for a second. Nothing is lost.	
5 seconds to 2 minutes	Blank for 5 seconds (*Realistic*: 1 minute), then the attitude comes back with an error of 7 to 10° in pitch, roll or both. The error stays until the next full initialization - run the IBIT (below) to get one. If the initialization had not finished, it simply starts again.	Blank for 5 seconds (*Realistic*: 1 minute), then normal data.
More than 2 minutes	A full start-up: power-on test, then the attitude initialization.	Blank, then an airborne alignment of 10 seconds (*Realistic*: 3 minutes) under a red ATTITUDE flag. Heading, airspeed and altitude come back with the screen.

Example SFD airalign



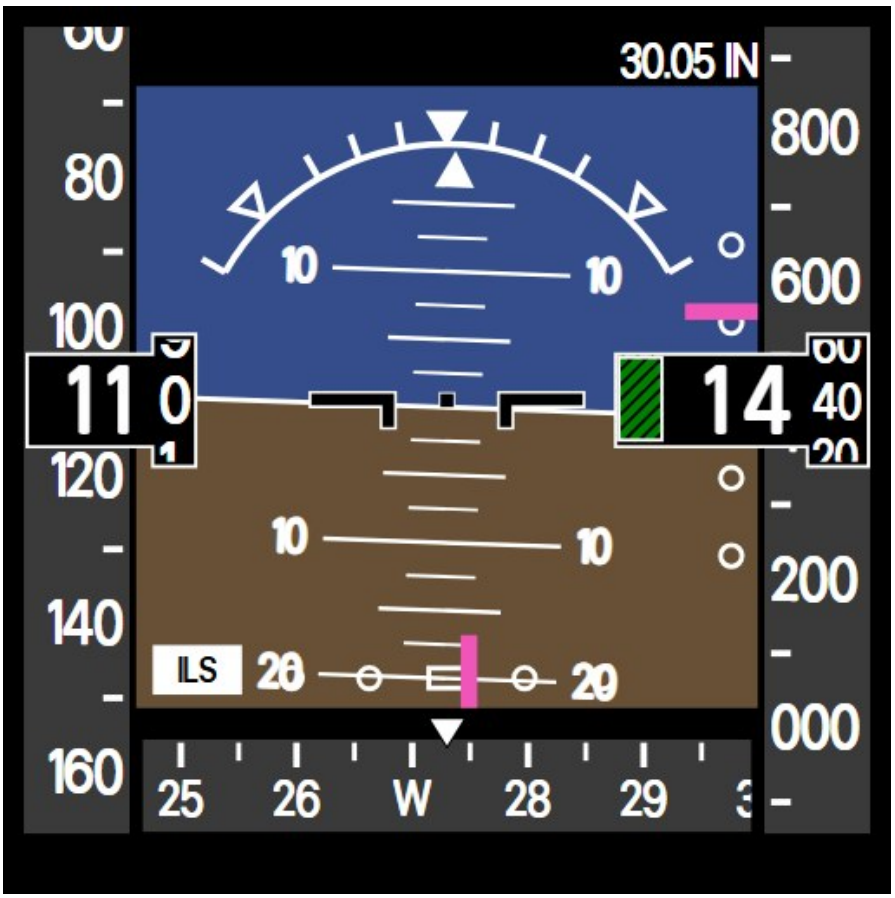
Airborne alignment after more than 2 minutes without power in flight: the red ATTITUDE flag covers the attitude ball while airspeed, altitude and heading are already back.

An initialization still running when you start to roll never finishes. Switch the SFD off and on again once you are flying (60 knots or more) and it becomes an airborne alignment instead. If your flight starts with the engine running (runway or air start), or after an EFB **Set up aircraft** preset, the SFD is ready immediately.

Controls

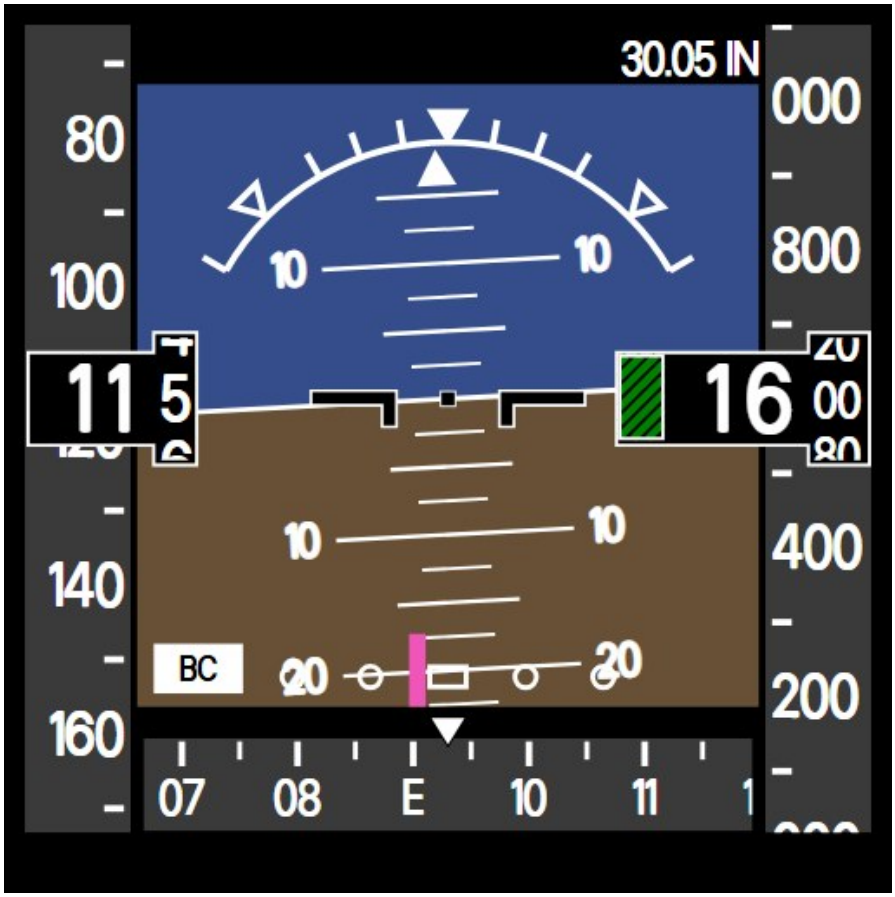
Control	Function
Baro knob - turn	Altimeter setting, 0.01 inHg per click - or 1 hPa per click while the PFDs show hPa (PFD BARO, R4). The SFD has its own altimeter setting, separate from the PFD, and its altitude follows it (about 1,000 ft per inch) - set both.
Baro knob - push	Standard pressure (29.92 inHg / 1013 hPa, shown as STD) in either unit. Turn the knob to leave STD.
NAV button	Cycles OFF → ILS → BC (back course) → OFF. Shows localizer and glideslope bars from NAV 1 (BC: the localizer bar only; red LOC and G/S flags without a signal). After any power loss it starts again in OFF.
TEST button	Built-in test (IBIT), below 60 knots once the SFD has finished starting: hold NAV and press TEST twice within 2 seconds. With the mouse, click NAV, then click TEST twice straight after. The three IBIT pages - display test, sensor status and configuration with IBIT PASS or IBIT FAIL - change by themselves every 3 seconds. Release NAV (with the mouse: click NAV again) to leave. The SFD then runs its power-on test and a new attitude initialization (10 seconds, *Realistic*: 3 minutes), so keep the aircraft still. TEST on its own does nothing.

Example SFD approach



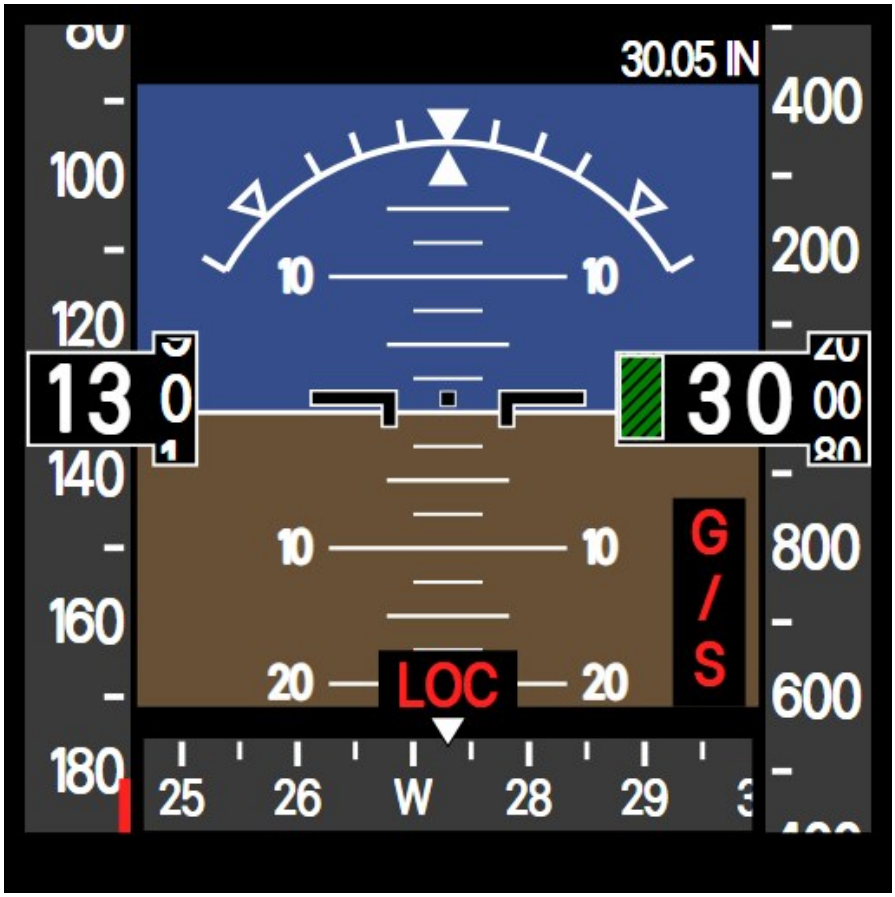
ILS approach with NAV in ILS: the magenta bars show the NAV 1 localizer and glideslope deviation (here a little right of the localizer and about one dot below the glideslope), and the baro window shows the 30.05 IN set with the knob.

Example SFD nav bc



Back-course mode (NAV pressed twice): only the localizer bar is shown, the glideslope scale is removed, and the label reads BC.

Example SFD nav noils



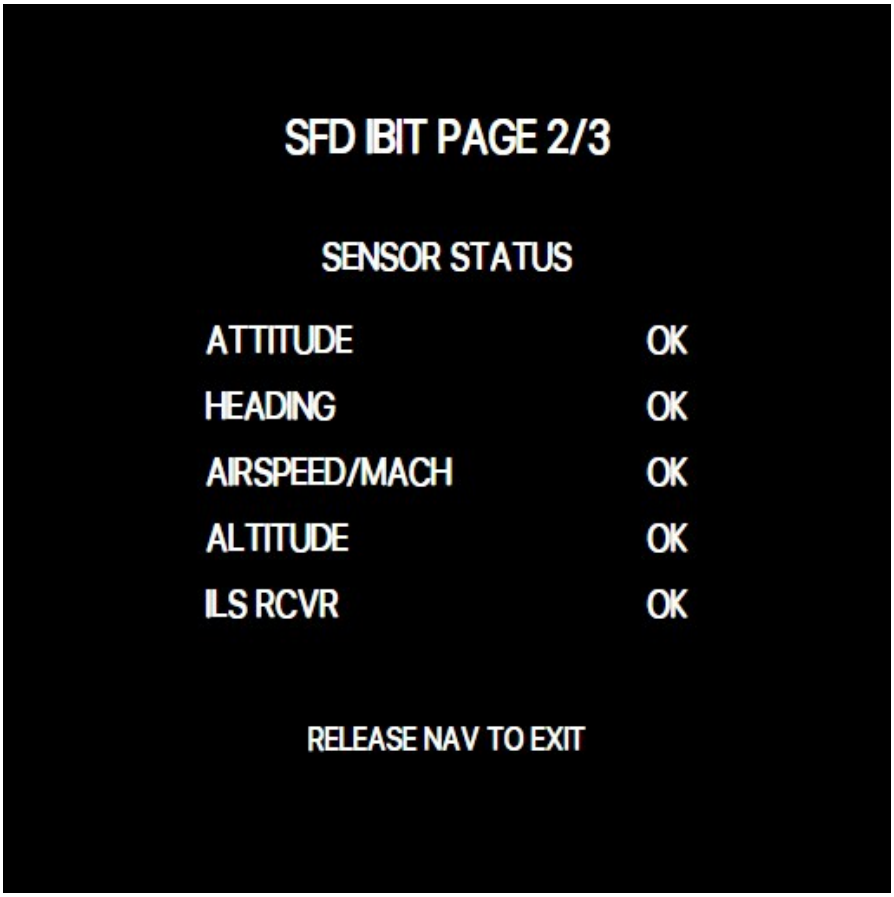
ILS mode selected with no ILS signal on NAV 1: red LOC and G/S flags replace the deviation bars.

Example SFD ibit1



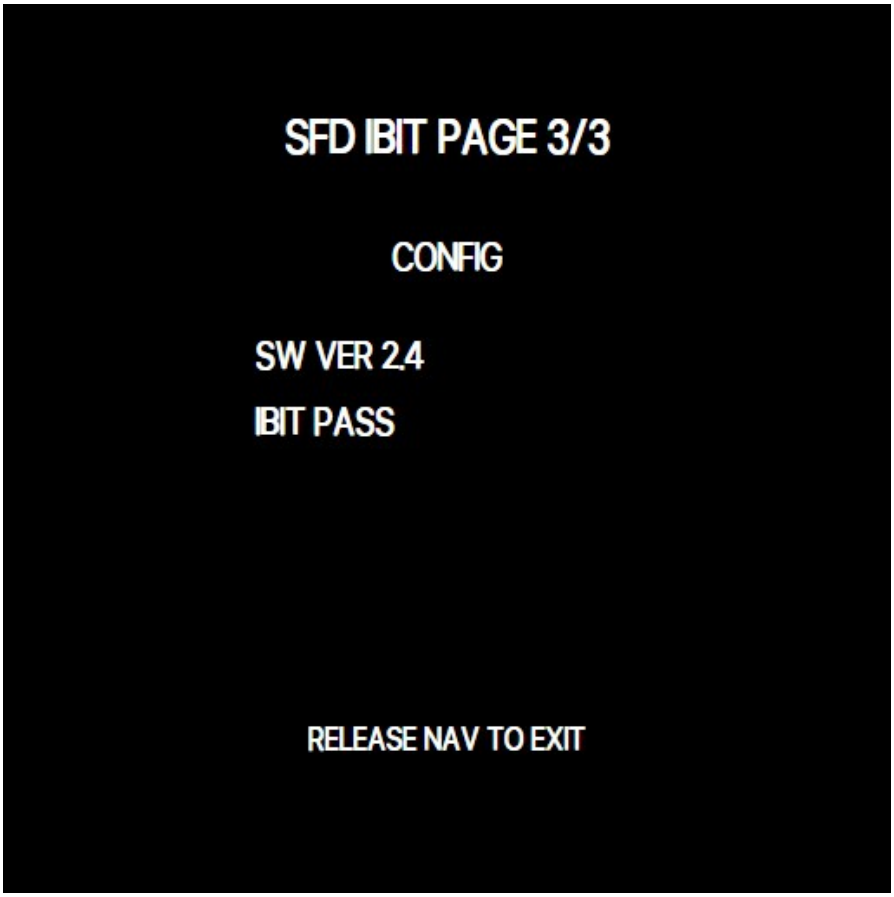
Built-in test, page 1 of 3: display test with colour bars. The pages change by themselves every 3 seconds.

Example SFD ibit2



Built-in test, page 2 of 3: sensor status for attitude, heading, airspeed/Mach, altitude and the ILS receiver.

Example SFD ibit3

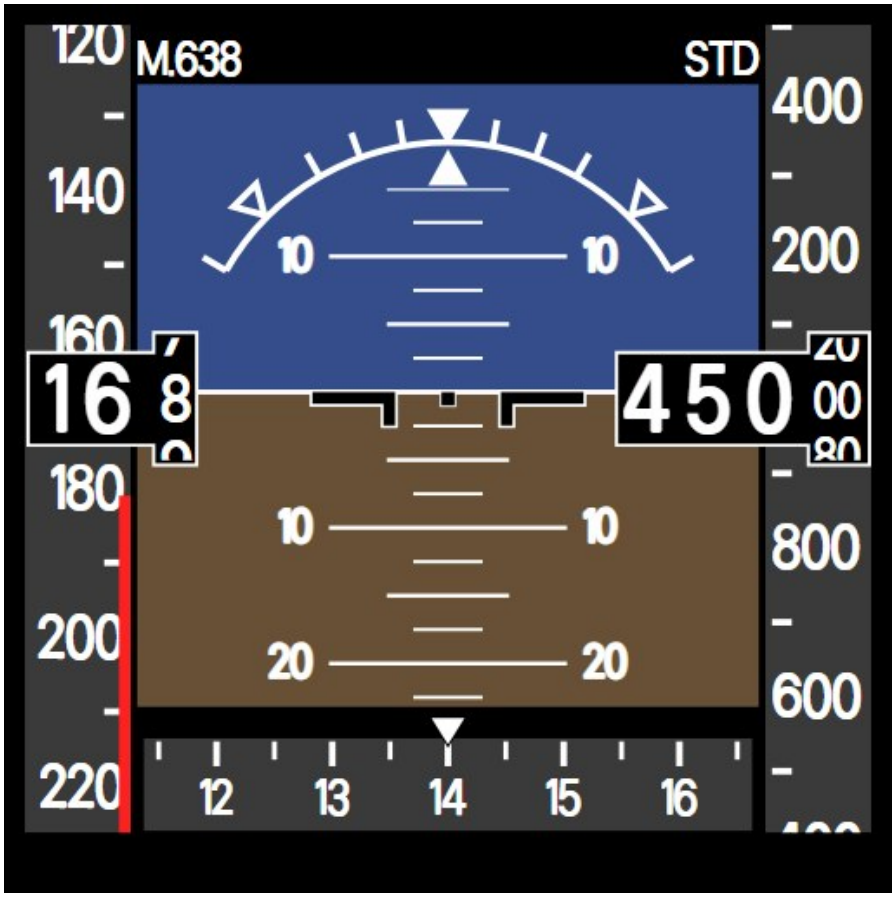


Built-in test, page 3 of 3: configuration with the software version and the overall IBIT PASS result.

The Red Max-Speed Band

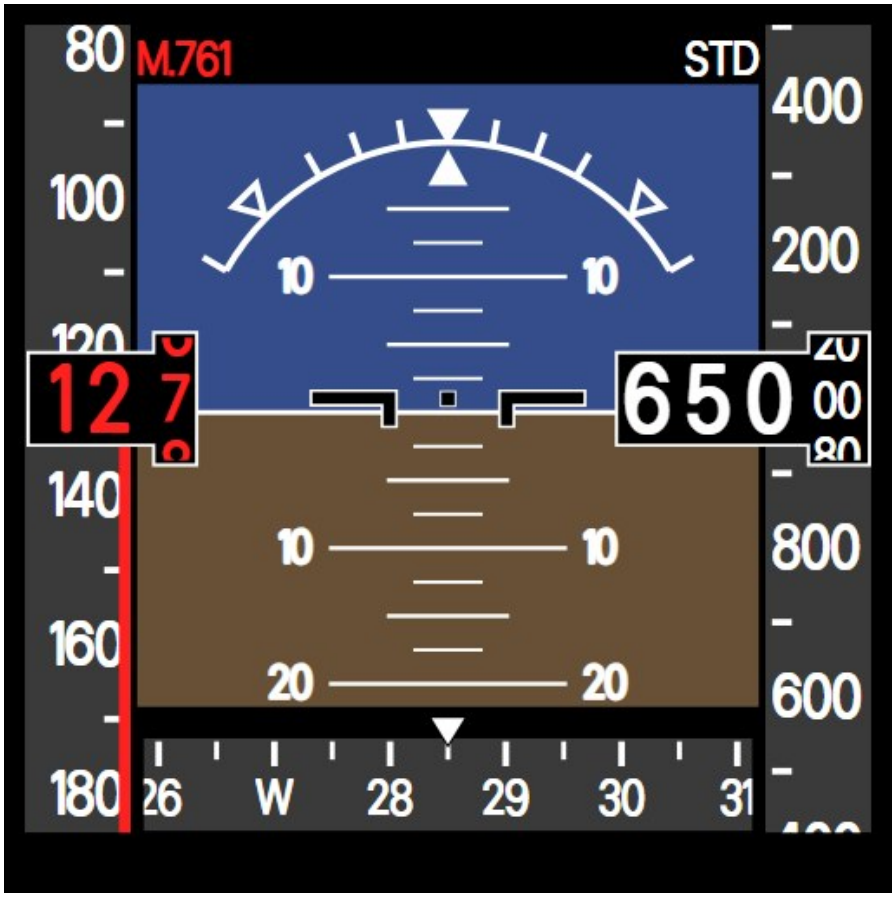
The U-2's speed limit changes with altitude and with the gust-control setting. The red band always starts at your current limit, and the speed readout turns red when you exceed it. The PFD uses the same limits. The SFD works its band and its red Mach limit out from its own altitude, so they follow the SFD baro setting.

Example SFD maxspeed



At 45,000 ft the limit is 181 KIAS: the red band starts at 181 on the speed tape, just beyond the current 168 knots.

Example SFD overspeed



Above the Mach 0.75 limit at 65,000 ft: the speed readout and the Mach number turn red, and the red band starts below the current speed.

Altitude	Airspeed limit	Mach limit
Below 30,500 ft	181 KIAS (wing faired) 241 KIAS (gust control UP, once both the flaps and the ailerons are up)	M 0.75
30,500 - 43,000 ft		M 0.65
43,000 - 49,500 ft	181 KIAS	M 0.75
Above 49,500 ft	-	

The lower of the two limits applies.

Related pages: Primary Flight Display (PFD) · Electrical and Avionics Power

Miltech Simulations U-2. SIMULATION USE ONLY. This documentation describes the simulated aircraft as delivered in the add-on and must not be used for real-world aviation.

Miltech Simulations U-2

Up-Front Control Display (UFCD)

The Up-Front Control Display (UFCD) is your quick-access panel for radios, transponder, destination points and timers. Its keypad and twin knob also serve as the data-entry device for the MFDs. The UFCD can display eight pages, each selected with its own page key.

UFCD

HOM Home	COM Radios
COM 1 / COM 2 preset and frequency TACAN channel, ILS frequency Steer-to DP, orbits	COM1 / COM2 / HF tabs Preset, frequency, guard receiver COMSEC, HQ, HF: INOP
IFF Transponder	DP Destination Points
Mode 3 code (squawk) MSTR: STBY / NORM / EMER Modes 1, 2, S: INOP; Mode 4 only its code check	Files A (Active), ST1-4 (Store), E (Emergency), B (Bullseye) Name, LAT / LONG, turn radius
NAV Steering	EMER Emergency Fields
Steering mode and DPs Steering status (128 MAX, 400 MAX, ZONE 1, ZONE 5, OVERSHOOT TURN) BRG / RNG / TTG look-up Overfly	Nearest fields from file E (Emergency) BRG, RNG, TTG, DEST FOB Direct steer - EMER becomes the active file
BULL Bullseye	TIME Clocks
Radial and range from two bullseyes (file B, Bullseye)	GMT / local time Flight time Count-up and count-down timers

UFCD page map. Select a page to go to its section.

The Panel

Layout



1. **Page Keys:** HOM COM DP IFF NAV above the screen. A page key always shows its page.
2. **Line Select Keys (LS1-LS4):** One for each of the four data lines. Press to put the entry cursor on that line.
3. **Keypad:** 0-9, CLR and ENT.
4. **G Key:** Mutes the guard receivers (see below).
5. **Page Keys, second group:** TIME EMER BULL.
6. ◉ **Twin Knob:** Large outer ring for coarse changes (whole numbers), small inner knob for fine changes (decimals). The small knob can also be pushed. The same knob serves the MFDs, and it can page the center MFD (see Remote MFD Paging below).
7. **PAD, IDENT, FIX:** Special function keys below the screen (see below).
8. **Screen:** Top line: clocks (GMT left, elapsed time right). Four data lines. Bottom line: the **scratch pad**, which normally shows your active steer-point number.

Screen Colors

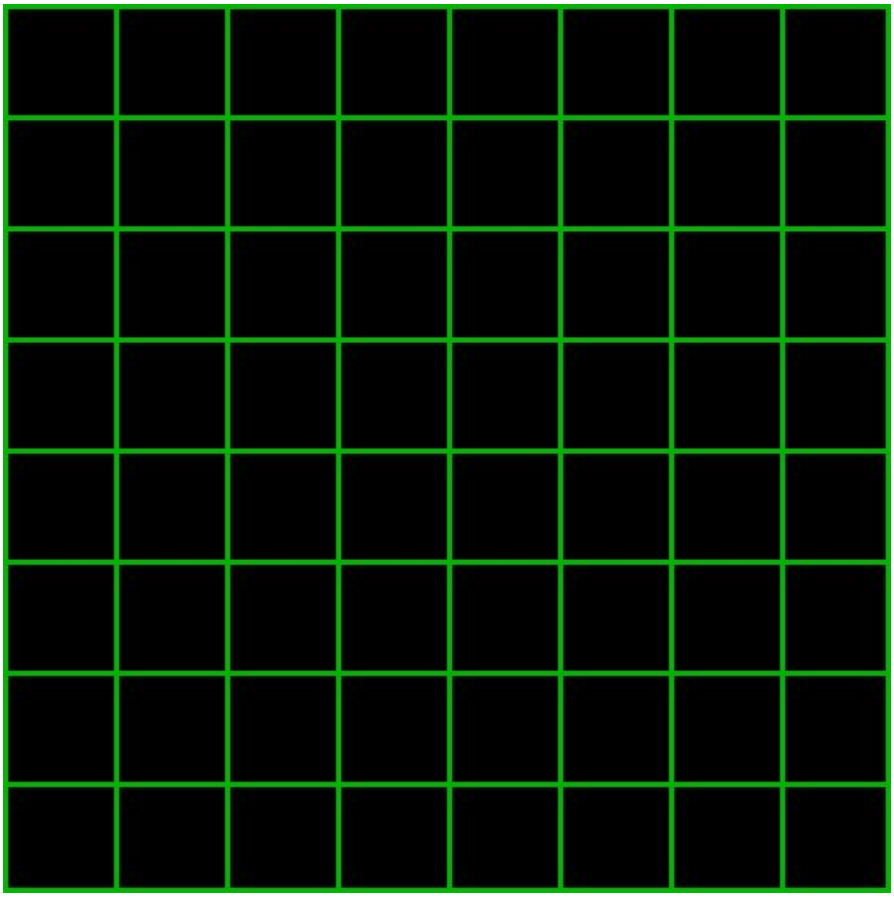
Green = active value · White = available / inactive · Cyan = labels · Yellow = "please confirm" · Magenta = standby, and the steering status on the NAV page · Reverse video = typed but not yet entered.

Power and Self-Test

Switch UFCD ON on the right console (needs DC power). When you switch it on in the cockpit it runs a 9-second power-on test - test patterns, then UFCD POWER ON BIT with six items that each go PASS - and then shows its pages again (HOM after a cold start).

Keys are ignored during the test. Brightness is on the UFCD/SFD LIGHTS knob. Your data survives a UFCD power cycle.

Example UFCD power-on test, line pattern



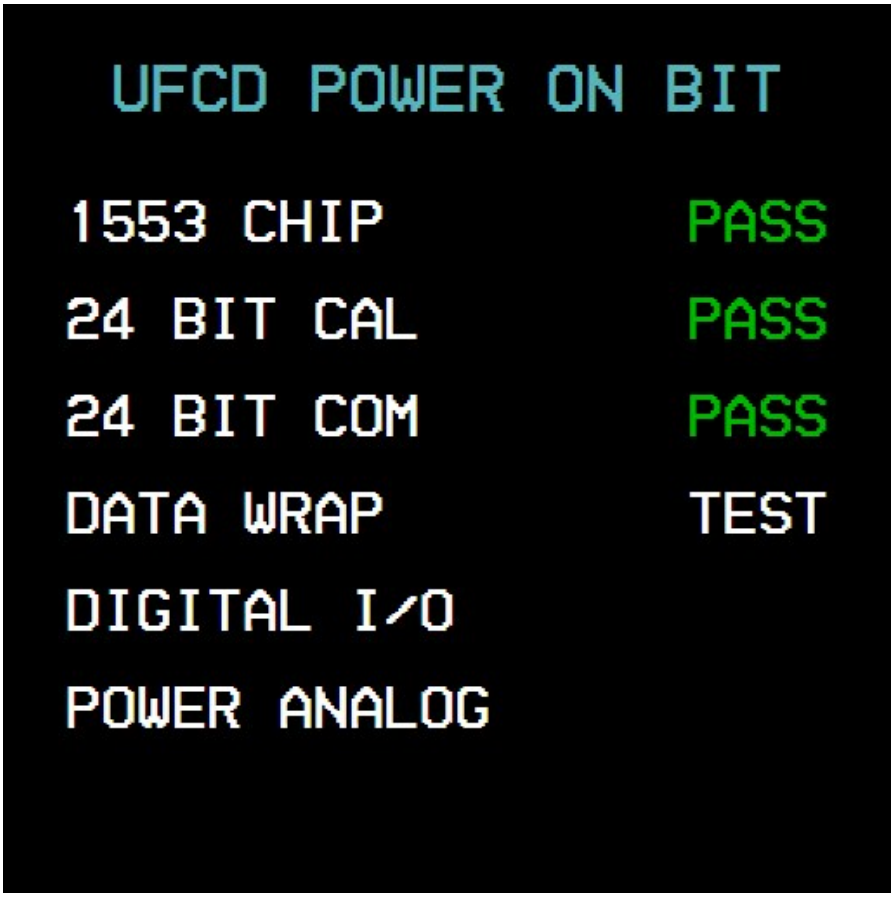
Every dot lit, then the line pattern.

Example UFCD power-on test, character set



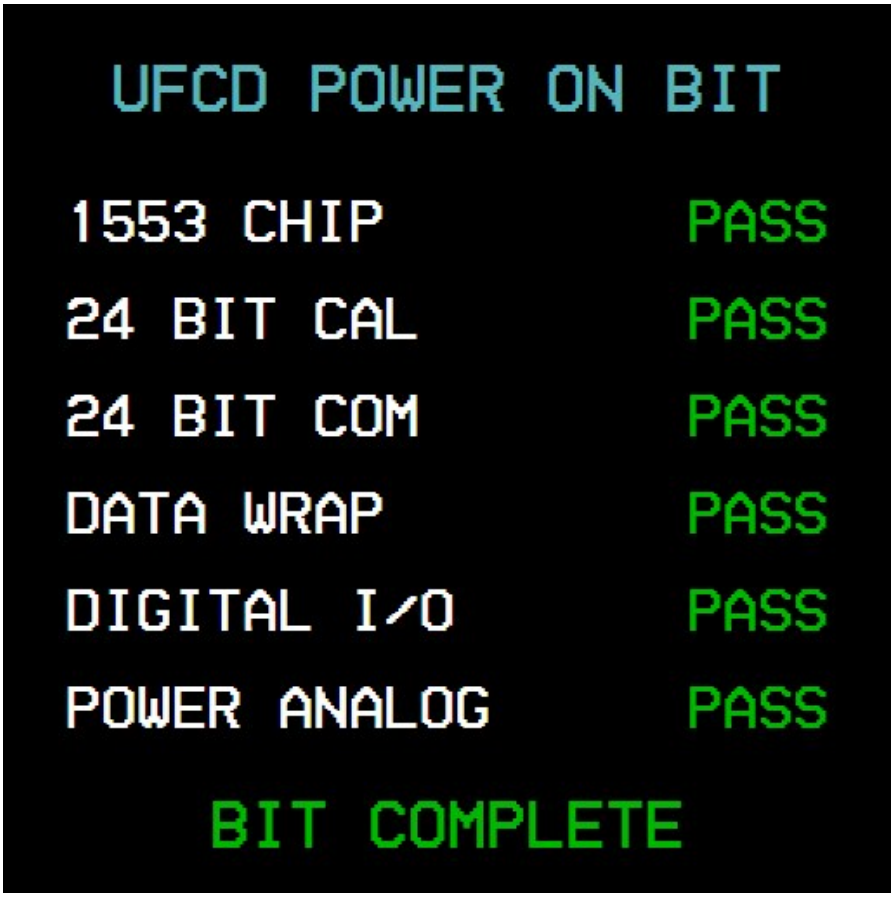
The character set and the numerals.

Example UFCD power-on BIT running



UFCD POWER ON BIT: each item goes from TEST to PASS.

Example UFCD power-on BIT complete



BIT COMPLETE - the pages come back. Keys are ignored until then.

Caution

NO COM The UFCD reaches the rest of the aircraft through the AVP. While the AVP is off or still starting, the screen shows only NO COM and no key works - not even FIX, IDENT or G. On a normal cold start the pages come up by themselves as soon as the AVP is running.

If the AVP is lost after it has been up, NO COM stays even when the AVP comes back: switch the UFCD OFF and ON again (another 9-second test) to get the pages back.

Example UFCD NO COM



NO COM: the AVP is off, still starting, or was lost. No key works.

Entering Data

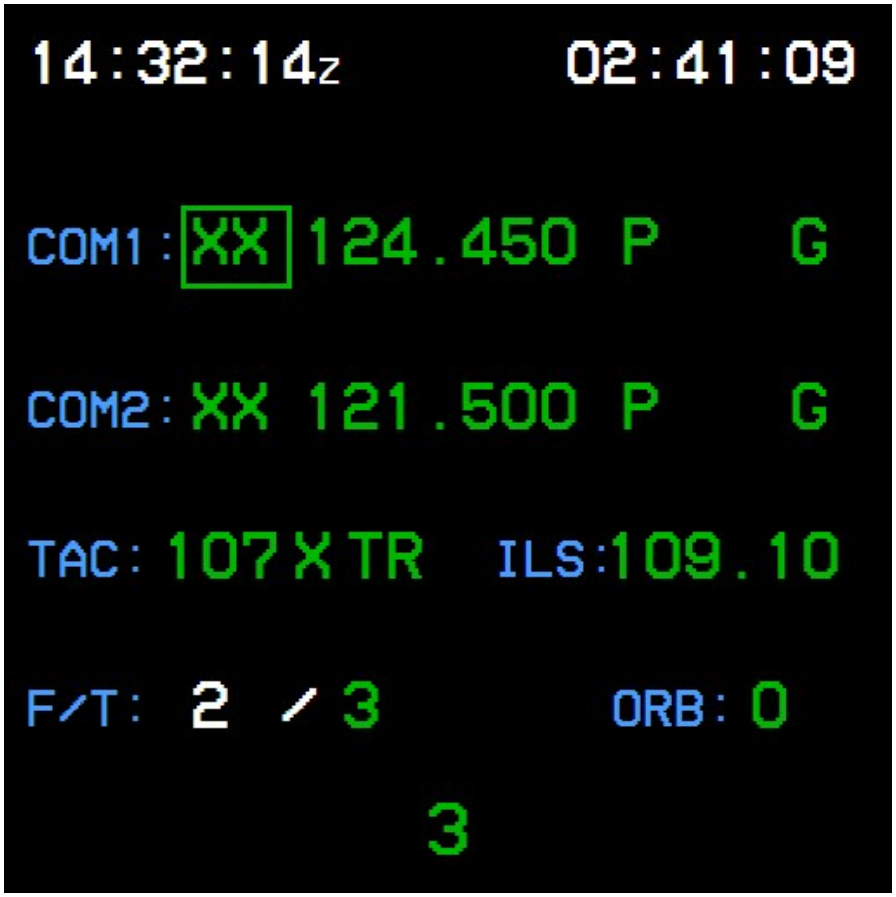
The Golden Rules of Data Entry

1. **Select** - press the LS key beside the line. A green box appears on the first editable field. Press the same LS key again to move the box to the next field on that line.
2. **Type** - digits appear in reverse video, with X for positions not yet filled.
3. **Press ENT** - nothing you type is ever used until you press ENT. There is no auto-enter and no time-out.Missing digits are filled with zeros: 1245 ENT gives 124.500.

- ◉ **Knobs act immediately** - no ENT needed. Turn quickly for ×10 steps.
- **ON/OFF-type fields** step to the next option with ENT, a repeat LS press, or the knob.
- **Invalid entry** - the rejected value flashes and the old value is kept. Press CLR or just type again.
- **CLR** cancels what you are typing and restores the previous value.
- **Recall** - when you change a number, the previous one is shown in white on the scratch-pad line. Press ENT with nothing typed to swap back (handy for "back to the last frequency").
- **Yellow prompts** such as ENT TO CONFIRM? need a second ENT; CLR cancels.

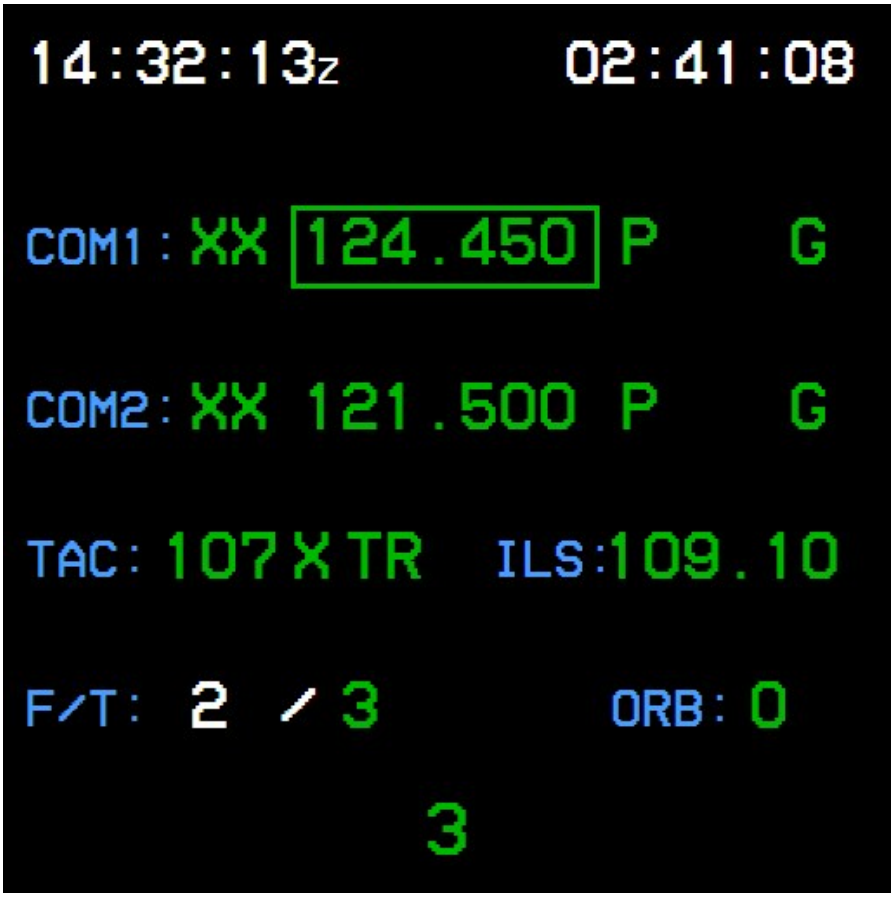
Example - tune COM1 to 132.450 on the HOM page

Example HOM page, box on the COM1 preset



HOM opens with the green box on the first field of line 1, the COM1 preset.

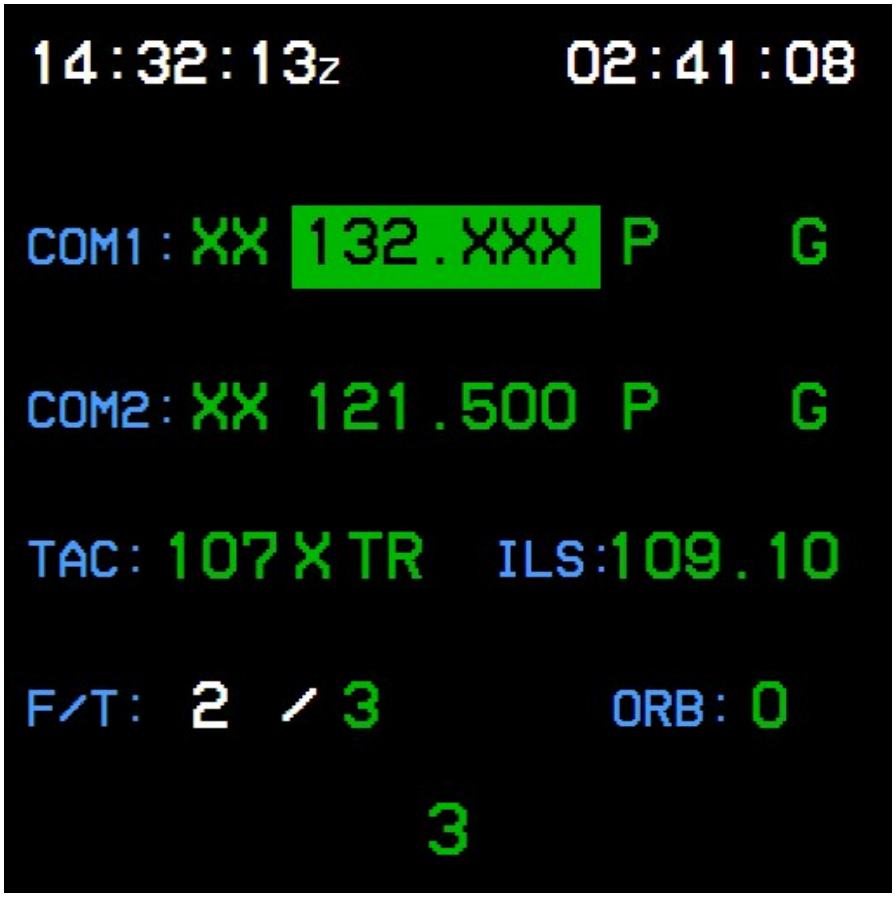
Example Box on the COM1 frequency



LS1

A second LS1 press moves the box to the frequency.

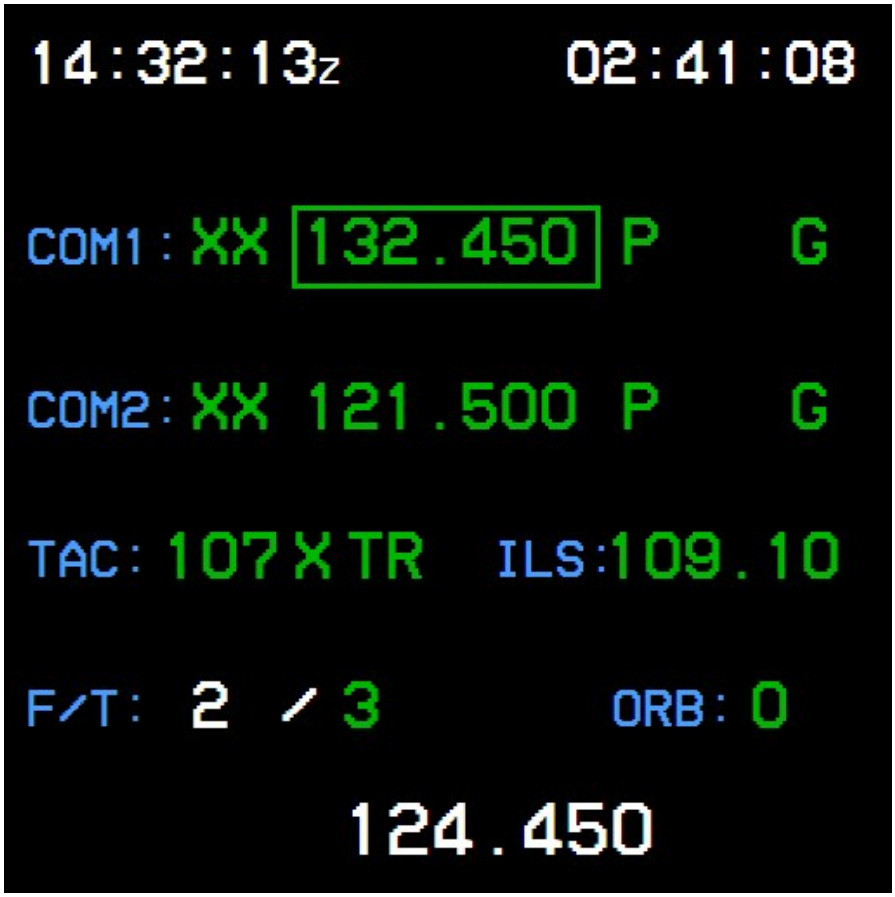
Example Typing 132



132

Digits appear in reverse video. X marks the positions still to fill. Nothing is used yet.

Example COM1 tuned to 132.450



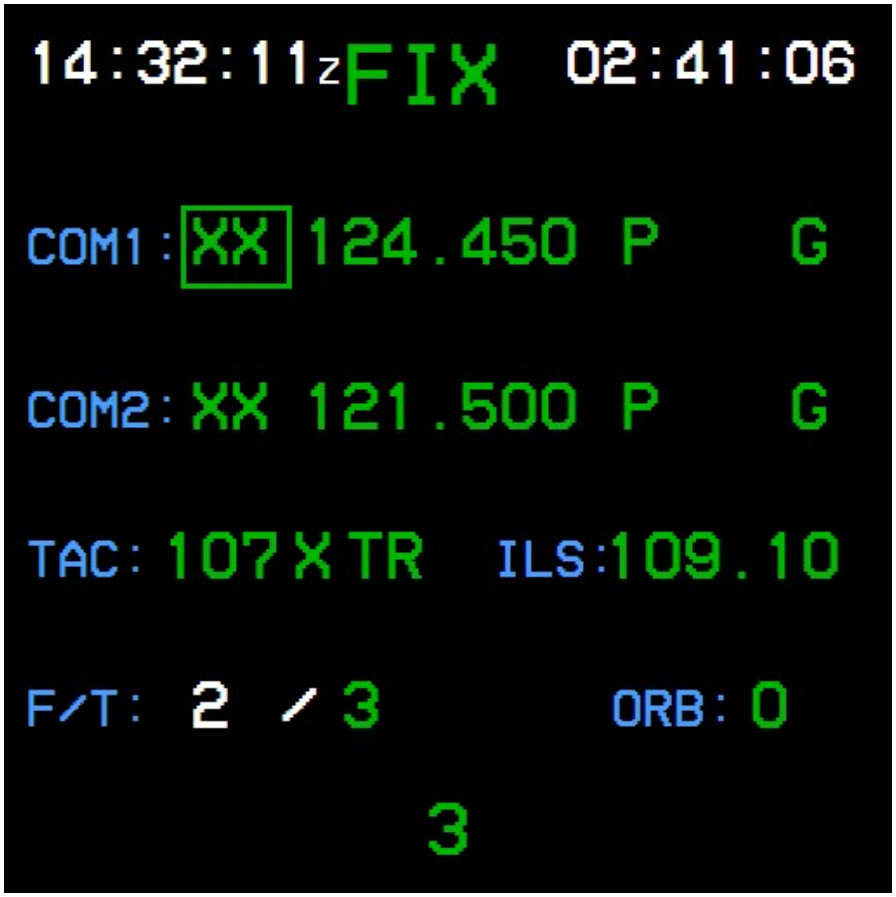
45ENT

ENT tunes the radio. The old frequency shows in white on the bottom line: ENT with nothing typed swaps back to it.

The Special Keys

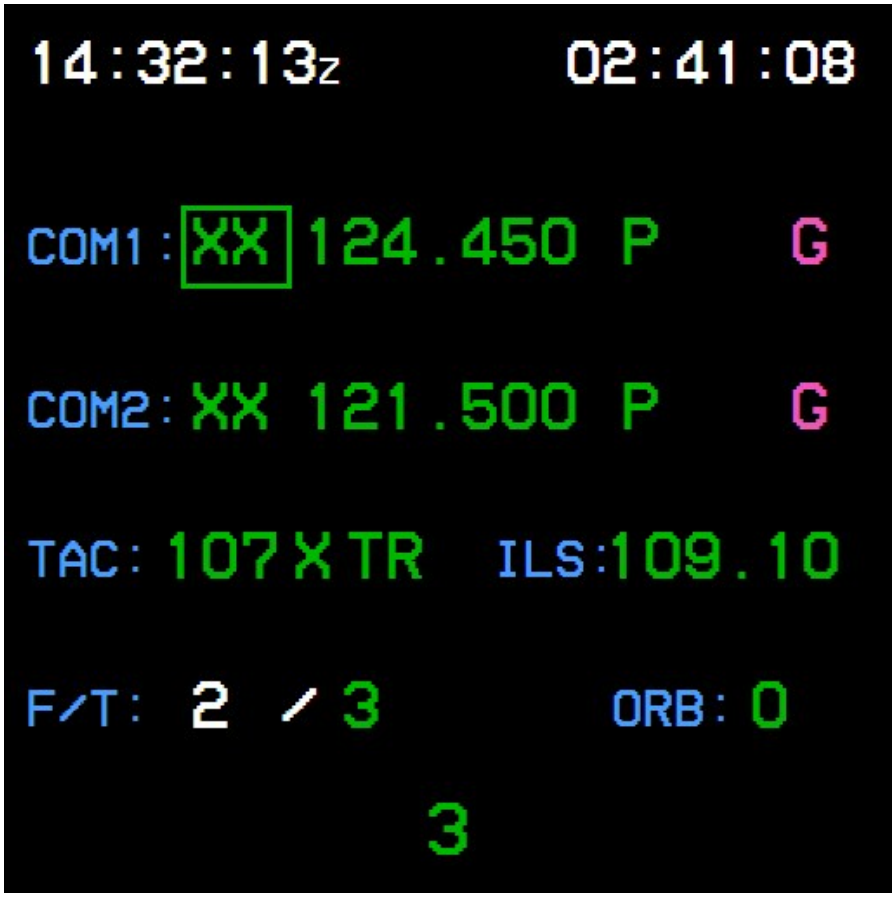
Key	Function
FIX	Records your present position, time, speed and heading. The fix appears in the MFD NAV → FIX table. FIX flashes at the top of the screen.
IDENT	Transponder ident (see IFF).
G	Mutes the guard receivers of both radios: one press for 30 s (magenta G, then green again), a second press within 1.5 s until you press G again (white G, which stays lit). A press while guard is muted brings it back (green). It does nothing with GRD OFF and never changes the radio frequency. Indication only - the sim has no separate guard audio.
PAD	Switches the scratch pad on or off, for typing a number *first* and sending it *afterwards*. It comes on by itself when an MFD field is opened for editing - this is how you key numbers into an MFD field. With the pad on and empty, two pushes of the small knob start remote MFD paging. See below.

Example FIX legend



FIX: FIX at the top of the screen for 2 seconds; the fix goes to the MFD FIX table.

Example Guard inhibited

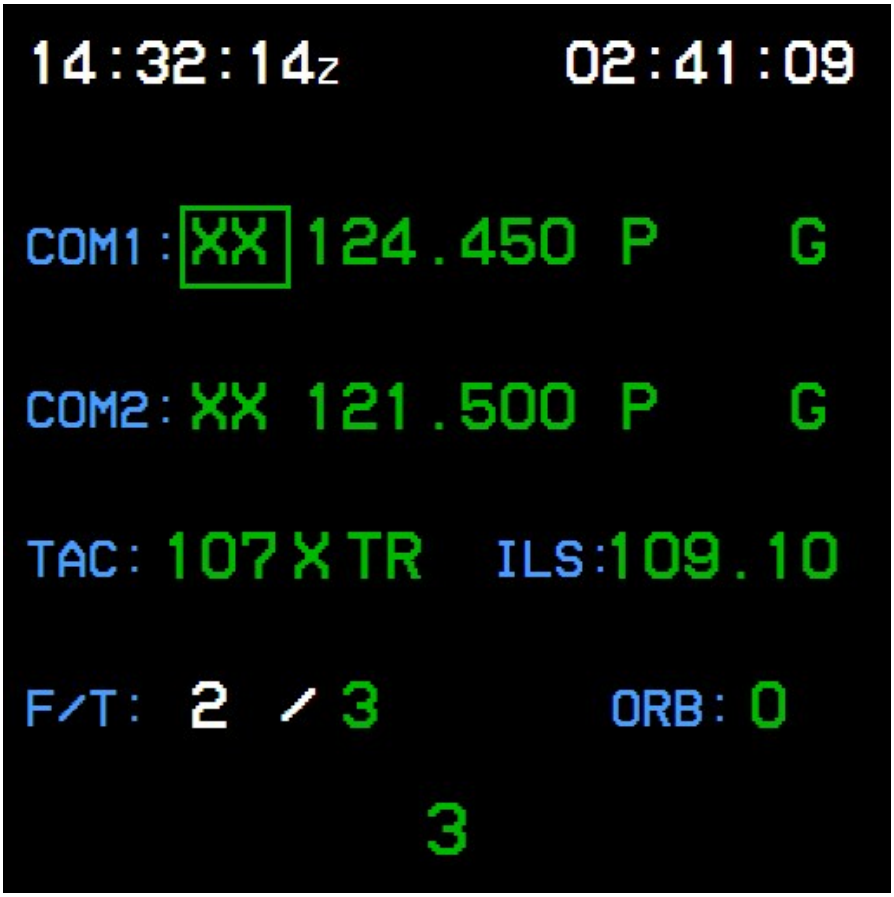


G once: both G indications turn magenta - guard muted for 30 seconds. A second press within 1.5 s turns them white: muted until the next press.

Radio Pages

HOM - Home Page

Example UFCD HOM page



HOM page in flight. The green box is the entry cursor; the LS keys sit to the left of the screen, one per data line.

1. **LS1** - COM1: preset (-- = none), frequency, P = plain voice, G = guard receiver: green on, magenta muted for 30 s, white muted until you press G again, blank off.
2. **LS2** - COM2, the same fields.
3. **LS3** - TACAN channel, X / Y, mode, and the ILS frequency (NAV 1).
4. **LS4** - Steering line: here F/T from DP 2 to DP 3, no orbits.
5. **Clocks** - GMT (Z) on the left, elapsed time on the right.
6. **Scratch pad** - Your active steer point (green), or the recall value (white) after a change.

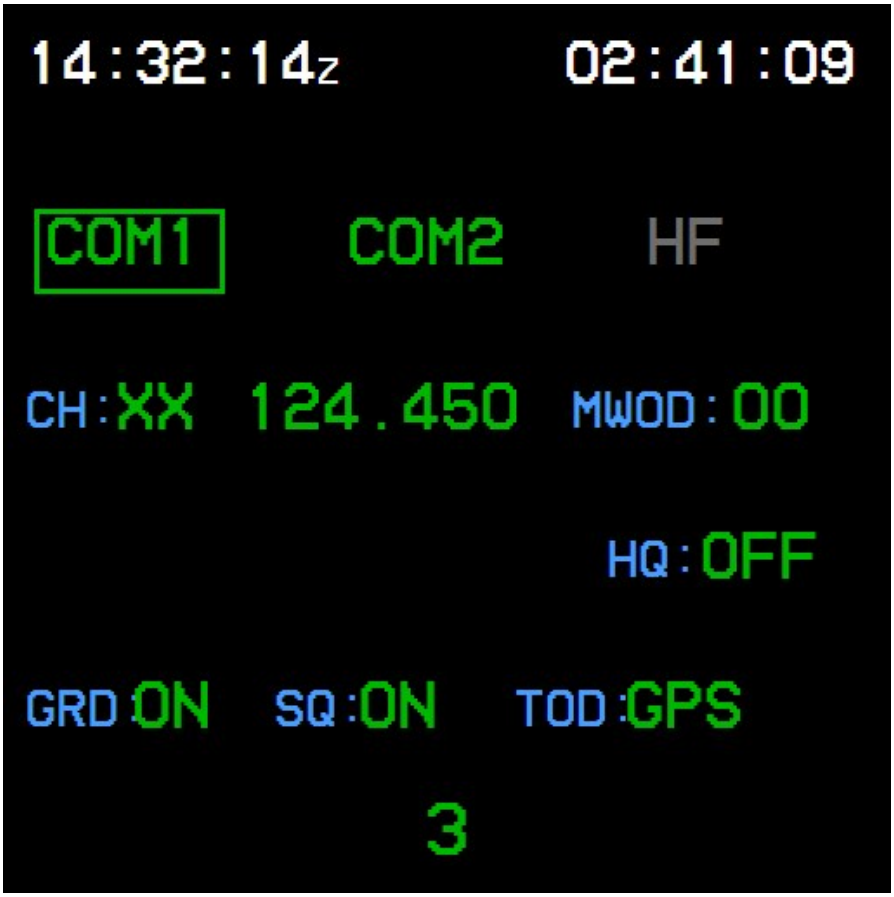
Field	Entry	Effect
COM1 / COM2 **preset**	0-25. 0 = guard 121.500.	Tunes the radio to that preset.
COM1 / COM2 **frequency**	118.000-136.990 MHz on the 8.33 kHz channels (118.000, 118.005, 118.010, 118.015, 118.025 ...). Large knob 1 MHz, small knob one channel; both wrap round the band. Any other frequency flashes and is refused.	Tunes the simulator's COM 1 / COM 2. The old frequency goes to standby. This is a manual tune: the preset goes back to --, here and on the MFD COM page, so no preset tunes over it.

Field	Entry	Effect
TAC channel, X/Y, mode	Channel 1-126, e.g. 57 ENT; X/Y toggles.	Tunes the TACAN. With the TACAN switched off (the audio panel TACAN knob at its stop) the X/Y and mode fields show dashes.
ILS frequency	Localizer frequencies 108.10-111.95 only, e.g. 1095 ENT = 109.50.	Tunes NAV 1.
Steering line (**F/T**, **T/T**, **T/F**, **TTD**, **TFD** or **EMER**)	Follows the steering mode. In F/T: "To" destination point 1-99 (confirm with ENT; "From" is set automatically) and **ORB** 0-15. In T/T: the two TO DPs. In T/F: DP and course. TTD / TFD add **NM** 1-128. EMER shows the selected airfield.	Entering a TO DP is a direct steer. Shared with MFD and BCDU.

Note
Radios are VHF The simulator's COM radios are VHF (118-137 MHz), so the UFCD accepts VHF frequencies only. UHF entries are rejected, and guard is always 121.500. The P (plain voice) indication is fixed.

COM Page - Radios

Example UFCD COM page



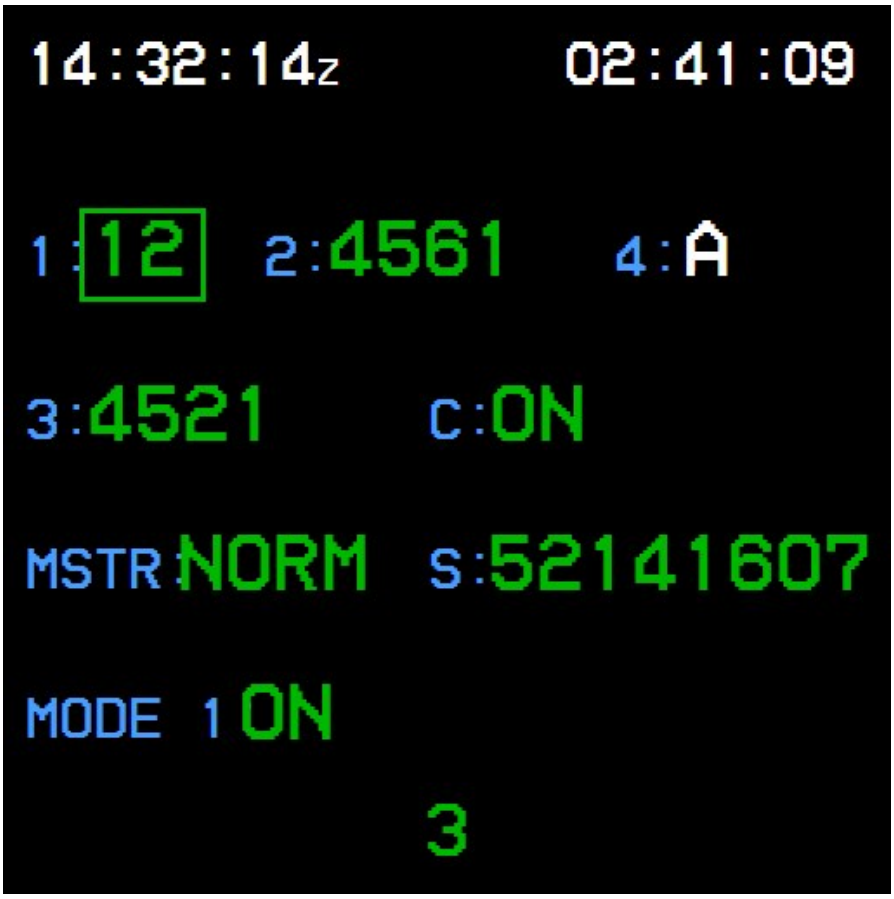
COM page with the COM1 tab boxed: preset channel, frequency, guard (GRD), squelch and time-of-day source.

LS1 steps across the tabs COM1 and COM2 (HF is greyed out - not fitted); the lines below switch to the selected radio. CH: and the frequency work exactly as on HOM. GRD: switches the guard receiver on or off (it is ON by default and controls the G shown on HOM); its ON takes the color of the G.

A runway start comes up with guard muted: white G. Neither GRD nor the G key retunes the radio - only preset 0 puts it on guard. TOD: is selected with the knob and confirmed with ENT. MWOD (00), HQ (OFF: HAVE QUICK is not modeled) and SQ are fixed displays.

IFF Page - Transponder

Example UFCD IFF page



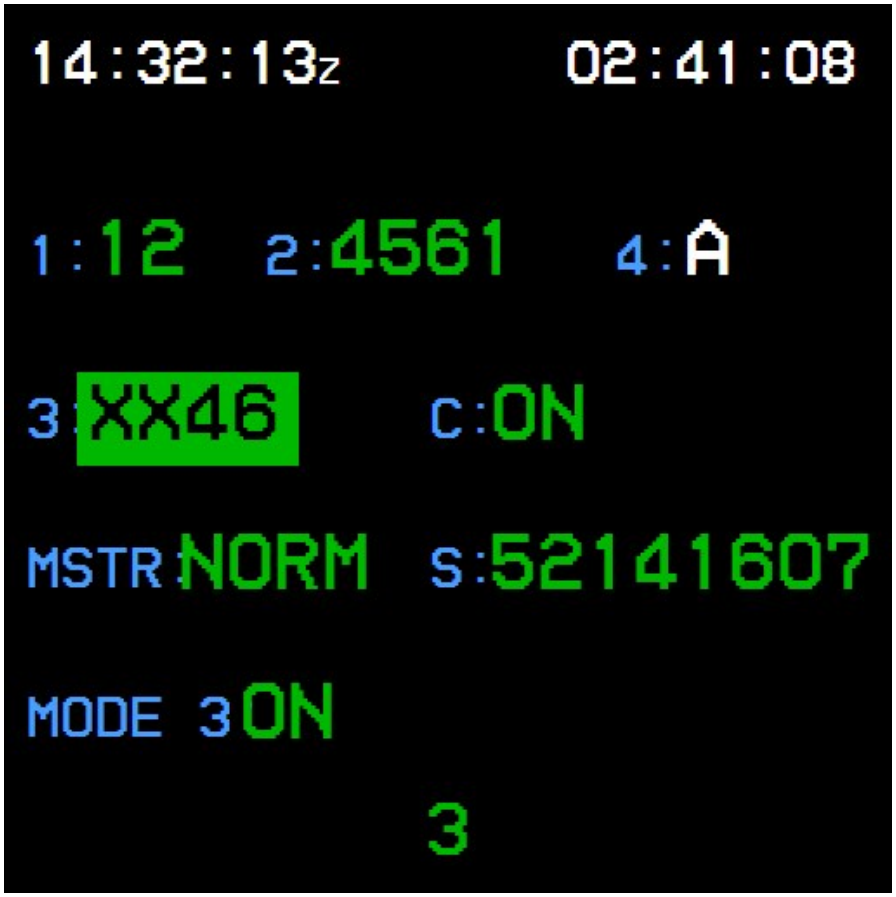
IFF page: Mode 1, 2 and 4 on line 1, the Mode 3 squawk and Mode C on line 2, MSTR and Mode S on line 3.

- **Squawk:** LS2, type four digits (0-7 only), ENT. This is the simulator's transponder code - a code set by ATC or on the MFD shows here too.
- **MSTR:** (knob only) - STBY = transponder standby; NORM = replying (Mode 3 and C ON = with altitude, C OFF = without altitude); EMER needs ENT to confirm, squawks **7700**, and restores your previous code when you leave EMER.
- **IDENT key** - sends an ident (needs MSTR NORM and a mode switched ON). ID shows at the top of the screen for 20 seconds.
- The IFF needs its own power: the IFF switch on the right console. With it off the page shows MSTR: OFF and the transponder is off. It always powers up in STBY - remember to select NORM.
- Mode 1, 2 and S codes can be entered for realism but have no effect in the simulator. Mode 4 has one: its code is lost with ZEROIZE, with the IFF switch put to OFF without HOLD first, or with the IFF power off on the ground after a flight (Mode 4 then goes OFF).

Switching Mode 4 ON again without a code, with MSTR in NORM or EMER, gives IFF MODE 4 RPLY FAIL with the IFF lamp. Mode 4 OFF clears it; the code comes back with the next flight.

Examples - squawk 4612, select EMER, ident

Example Typing a squawk



LS246

LS2 boxes the Mode 3 code. Digits come in from the right, X for the ones still to type.

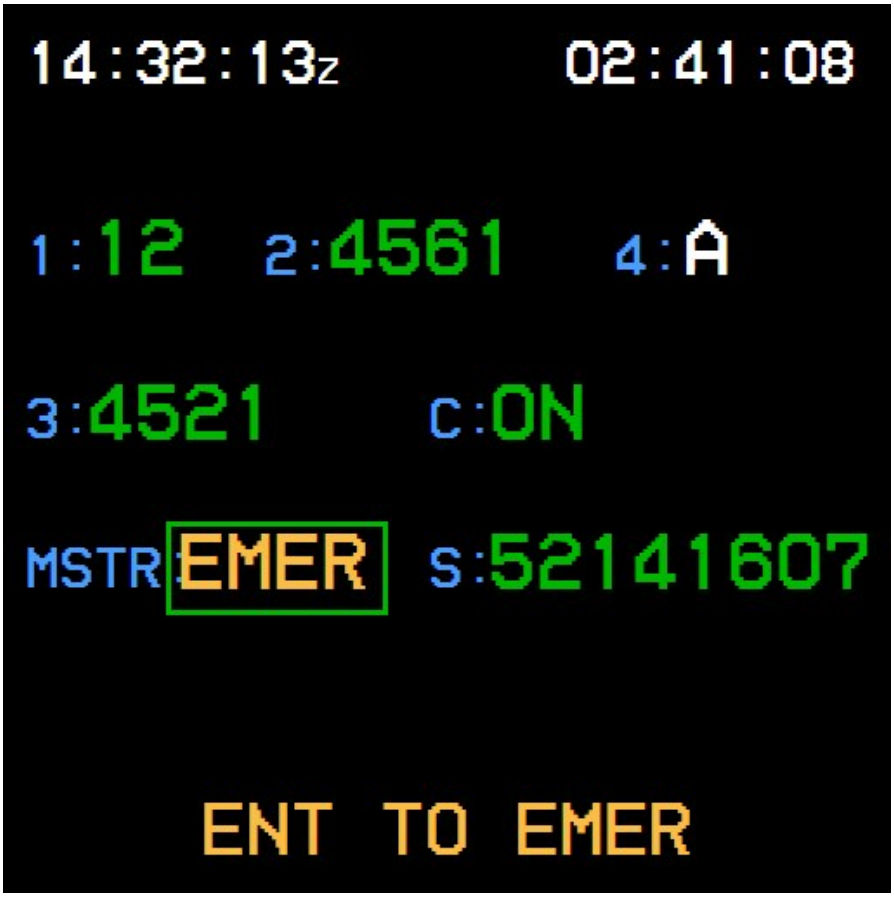
Example Squawk 4612 set



12ENT

ENT sets the transponder. The previous code shows in white on the bottom line.

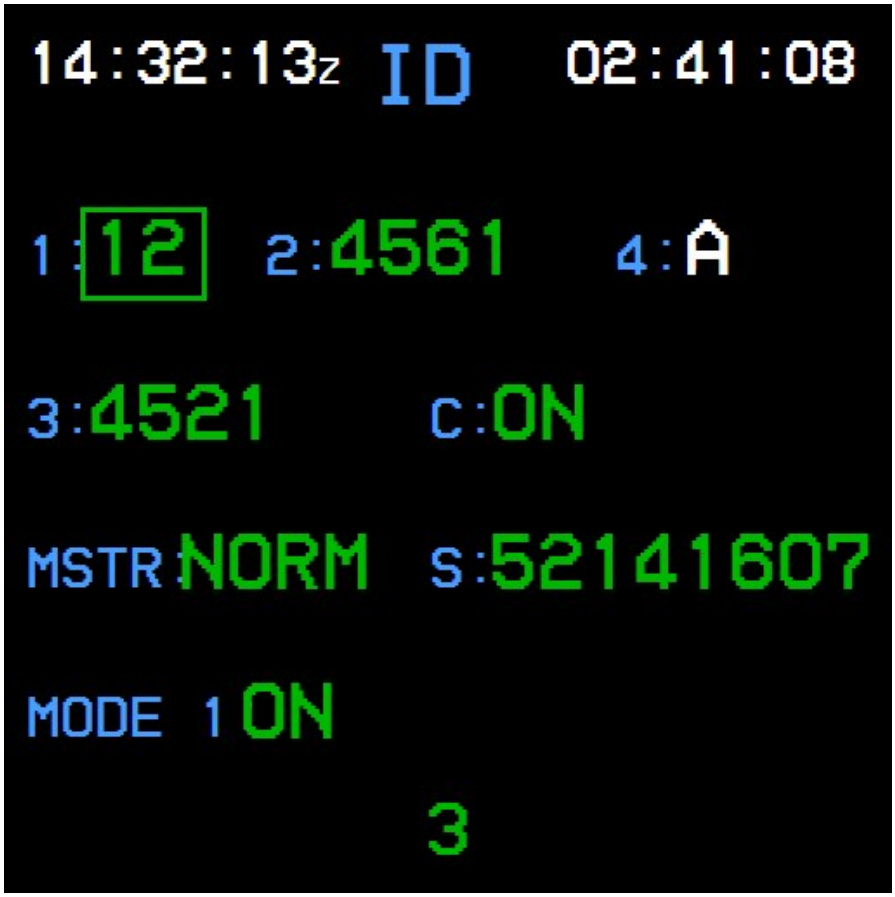
Example ENT TO EMER prompt



LS3knob

MSTR is changed with the knob. EMER asks ENT TO EMER first; CLR cancels.

Example IDENT



IDENT

ID shows at the top for 20 seconds while the transponder idents.

Navigation Pages

Destination points (DPs) are the U-2's waypoints. They live in files: A active route, ST1 - ST4 stored routes, E emergency airfields, B bullseyes, plus the UFCD-only file U.

File	Holds	Points	Shared with the MFD and BCDU
A	The active route - the one the steering computer flies	99	Yes
ST1 - ST4	Stored routes	99 each	Yes
E	Emergency airfields, used by the EMER page	16	Yes
B	Bullseyes, used by the BULL page	10	Yes
U	UFCD-only points	-	No

All 99 points of files A and ST1 - ST4 (16 in E, 10 in B) are shared live with the MFD (NAV/DPS page) and the BCDU - enter a point on one and it appears on the others within half a second. Only file U stays on the UFCD.

DP Page - Destination Points

Example UFCD DP page

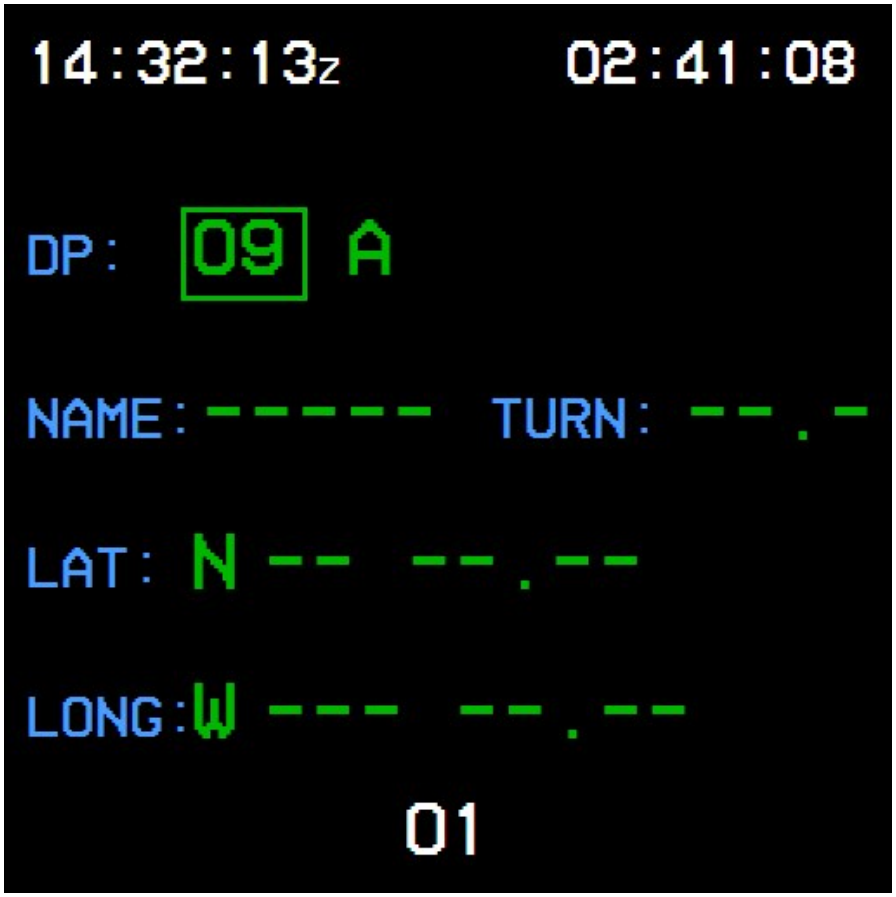


DP page showing DP 03 of the active file A: its name, turn radius, latitude and longitude.

Key	Field	How to enter
LS1	DP number, then file	Number 1-99 + ENT. Second press boxes the file letter - cycle with the knob.
LS2	NAME (5 characters), then TURN radius	Name uses the knob: large = letters, small = digits, **push** the small knob for the next character, ENT to store. Turn radius 0.1-99.9.
LS3	Latitude, then N/S	Six digits, degrees-minutes-hundredths: 390816 ENT = 39° 08.16'. Hemisphere: 2 = N, 8 = S.
LS4	Longitude, then W/E	Seven digits: 1212619 ENT. Hemisphere: 4 = W, 6 = E.

Example - start a new DP 09 and enter its latitude, N 39° 08.16'

Example New DP 09



9ENT

The box is on the DP number when the page opens. An unused number starts a new point: dashes until it has a position.

Example Typing the latitude



LS3390816

LS3 boxes the latitude. Six digits: degrees, minutes, hundredths.

Example Latitude stored

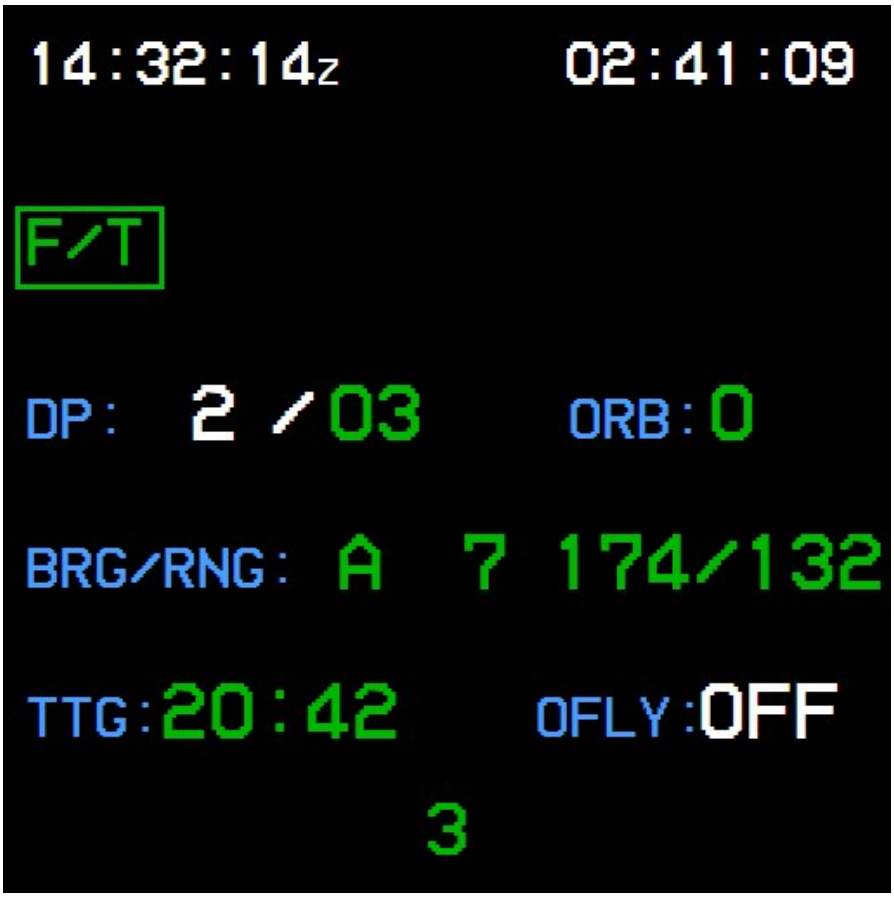


ENT

ENT stores it. A second LS3 press boxes the N / S letter (2 = N, 8 = S). The longitude on LS4 works the same way, with seven digits.

NAV Page - Steering

Example UFCD NAV page

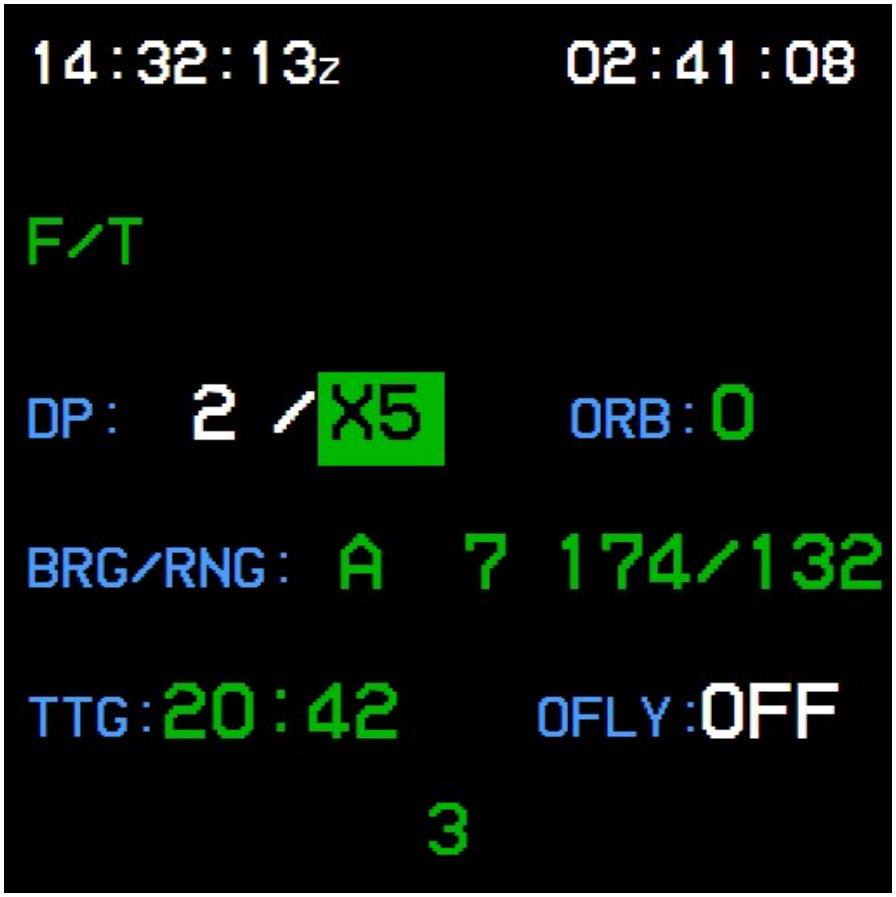


NAV page in F/T steering: from DP 2 to DP 3, no orbits. BRG/RNG looks up DP 7 of file A: 174° true, 132 NM, 20 minutes 42 seconds to go.

- LS1 - steering mode (F/T, T/T, T/F, TFD, TTD), confirmed with ENT. LS2 - the DP numbers / course / distance that go with it: in F/T the TO DP and orbit count, in T/T the two TO DPs, in T/F the DP and inbound course, in TFD / TTD also the intercept distance. Steering modes are explained under Navigation System (INS Steering).
- LS3 BRG/RNG: - a quick look-up: pick any file and DP number and read the live bearing (° true) and range (NM) from your INS position, with TTG (time to go) below. Until the INS is in NAV they show dashes. It does not change your steering.
- Right of the steering mode, a magenta message shows the steering computer's status: **128 MAX**, **400 MAX**, **ZONE 1**, **ZONE 5** or **OVERSHOOT TURN** (explained under Navigation System (INS Steering)). In the EMER steering mode the page shows the emergency field instead: its name, BRG, RNG, TTG and DEST FOB.
- LS4 OFLY: - overfly ON/OFF.

Example - steer direct to DP 05

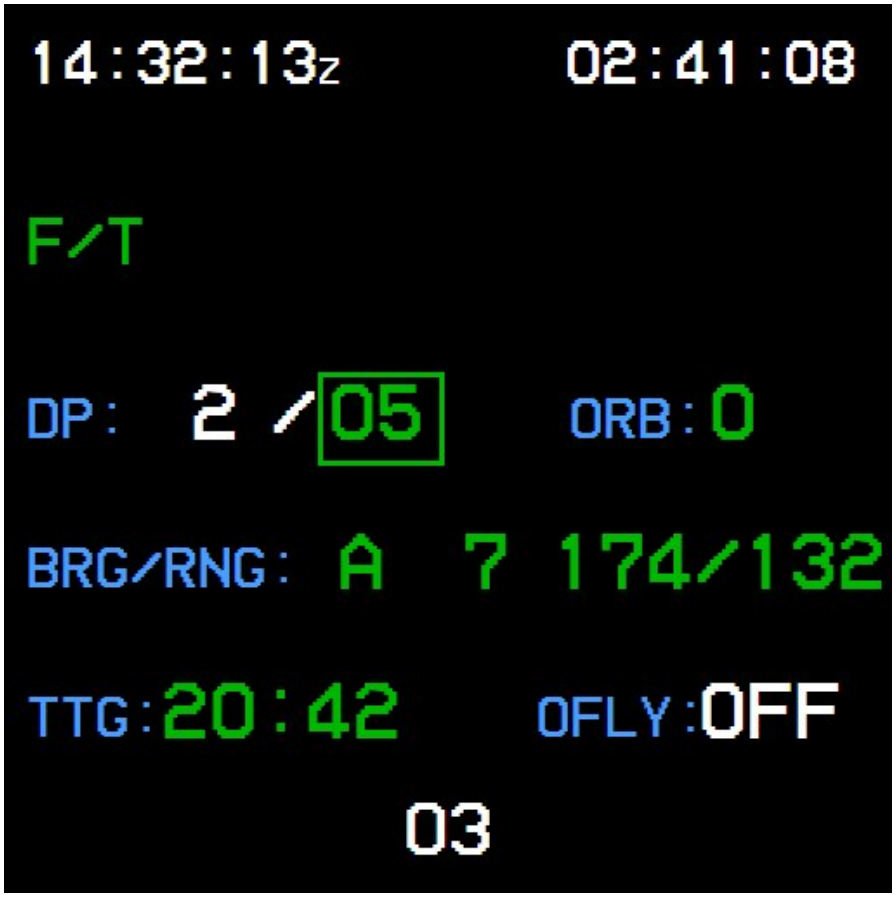
Example Typing the TO DP



LS25

LS2 boxes the TO DP. Type the number.

Example Direct to DP 05



ENT

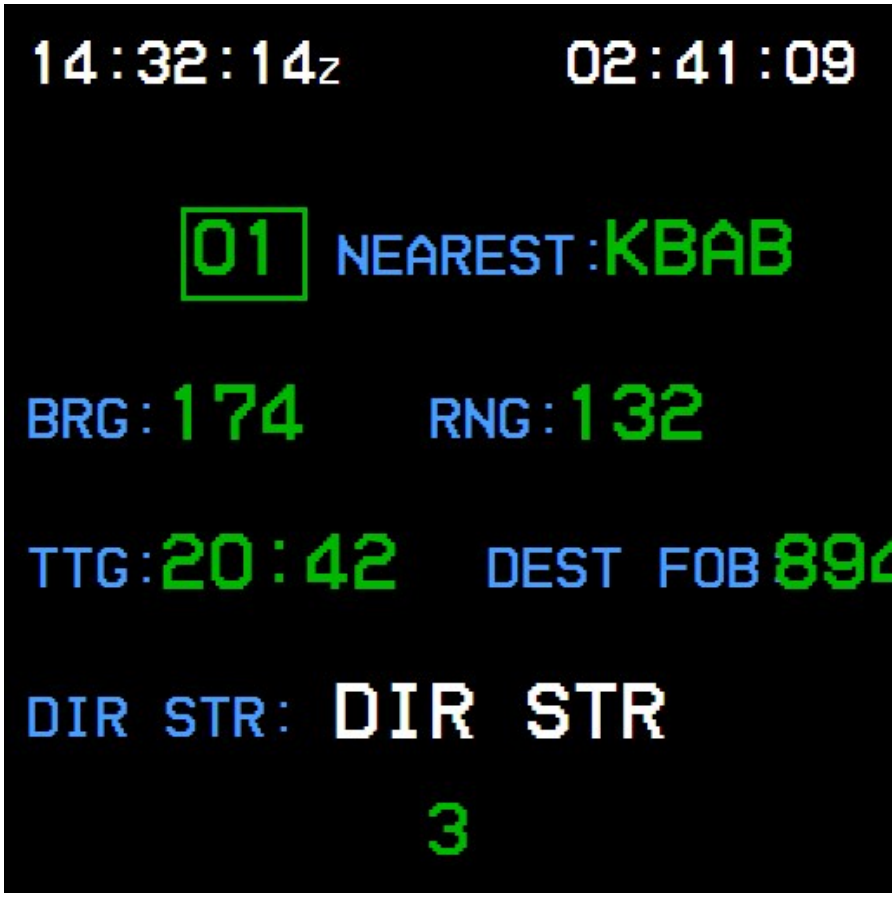
ENT: the aircraft now steers direct to DP 05. The old TO DP shows in white on the bottom line.

EMER Page - Nearest Emergency Airfield

Lists the airfields in DP file E, sorted by distance from your INS position - 01 is the nearest. For the selected field you get bearing, range, time to go and DEST FOB - the fuel (gallons) you would land with at the present fuel flow. Until the INS is in NAV the fields stay in file order and these values show dashes.

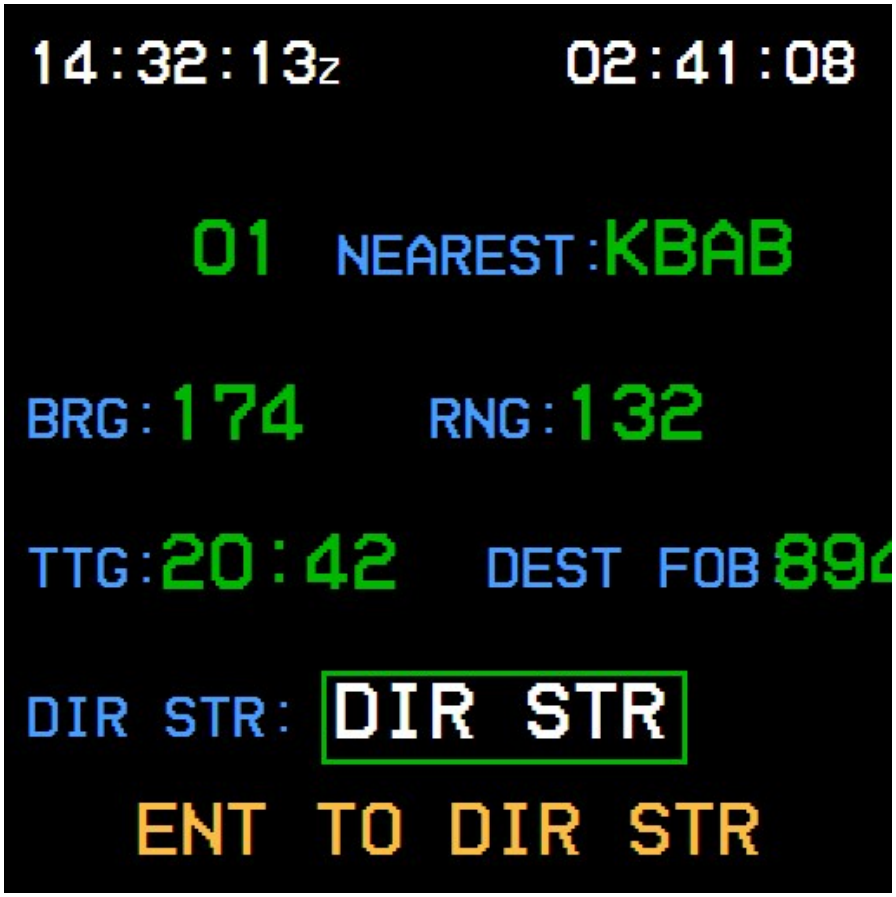
LS4 boxes DIR STR and the scratch pad asks ENT TO DIR STR; ENT selects direct steering to the field. The steering computer then makes the EMER file your ACTIVE file - see Navigation System / EMER. While the autopilot is flying NAV the request is refused and DIR STR flashes.

Example UFCD EMER page



Nearest field first: KBAB, 174° true, 132 NM, 20 minutes 42 seconds to go. DEST FOB is the fuel you would land with at the present fuel flow.

Example ENT TO DIR STR



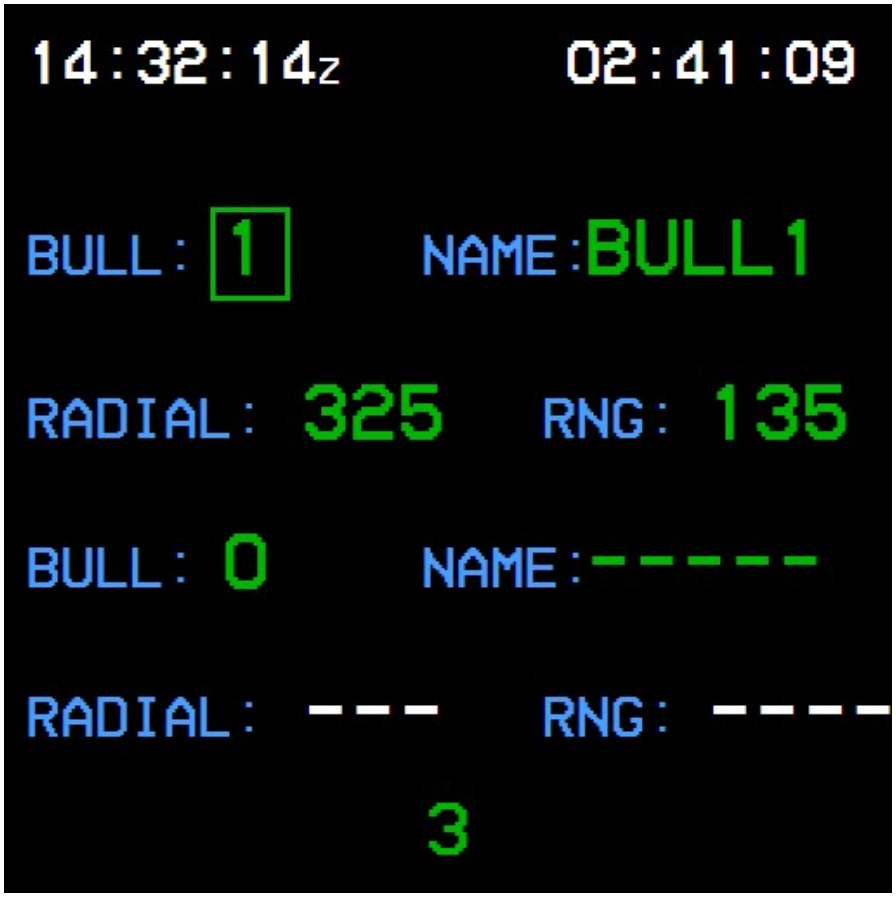
LS4 boxes DIR STR and asks ENT TO DIR STR; ENT starts direct steering to the field.

Caution
Fill file E first There is no built-in airport database. The EMER page only knows the airfields you (or the default data) have put in file E.

BULL Page - Bullseye

Shows two bullseye reference points from DP file B at once. For each: your radial (° true) *from* the bullseye and your range in NM, worked out from your INS position (dashes until the INS is in NAV). Select which bullseye (1-10) with LS1 / LS3.

Example UFCD BULL page

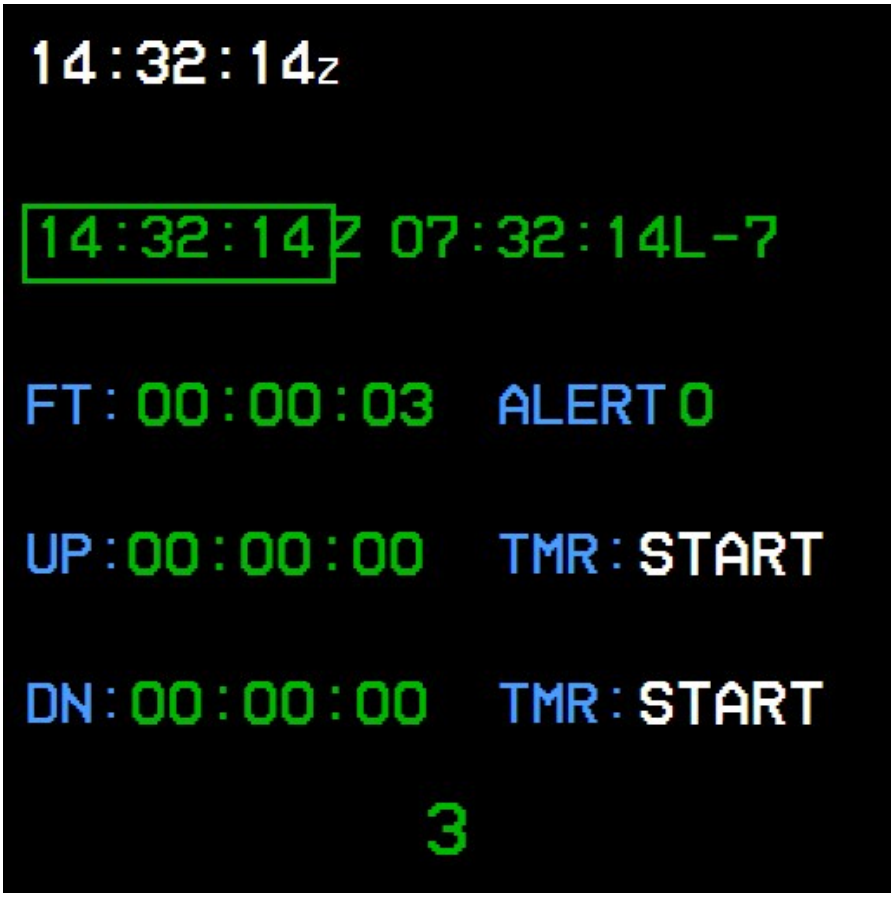


Bullseye 1 selected: you are on its 325° radial at 135 NM. No second bullseye is selected.

Time Page

TIME Page - Clocks and Timers

Example UFCD TIME page



TIME page: GMT 14:32:14 Z and local time (UTC -7), flight time, the alert interval and the two timers.

Line	Function
GMT	Shows Zulu time. **Entering a time here changes the simulator's clock** (hours and minutes). Further LS1 presses let you hide the GMT clock or set/show local time.
FT:	Flight time. Starts automatically at take-off, stops after landing, and starts again from zero at the next takeoff and in a new flight. It keeps counting in outside views. ENT while boxed resets it.
ALERT:	Alert interval in hours (0-9, default 1). Every time the flight time passes a multiple of it, the advisory ALERT TIME comes on and the navigation system records an **automatic fix** on the MFD NAV/FIX page. ACK on the MFD clears the alert line; the advisory itself goes when you change the ALERT value or FT is reset. 0 switches both off.
UP: / DN:	Count-up and count-down timers. Type HHMMSS + ENT to set; box TMR: START and press ENT to start / stop. CLR twice resets. The count-down keeps counting past zero, and the MFD shows COUNT DOWN ALERT / COUNT UP ALERT when a timer runs out.

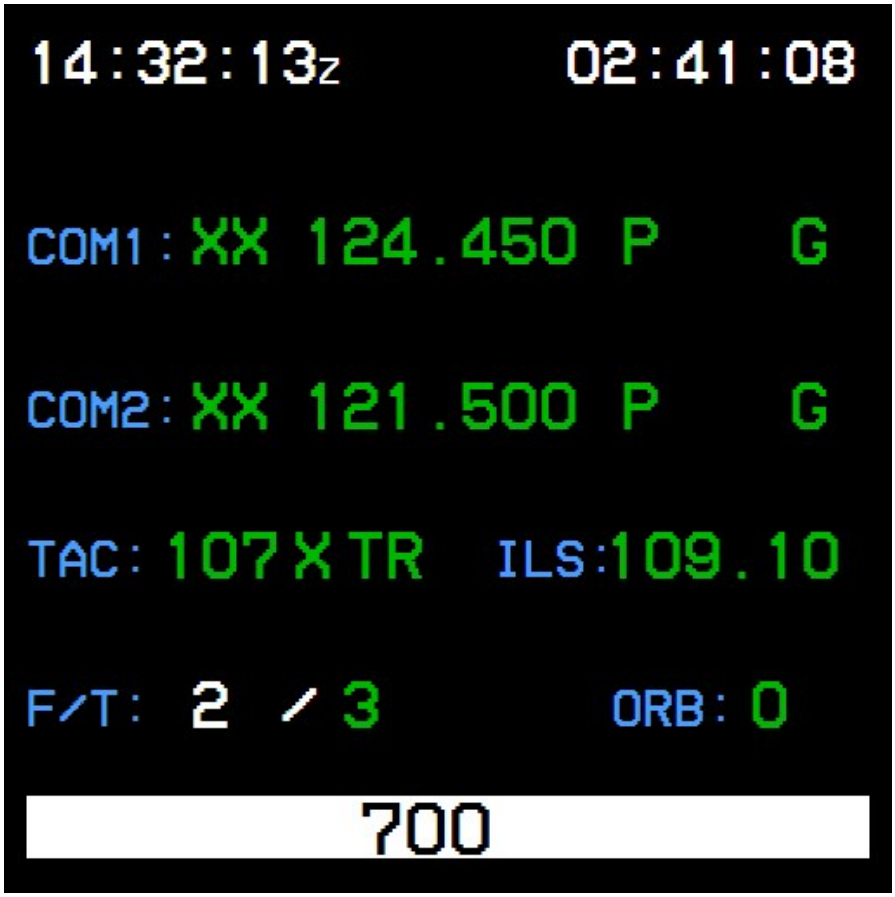
Working with the MFDs

Using the UFCD Keypad for MFD Entries

Whenever a field is open for editing on any MFD (a boxed heading, altitude, baro, DP coordinate...), the UFCD lends its controls to that MFD:

1. Open the field on the MFD (for example PFD R1 ALT). The UFCD scratch pad switches on by itself - a white bar runs across the whole bottom line, with black digits in its middle and the red cursor after them.
2. The ◉ **knobs** now change the MFD value directly.
3. To type instead: key the digits and press ENT. The number goes to the MFD field. If the MFD rejects it, it flashes in the pad. There is no need to press PAD - it would switch the pad off (press it again to bring it back).

Example UFCD scratch pad with 700



An MFD field is open: the scratch pad (white bar) is on and holds 700 - an altitude bug of 70,000 ft once you press ENT.

When every MFD edit has ended the pad switches itself off, digits and all. Left untouched for 15 seconds it goes off too; while an MFD field is open, that field's own 15 seconds count instead.

Examples: altitude bug 700 = 70,000 ft · baro 2992 = 29.92 · heading 270.

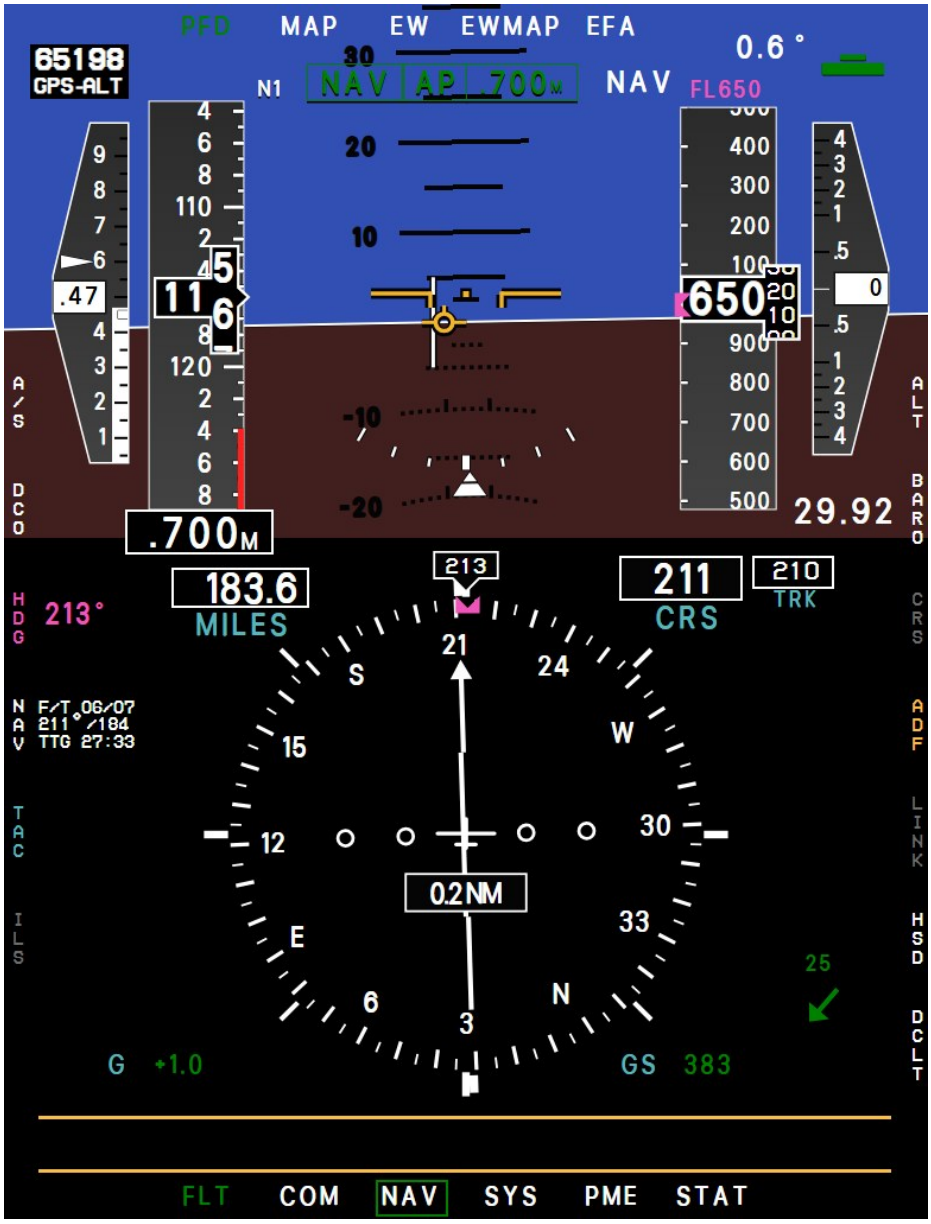
Note
With the PFD BARO field open, the pad digits are an altimeter setting with an implied decimal point: 3001 = 30.01 inHg (22.00-31.00). The SFD has its own, separate altimeter setting on its own knob.

Remote MFD Paging

You can change the page on the **center** MFD from the UFCD, without reaching for its bezel:

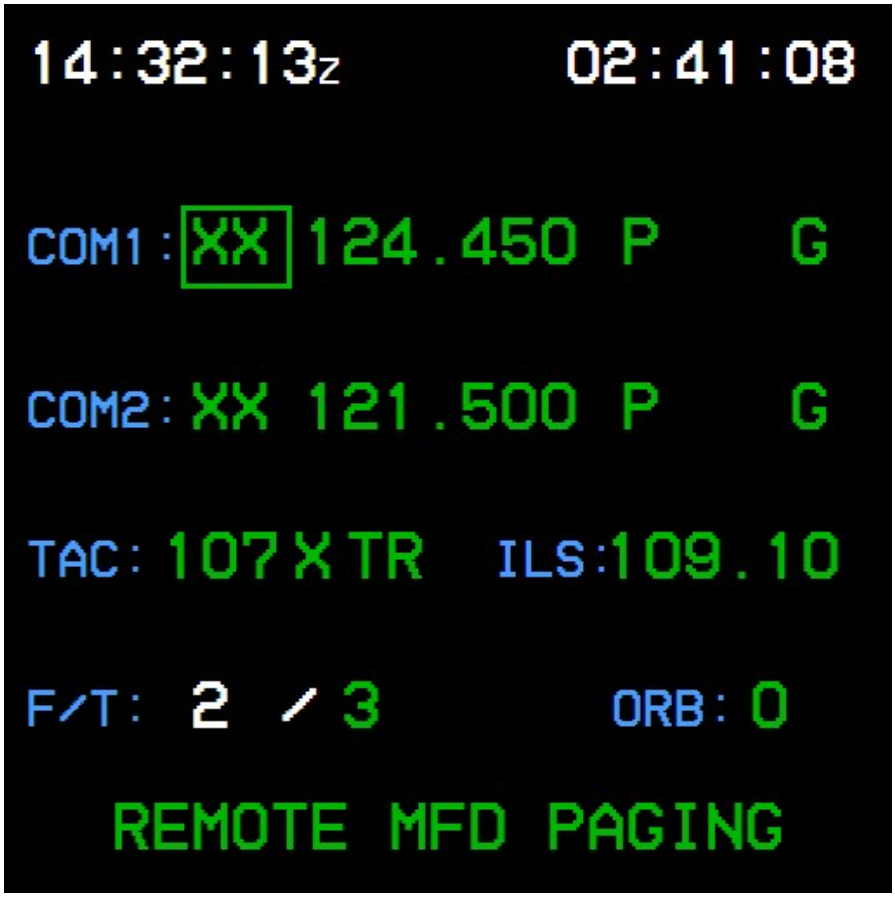
1. Switch the scratch pad on with PAD - it must be empty (if it holds digits, press PAD twice). Then push the small knob twice within 2 seconds. The scratch pad reads REMOTE MFD PAGING and a green box appears on the center MFD, round the bottom legend of the branch it is showing.
2. Turn the ◉ **large** knob to move the box along the bottom legends (FLT, COM, NAV, SYS, PME, STAT), the ◉ **small** knob to move it along the top legends of the branch shown. The first click on the other knob only moves the box to that row.
3. Push the small knob: the center MFD shows the boxed page. Repeat as often as you like.
4. Press PAD or ENT on the UFCD to finish. EDIT on any MFD also ends it.

Example MFD remote



Remote MFD paging from the UFCD: the green box on the centre MFD marks the legend a push of the small knob will select - here the NAV menu.

Example REMOTE MFD PAGING



Remote paging is on: the scratch pad line reads REMOTE MFD PAGING.

While paging, the keypad digits and CLR do nothing; G, FIX, IDENT, the LS keys and the page keys keep working. Paging cannot be started while an MFD field is being edited.

Audio and Backup Radio

Audio Panels

Two panels decide what you hear and which radio you talk on: the audio panel at the lower left of the main panel and the volume panel on the left console.



Audio panel, lower left of the main panel.



Volume panel on the left console.

Audio panel

1. **MASTER VOLUME** - Scales every radio and station ident. At the bottom stop it mutes all headset audio, warning tones and chase-car calls included.
2. **TRANSMITTER SELECT** - HF / D/L / COMM 1 / COMM 2 / SSR. Picks the transmitter only; both COMM receivers are always heard. HF, D/L (the SATCOM radio, not simulated) and SSR transmit nothing.
3. **HOT MIC / CALL RCD** - HOT / OFF / CALL/RCD. CALL/RCD is momentary and disables the transmitters while held. HOT has no effect (no intercom in the sim).
4. **COMM CONTROL** - NORMAL / BACKUP. BACKUP hands the selected COMM radio to the ARC-210 backup panel; back to NORMAL restores the previous frequencies.

Volume panel

1. **COMM 1 VOLUME** - COMM 1 receiver volume, multiplied by MASTER VOL. At the stop the radio is silent but stays on.
2. **COMM 2 VOLUME** - COMM 2 receiver volume, multiplied by MASTER VOL. At the stop the radio is silent but stays on.
3. **HF VOLUME** - No function in the simulator (there is no HF radio).
4. **TACAN VOLUME** - TACAN ident volume, multiplied by MASTER VOL. At the stop the TACAN is off: you get the TACAN FAULT advisory, the UFCD shows dashes and autopilot TAC steering drops to basic roll.
5. **ILS VOLUME** - ILS ident volume, multiplied by MASTER VOL. At the stop the ILS receiver is switched off.

6. **AOA VOLUME** - Only the stop matters: there it silences the AOA approach, flare and touchdown tones. The stall tone always stays.
7. **THREAT VOLUME** - Volume of the EW new-threat tone, multiplied by MASTER VOL, in four steps. Silent at the stop. See EW System.

ARC-210 Backup Radio



1. **ARC-210 DISPLAY** - Shows frequency, mode and preset channel. The ARC-210 is the sim's COM 3, independent of the UFCD; brightness on the up / down arrow buttons.
2. ◉ **OPERATING MODE (left knob)** - OFF / TR+G / TR / ADF / CHG PRST / TEST / ZERO. OFF switches the radio off; TR or TR+G to use it; CHG PRST stores presets.
3. ◉ **CHANNEL (centre knob)** - Selects the preset channel, 1-25, used in PRST; with CHG PRST it picks the channel to store.
4. ◉ **FREQUENCY MODE (right knob)** - ECCM MASTER / ECCM / PRST / MAN / MAR / 243 / 121. MAN: frequency knobs; PRST: presets; 121: guard 121.500. The rest are not simulated.

The ARC-210 control panel on the left console is the simulator's **COM 3**. It is independent of the UFCD.

- **Right rotary = frequency mode.** MAN: tune with the five frequency knobs (the radio retunes on every click). PRST: use the channel knob to pick presets 1-25. 121: guard 121.500.
- **Left rotary = operating mode.** TR or TR+G for normal use. CHG PRST lets you store a new frequency in the selected channel (dial it, press the top line key LOAD). TEST runs a display test.
- Coverage is VHF 118.000-136.990 MHz with 8.33 kHz channels. The top line key in MAN swaps back to your previous frequency. Brightness has its own up/down buttons.
- Positions and buttons for functions the simulator cannot provide (ADF, 243, maritime, SATCOM, encryption, menu items) show UNAVAILABLE or are decorative. Presets you change are not saved between flights.

Related pages: Backup Control Display Unit (BCDU) · Navigation Pages (NAV) · Navigation System (INS Steering) · Quick Answers

Miltech Simulations U-2. SIMULATION USE ONLY. This documentation describes the simulated aircraft as delivered in the add-on and must not be used for real-world aviation.

Miltech Simulations U-2

Backup Control Display Unit (BCDU)

The Backup Control Display Unit (BCDU) is the small green-screen computer with the alphabet keypad. In our rendition of the U-2S it is exactly what its name says - the backup. While the AVP is running, the BCDU only shows the RT page, a read-out of navigation data, and its keys do nothing.

Its menu pages - INS alignment, destination points, steering, radios and transponder - work in backup control, that is while the AVP is off, still starting, or failed. Pages are reached through the five positions of the menu knob and the function keys.

Caution
Using the BCDU pages Switch the AVP off to get the menu pages - or use the BCDU before you switch the AVP on, or while it is still starting. That is how you type the INS alignment position by hand. With the AVP off the MFDs show DISPLAY BUS OR AVP FAILURE and the UFCD shows NO COM (switch the UFCD off and on again once the AVP is back).

As soon as the AVP is up again the BCDU returns to the RT page, and an entry you have not finished is lost.

BCDU - Menu Knob

STAT	NAV-1
SYS STAT - subsystem status, CHK STAT / ACK	**NAV INIT** - alignment position, ALN / 2 POS ALN / TEST, KALMAN RESET / IFA RESTART **MODE STAT** - accept LIM / FULL NAV, IFA status FIX TABLE TEST - INS self-test (TEST MODE only) FLT DATA - current flight data; GND TRKR - present position MEMORY, BIAS: INOP
NAV-2	GPS
DEST PTS - edit destination points, accept / reject uploads **BRG/RNG** - direct steer to a DP **NAV PRIM / SEC** - live nav data, steering mode **MAN UPDT** - manual position update **TRACK ID** - file names, store / load / clear files UPLK STAT - pending datalink upload	EGPS FLT DATA - GPS position and velocity Key functions: INOP
DDL	
Data link pages: INOP	

Function Keys

CNI	FIX
IFF - master, codes, IDENT, Mode S / FLIGHT ID **ADF** - frequency, power **ILS** - tune the ILS	Store present position in the fix table (and freeze it for MAN UPDT)

CNI	FIX
RTN	ENT CLR
Back to the top page of the knob position	Accept / cancel an entry or action
BUL EMR EW	
Bullseyes / emergency fields with bearing and range; EMR = direct steer EW: INOP	

BCDU page map - backup control, AVP off. Pages in bold are the ones that do something in the simulator. With the AVP running the BCDU shows only the RT page.

Layout



1. **Screen:** 10 lines of 24 characters. The bottom line is the **scratch pad** - it shows the page title in brackets, or what you are typing, or a message. Its first five characters are the advisory letters (see Advisory Letters below).

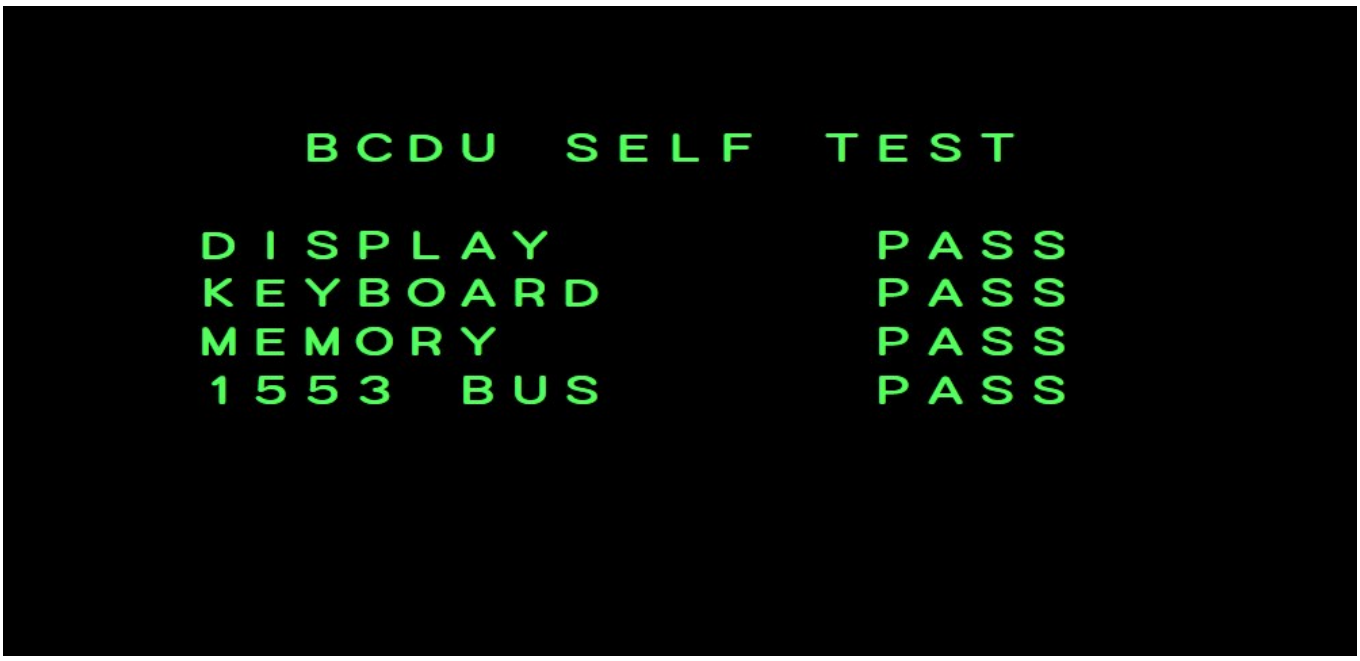
2. **Right Line Select Keys (R1-R5)**
3. **Left Line Select Keys (L1-L5)**
4. ◉ **Menu Knob:** Five positions - STAT, NAV 1, NAV 2, GPS, DDL. Turning it always takes you to the top page for that position (only while the AVP is off).
5. **BIT Light:** Built-in-test indicator (decorative in the simulator).
6. **Keypad:** Each key carries two letters and a digit. The small letters in the corners are the hemispheres: 2 N, 8 S, 4 W, 6 E.
7. **ST / WX Keys:** Double as the up / down arrows (scrolling), and type S/T and W/X in a letter field.
8. **FIX, RTN, CNI** function keys.
9. **ENT:** Accepts an entry or action.
10. **CLR:** Clears a message, resets an entry, or cancels.
11. **YZ Key**
12. **Left / Right Arrows:** Move the cursor during an entry; adjust the brightness when nothing is being typed.

Note
Go by the key legends, not the mouse tooltips Some mouse-over tooltips on the BCDU keys show labels from a different unit and do not match. Use the legend printed on the key and the positions described here.

Power-Up

Switch BCDU ON (right console). The screen runs a 5-second display test (full raster, grid, character set, numerals, self-test summary) and then counts down INITIALIZING: 9 ... 1. Keys are ignored until it finishes - about 15 seconds in total. It then shows the RT page if the AVP is running, otherwise the page for the menu knob position. With no keys being typed, ← and → adjust the screen brightness.

Example BCDU selftest



Right after you switch the BCDU on it runs a five-second display test that ends with this self-test summary.

Example BCDU powerup



After the display test the BCDU counts down INITIALIZING from 9 to 1; keys are ignored until it finishes.

RT Page (AVP Running)

While the AVP runs the navigation bus, the BCDU is only a terminal on it and shows the RT page: present position, true airspeed and ground speed, time and distance to go, magnetic heading and track, INU temperature, wind, cross-track error, the orbit count while orbiting, the steering mode and DPs (for example FM/TO:03/04) and calibrated altitude.

The bottom line carries the advisory letters and GMT. Only ← and → (brightness) work; every other key, FIX and CNI included, and the menu knob are ignored until the AVP goes off.

Example BCDU rt



While the AVP runs, the BCDU only shows the RT page, a read-out of the navigation data.

1. **Present position (latitude, longitude)**
2. **True airspeed (GS below)**
3. **Time to go**
4. **Distance to go (NM)**
5. **Cross-track error (R = right of course)**
6. **Steering mode and DPs**
7. **Calibrated altitude**
8. **Advisory letters (GMT at the right)**

Advisory Letters

The first five characters of the bottom line are single-letter advisories, each in a fixed position (blank while the INS is off):

Position	Shows	Meaning
1	L / N	Limited / full navigation. While aligning it flashes: that level is ready to accept. In NAV it flashes 21 seconds before a turn point.
2	1-7	GPS navigation mode: 1-5 GPS in use (1 = best), 6 ground tracker, 7 no update.
3	E / A	E: the alignment position and the gravity deflection are not both entered yet. A: aligning or testing; flashing once a NAV level is ready.
4	O	Overfly selected or orbit adjust armed; flashing once the DP has been overflown.
5	U	Flashing: a datalink upload is waiting.

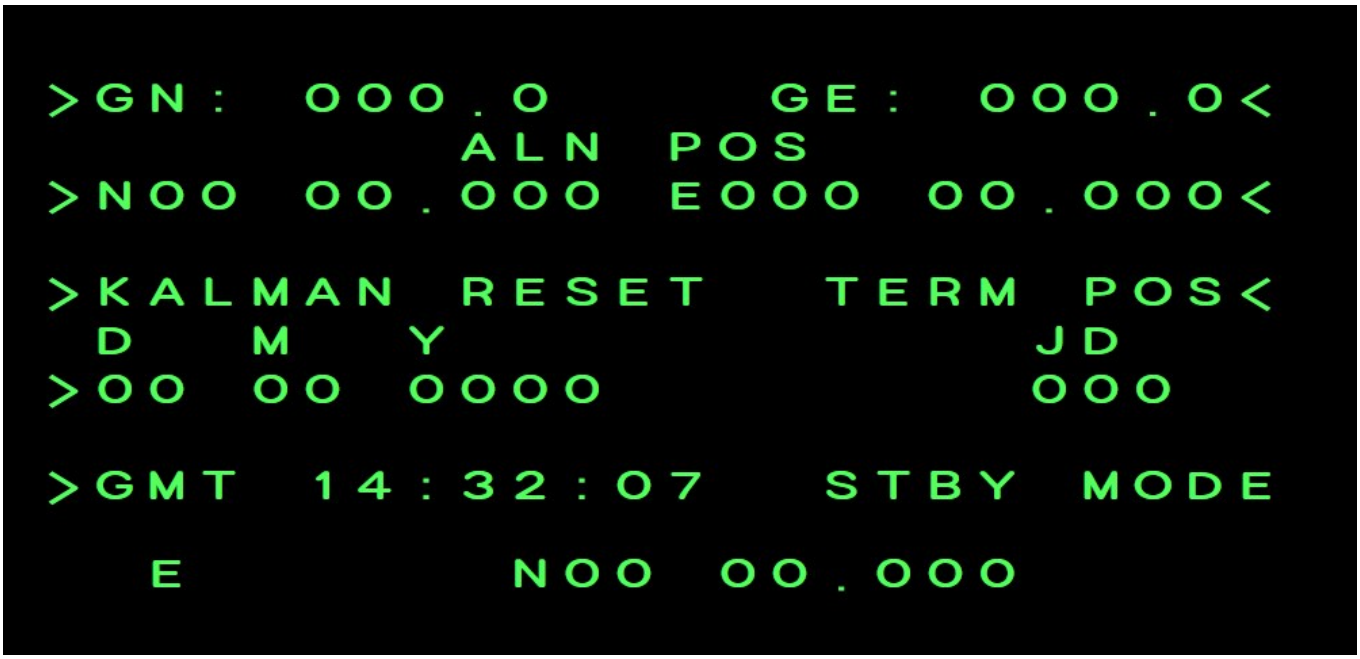
During an in-flight alignment position 3 shows E for about the first two minutes, then A with a flashing L in position 1.

How to Read a Page

You see	It means
<NAV INIT (arrow pointing *out* of the screen, at the key)	The key opens another page.
>SEL DP / STBY MODE< (arrow pointing *into* the screen)	The key edits that field or performs that action. One exception: IFF PANEL< on the Mode S page opens the IFF page.
No arrow	Display only.

Entering Data

Example BCDU entry 1

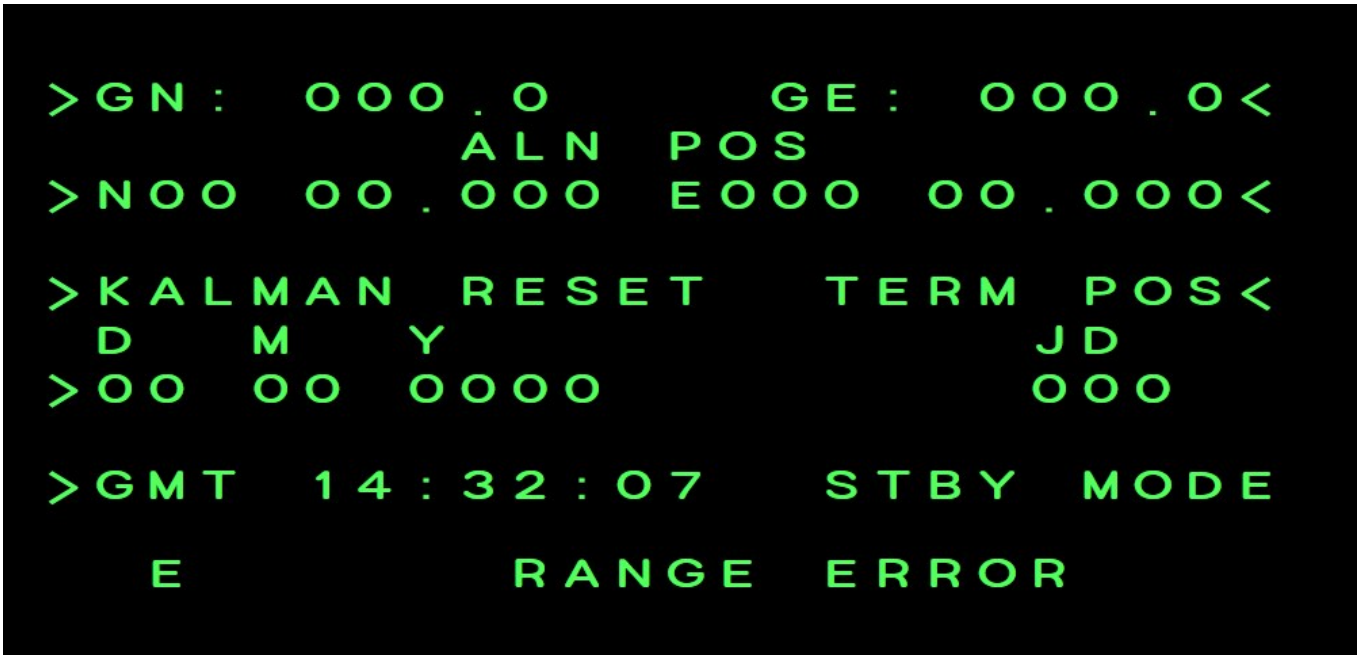


Press L2 beside the latitude: its arrow flashes and the current value is copied into the scratch pad, ready to type over.

1. Press the key beside the field. The arrow flashes and the current value appears in the scratchpad.
2. Type over it. Digits move the cursor on automatically and jump over spaces and decimal points.
3. Press ENT to accept.Nothing is ever changed until you press ENT. That is also true for actions: the scratchpad shows what is about to happen (e.g. ALN MODE) and waits for ENT.

- **Hemispheres:** 2 = N, 8 = S, 4 = W, 6 = E (think of a compass laid over the keypad).
- **Letters:** press a key once for its first letter, twice for its second and a third time for its digit. The cursor does *not* move on after a letter - press → before the next one. Name fields take letters and digits.
- **CLR:** clears a message; or resets what you have typed; or, pressed again, abandons the entry.
- RANGE ERROR flashing in the scratchpad means the value was not acceptable. Press CLR and try again.
- RTN returns to the top page of the current knob position.
- **Several choices:** some keys offer a list (for example STBY MODE< or >KALMAN RESET). The scratch pad shows the current choice with ↑↓; step with ↑ ↓ and press ENT for the one shown.
- **Changing page** - with the menu knob, RTN, a function key or a page key - abandons an entry you have not yet entered.

Example BCDU rangeerror

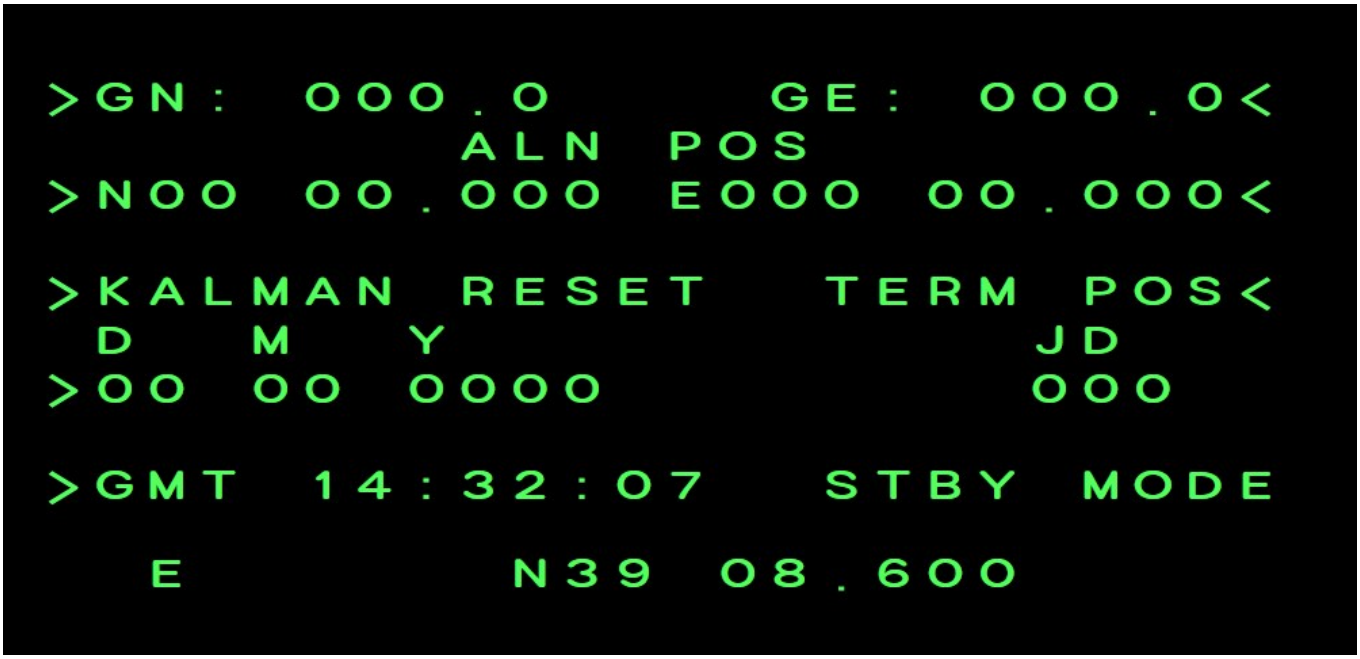


A value the field cannot take is refused: RANGE ERROR flashes in the scratch pad, alternating with what you typed, until you press CLR.

Example - Entering Your Alignment Position N39 08.600 W121 25.900

1. AVP off (backup control) and INS ON. Menu knob to NAV-1, then L1 <NAV INIT.
2. L2 (latitude). Type 2 (N) 3908600, then ENT.
3. R2 (longitude). Type 4 (W) 12125900, then ENT.
4. L1 (GN, gravity deflection north), ENT on the zeros shown. The advisory E goes out and STBY MODE< gets its pointer.
5. R5 STBY MODE< → scratchpad shows ALN MODE ↑↓ → ENT. The alignment starts. (↑ ↓ would offer 2 POS ALN and TEST MODE instead.)
6. Switch the AVP on. When it is up the BCDU goes to its RT page; follow and accept the alignment on MFD NAV → INIT.

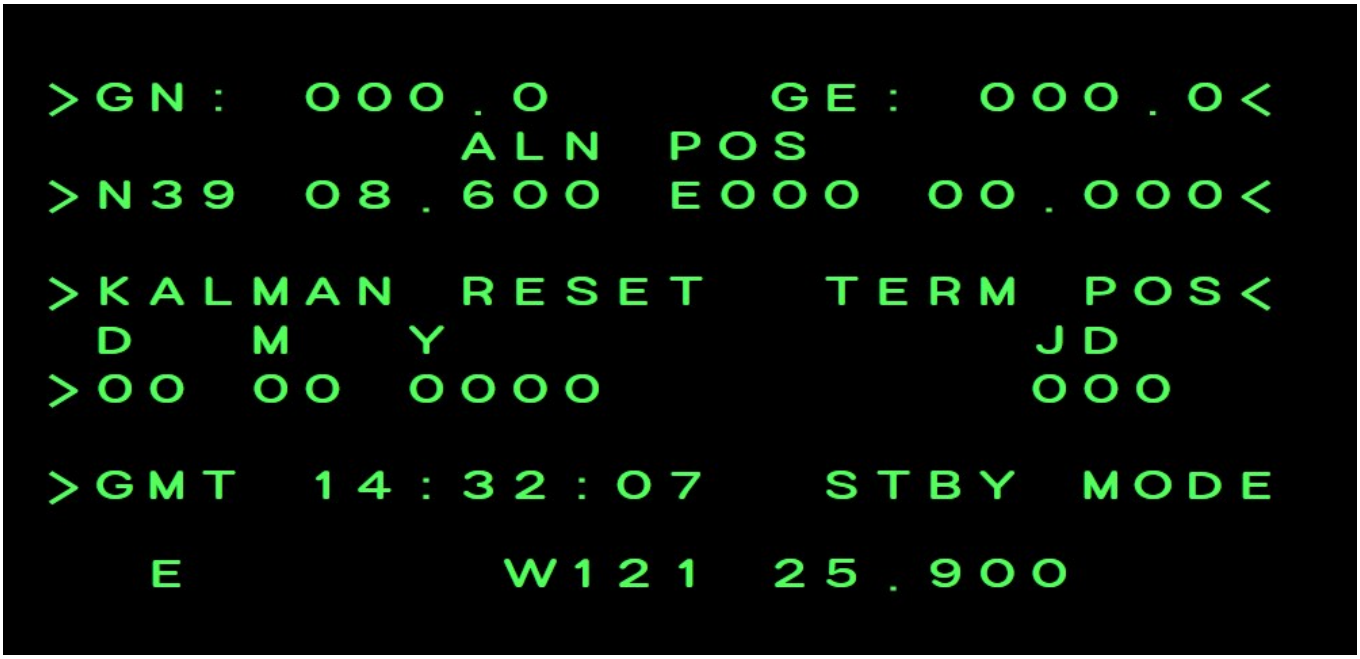
Example Latitude typed



L223908600

Type 2 (N) 3 9 0 8 6 0 0: the scratch pad reads N39 08.600, the cursor having skipped the space and the decimal point by itself.

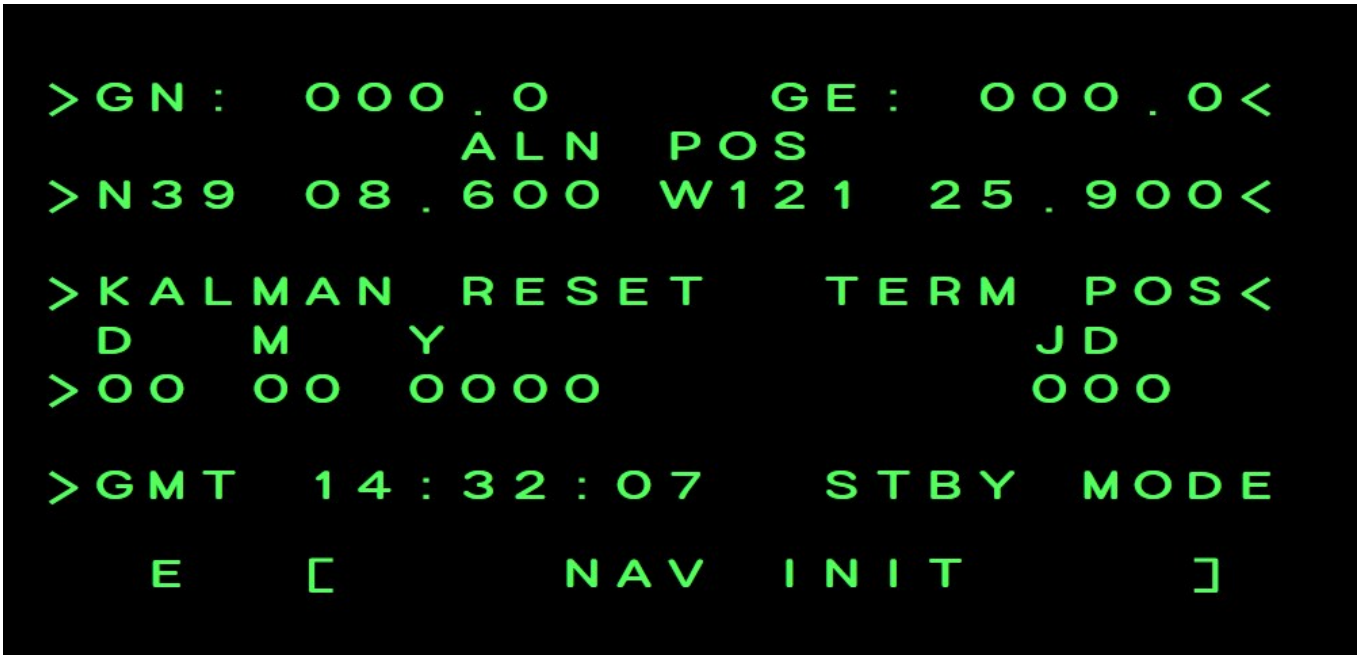
Example Longitude typed



ENTR2412125900

After ENT the latitude lands in its field; R2 and 4 (W) 1 2 1 2 5 9 0 0 put the longitude in the scratch pad.

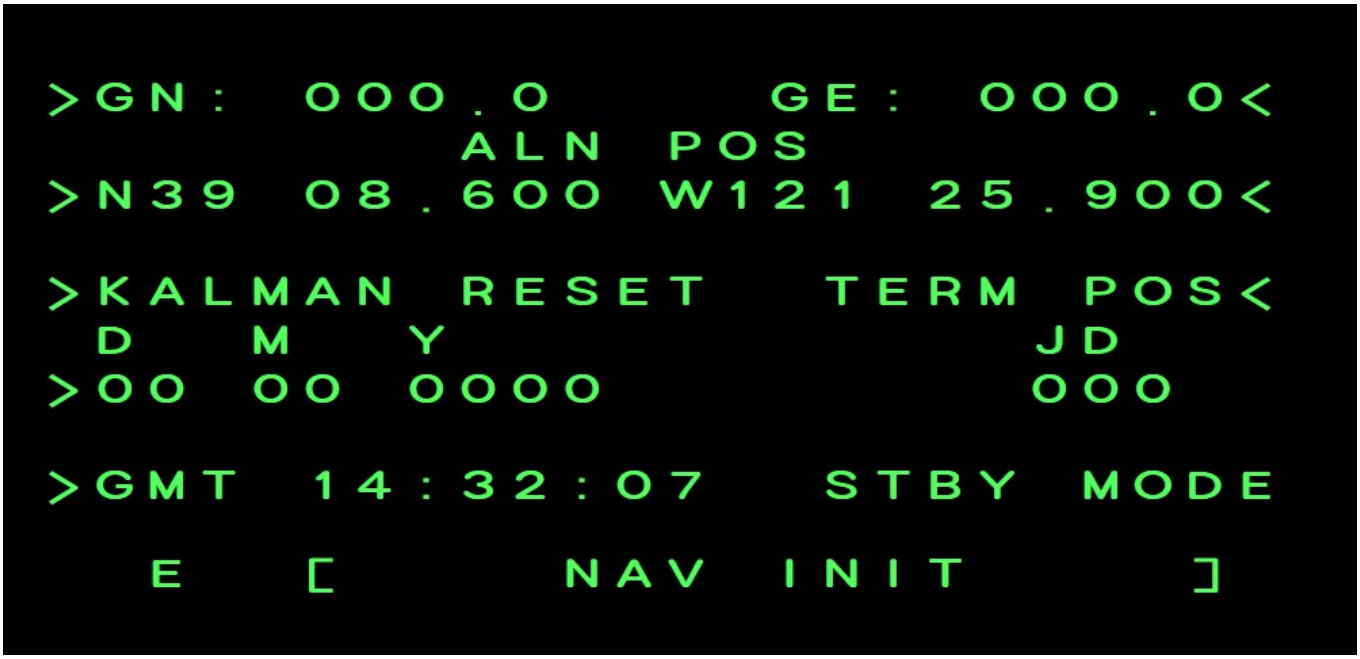
Example Position entered



ENT

NAV INIT after the position has been entered: STBY MODE< is now active.

Example ALN MODE offered



R5

With the position in, R5 STBY MODE< offers ALN MODE in the scratch pad; the arrows step the other choices and ENT starts the alignment.

The Pages That Matter

Example BCDU nav1menu



The NAV-1 menu is the top page of the NAV-1 knob position and leads to the INS pages.

Example BCDU nav2menu

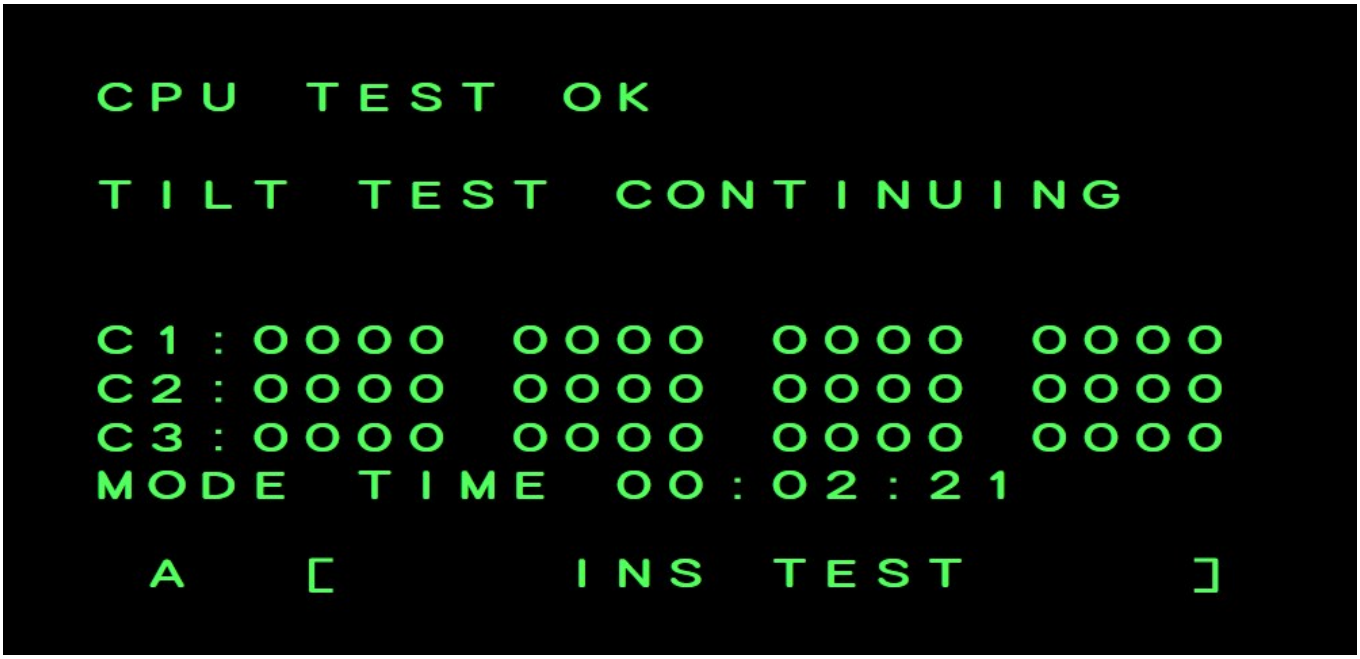


The NAV-2 menu, top page of the NAV-2 knob position, leads to the destination point and steering pages.

NAV-1 → NAV INIT

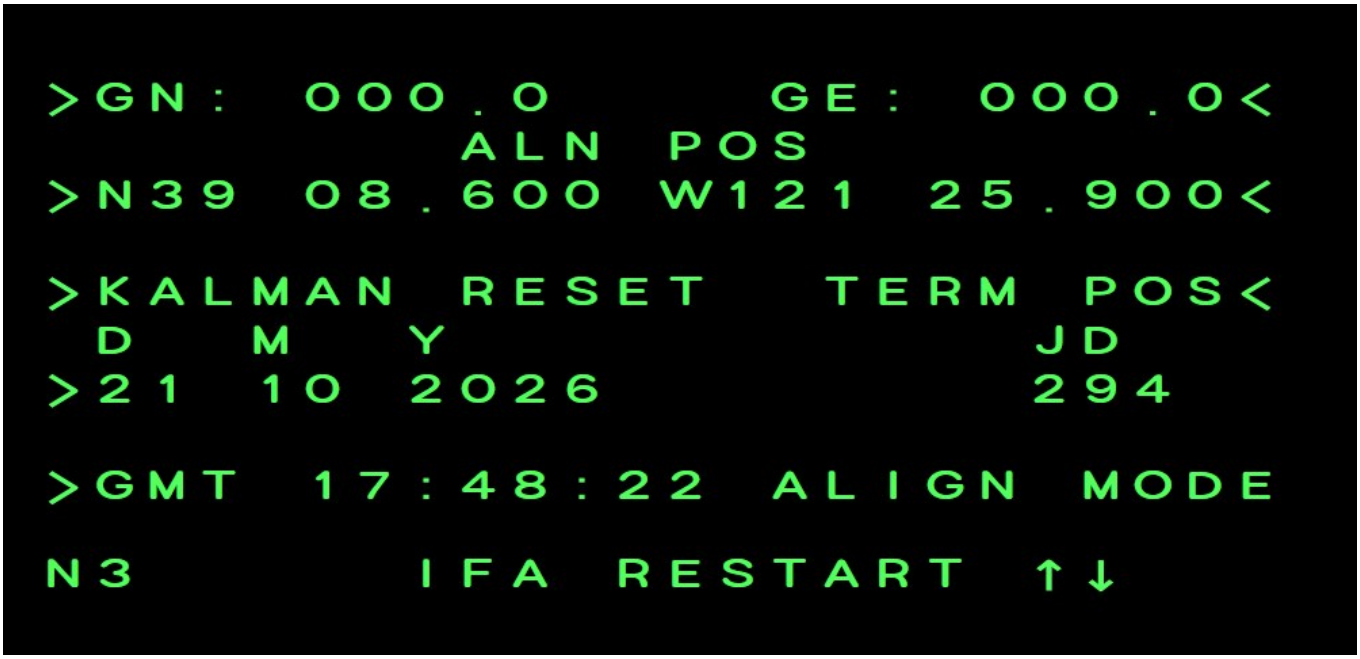
Alignment position (latitude / longitude, L2 / R2), date (L4), the INS clock (L5 GMT, settable once a date is in) and the STBY MODE< key (R5), which becomes active once the position and then a gravity deflection are in (L1 GN / R1 GE, zeros will do), or after the INS switch LOAD. Its choices:

Example BCDU instest



With TEST MODE chosen on NAV INIT, the INS TEST page shows the self-test as it runs.

Example BCDU navinit ifa



In the air, L3 >KALMAN RESET also offers IFA RESTART on the arrow keys; ENT would start an in-flight alignment.

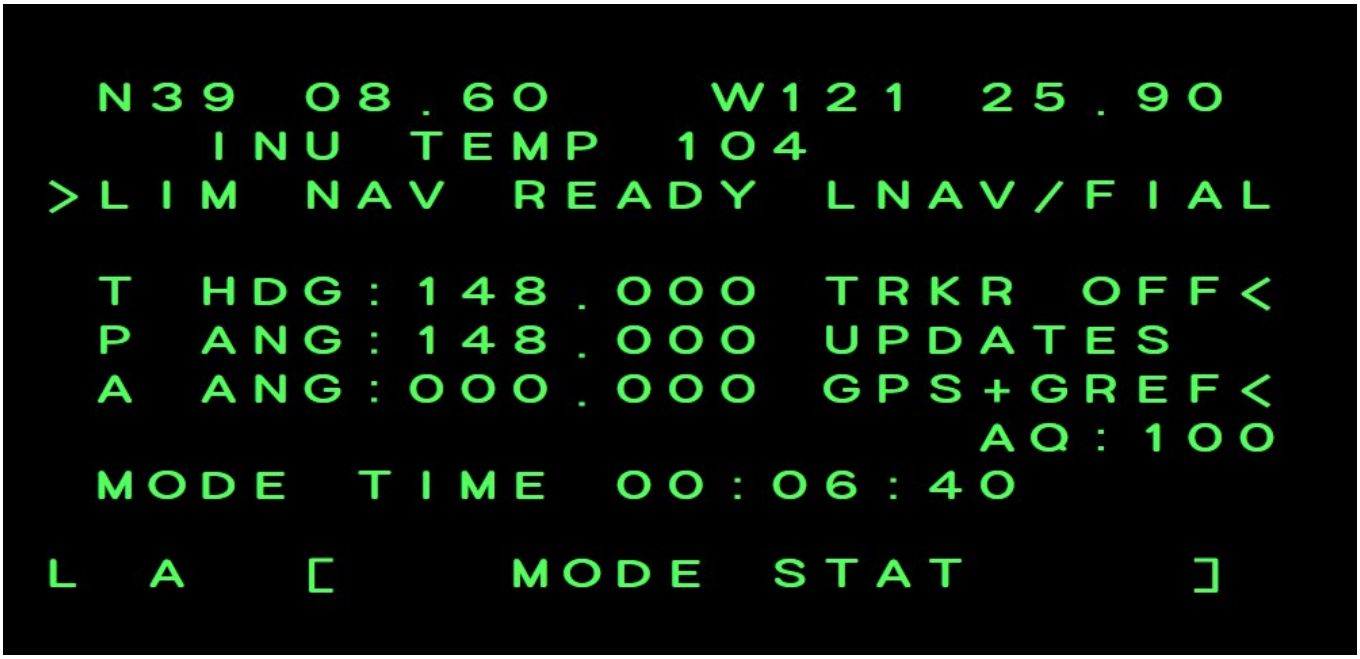
- ALN MODE - the normal ground alignment.
- 2 POS ALN - a two-position alignment. In our rendition it runs the same timeline and needs the same acceptance; do not move the aircraft.
- TEST MODE - an INS self-test of about a minute, shown on NAV-1 → TEST>. The INS stays in standby. To leave the test, switch the INS off for more than 8 seconds and on again, or start the alignment from MFD NAV/INIT.

L3 >KALMAN RESET + ENT resets the navigation filter while the INS is in NAV: with GPS updating on, the position is pulled back onto the GPS within about a minute. In the air the same key also offers IFA RESTART, which starts an in-flight alignment. R3 switches the display between the alignment position and the terminal position (where the INS was last shut down).

NAV-1 → MODE STAT

Shows the INS mode, align quality AQ, mode time and true heading. When the alignment is ready, the mode line becomes >LIM NAV READY or >FULL NAV READY: press its key (L2), then ENT, to accept and go to NAV. During an in-flight alignment the page shows IFA, and IFA CHG HDG 45 while the INS asks for the heading change (see INS).

Example BCDU modestat



MODE STAT follows the alignment; once limited navigation is ready the mode line becomes >LIM NAV READY.

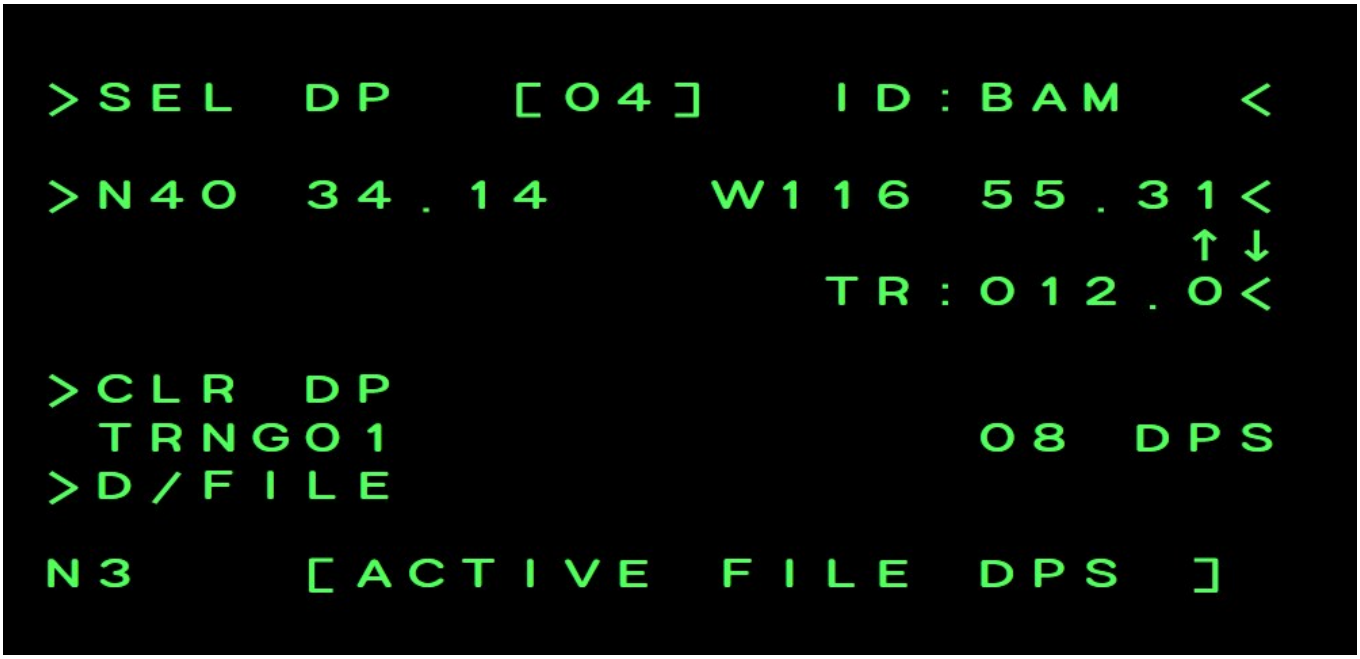
Example BCDU modestat accept



Pressing L2 beside >LIM NAV READY puts LIM NAV in the scratch pad; ENT then takes the INS to limited navigation.

NAV-2 → DEST PTS (Destination Points)

Example BCDU destpts



DEST PTS shows one destination point of the selected file at a time, with its name, position and turn radius.

1. **L1 DP number (or ↑↓)**
2. **R1 name**
3. **L2 latitude**
4. **R2 longitude**
5. **R3 turn radius (NM)**
6. **L4 zero a point (type its number)**
7. **File name (08 DPS = points with a position)**
8. **L5 file (type it; the title shows it)**

Create and edit the same destination points the MFD and UFCD use.

Example BCDU nav2menu upl



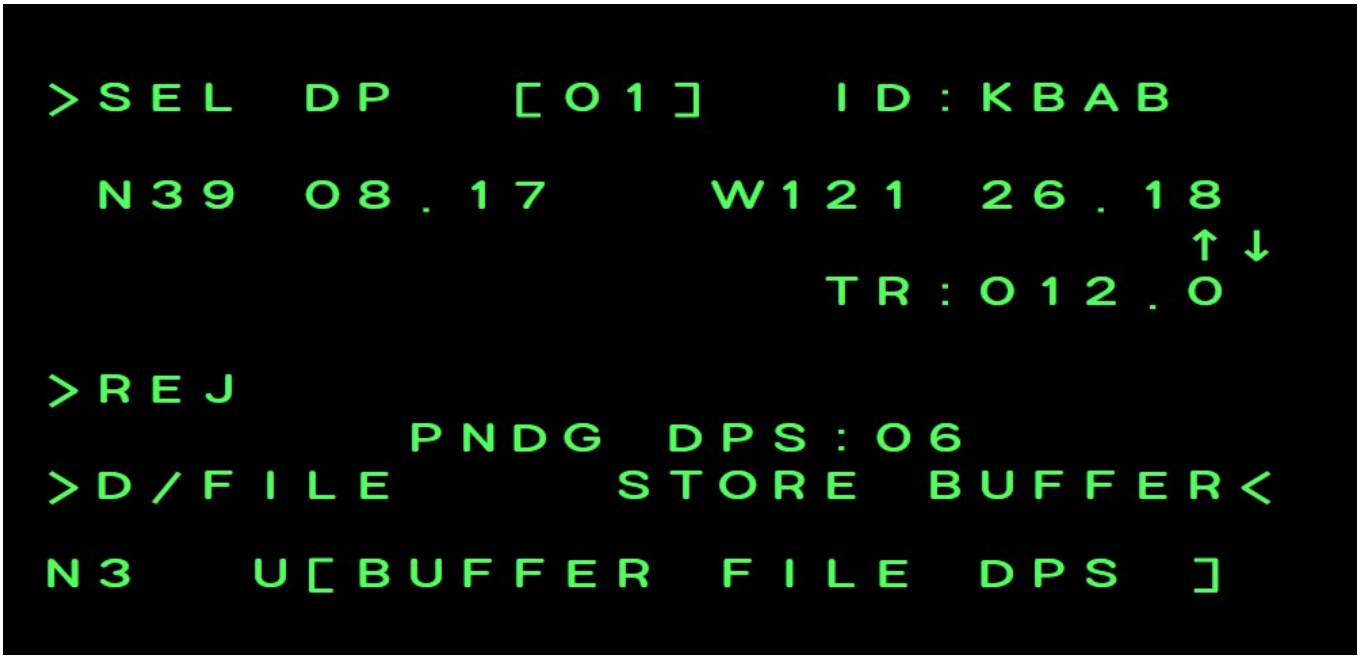
When a datalink upload is waiting, UPLK STAT gets its arrow and a U flashes in advisory position 5.

Example BCDU uplkstat



UPLK STAT shows how many points are waiting in the upload and its track ID.

Example BCDU destpts buffer



The buffer file holds the upload read-only: STORE BUFFER< accepts it into a storage file, >REJ removes points or all of it.

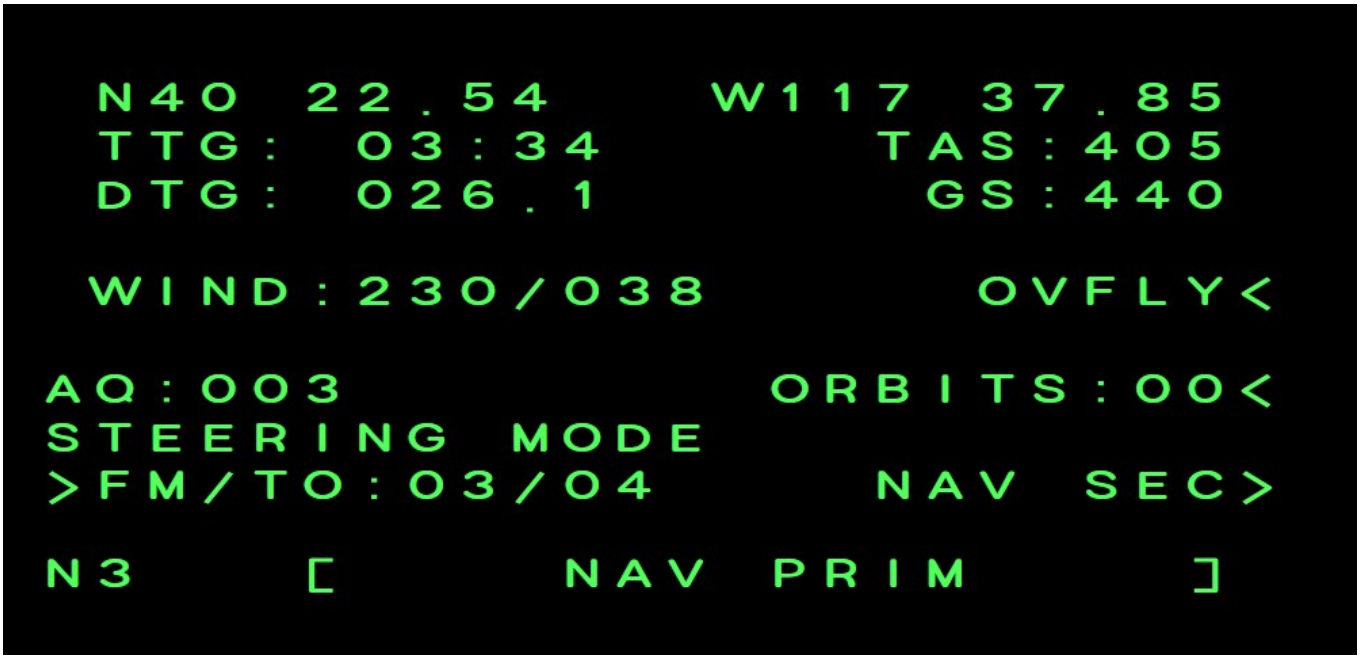
- L5 >D/FILE, type the file and press ENT: 1-4 a storage file, 5 bullseyes, 6 emergency fields; key 1 twice gives A (active), three times B (a pending datalink upload).
- L1 >SEL DP picks the point number 01-99 (or scroll with ↑ ↓).
- R1 name (up to 5 letters), L2 latitude, R2 longitude, R3 turn radius, L4 >CLR DP with the point's number and ENT zeros its position and turn radius (the name stays).
- All 99 points of each file are shared with the MFD and UFCD.
- **Buffer file:** when the EFB has sent a datalink upload, the file is read-only here. R5 STORE BUFFER< accepts it: for a route, type the storage file 1-4 (1 is offered) and press ENT; a bullseye or emergency upload goes into, and overwrites, its own file with ENT. L4 >REJ takes a DP number: type it and press ENT to remove that one point. The number offered is 00, which throws away the whole upload - so L4 ENT rejects everything.
- A flashing U in advisory position 5 and an arrow on UPLK STAT on the NAV-2 menu tell you an upload is waiting (the line is always there; the arrow only comes with an upload). UPLK STAT shows how many points are pending and its track ID; R5 BUFFER FILE> opens the buffer at its first point.
- The BCDU also has a SUB-BUFFER FILE page for partial uploads that replace single points of a storage file. The EFB ground station only sends complete files, so you will not see it in normal use.

NAV-2 → NAV PRIM / NAV SEC

Live navigation read-outs: position, ground speed, true airspeed, wind, distance and time to go, track, headings, pitch, roll and drift. With the INS in NAV and a route in the ACTIVE file, the steering line shows FM/TO:03/04 - the leg you are flying.

OVFLY< (fly over the point instead of turning early) and ORBITS< are available here and are mirrored on the MFD. L5, the steering-mode key, opens a steering entry: ↑ ↓ step through F/T, T/F, T/T, TTD and TFD (shown as FM/TO, TO/FM, TO/TO, TTD, TFD); type the DPs, course and distance and press ENT.

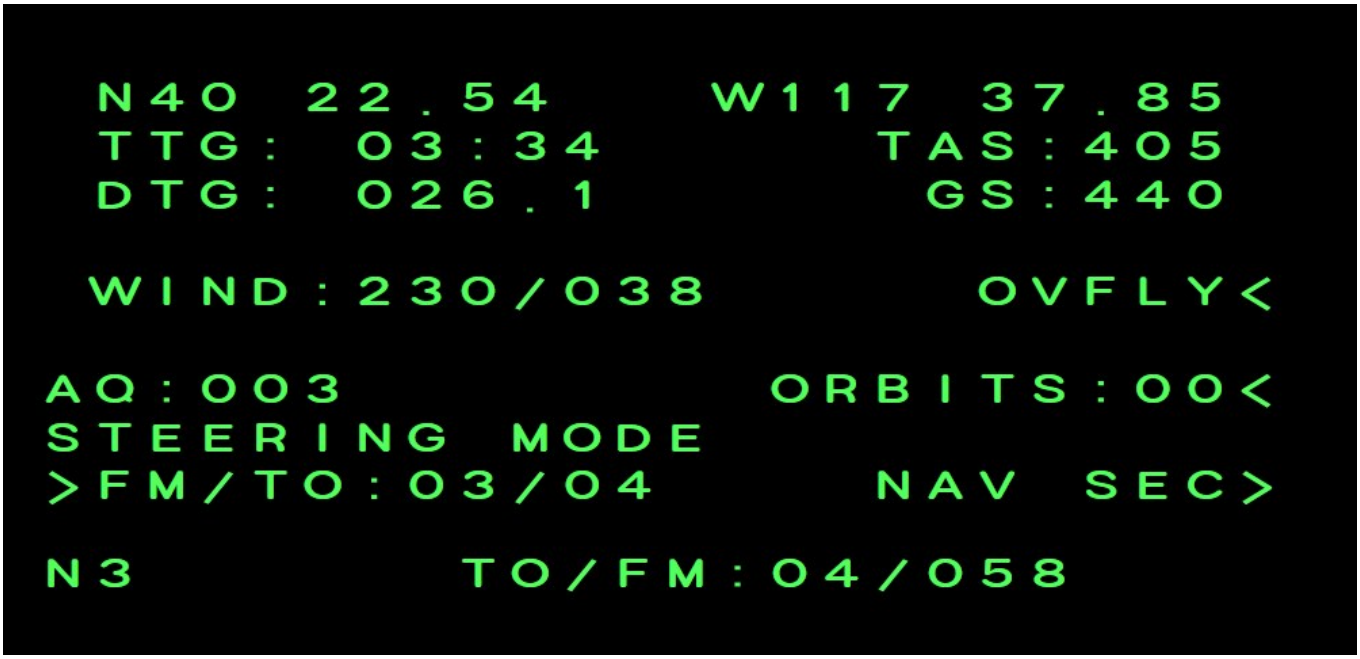
Example BCDU navprim



NAV PRIM gives the live navigation read-outs and the steering-mode key.

1. **INS present position (latitude, longitude)**
2. **Time to go**
3. **Distance to go (NM)**
4. **Wind**
5. **R3 overfly (F/T only)**
6. **R4 orbits (F/T only)**
7. **L5 steering mode - the leg flown**
8. **R5 NAV SEC**

Example BCDU navprim steer



L5 opens a steering entry; the down arrow steps from FM/TO to TO/FM with the present track offered as the course.

Example BCDU navsec



NAV SEC adds headings, track, pitch, roll, drift, altitudes and the INS-minus-GPS position check.

NAV-2 → BRG/RNG

>DR STR DP + ENT makes the selected destination point your steer-to point ("direct to"). L2 selects the point; only points of the active file (A) can be steered to. The MFD and UFCD follow.

Example BCDU brgrng



BRG/RNG gives bearing, range and time to any destination point, and can make it the direct-steer point.

NAV-2 → MAN UPDT (Manual Position Update)

Corrects the INS over a known point - the BCDU version of the MFD NAV/DATA manual update. L5 >DP: selects the point (number and file in one entry, for example 07 A for DP 7 of the active file). The INS position (PP) and its DIFFERENCE to the DP update live; exactly overhead press FIX and ENT to freeze them - then ACPT and REJ get their arrows.

L1 >ACPT + ENT moves the INS position by that difference, R1 REJ< + ENT throws it away.

Example BCDU manupdt fix



Overhead the selected point press FIX: FIX FREEZE asks for ENT to freeze the INS position.

Example BCDU manupdt

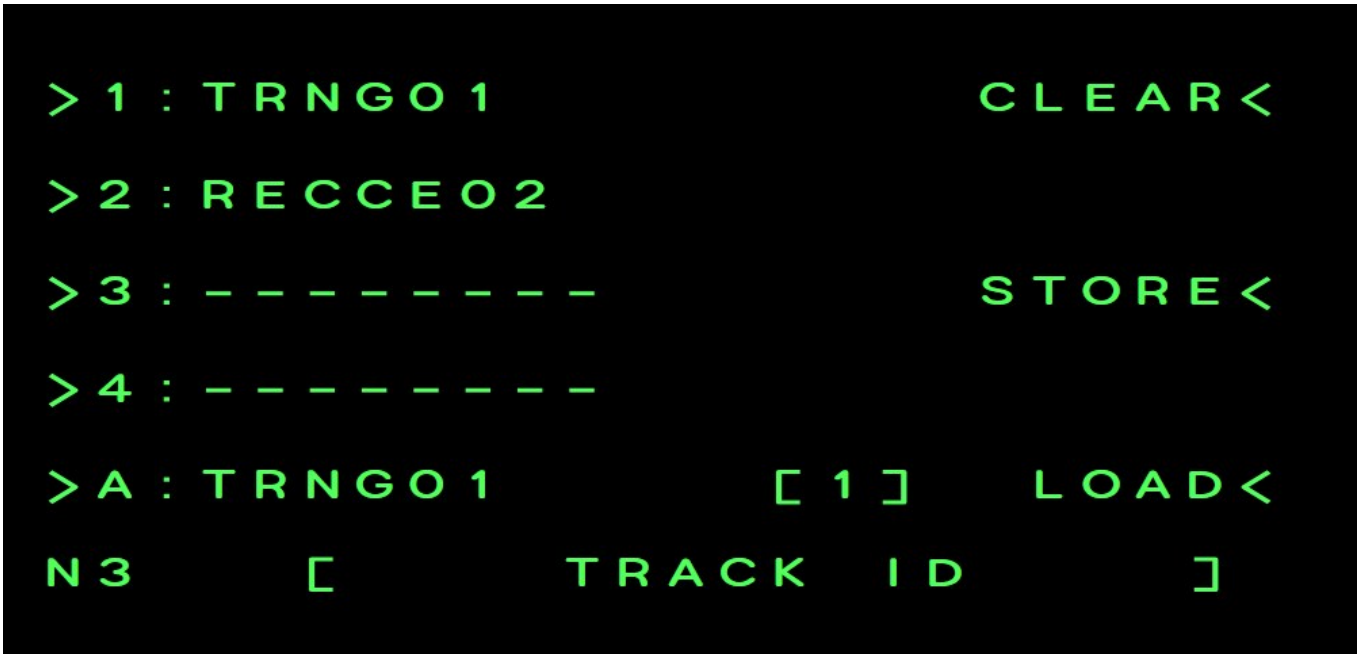


After FIX and ENT the INS position is frozen against the DP; >ACPT applies the difference, REJ< throws it away.

NAV-2 → TRACK ID

Lists the names (track IDs) of storage files 1-4 and of the active file.

Example BCDU trackid



TRACK ID lists the names of storage files 1-4 and the active file, and moves whole files between them.

- L1-L5 rename a file (up to 8 letters and digits); an M marks a name you have changed.
- R1 CLEAR< takes a number - 1-4 one storage file, 5 the bullseye file, 6 the emergency file, 0 all four storage files - then ENT.
- R3 STORE< copies the active file into storage file 1-4.

- R5 LOAD< makes storage file 1-4 the active file, steering from DP 01. While the autopilot flies NAV it reads A/NAV and does nothing.
- With EMER the active file, the active line reads A:EMERGENCY.

CNI Key - Radios

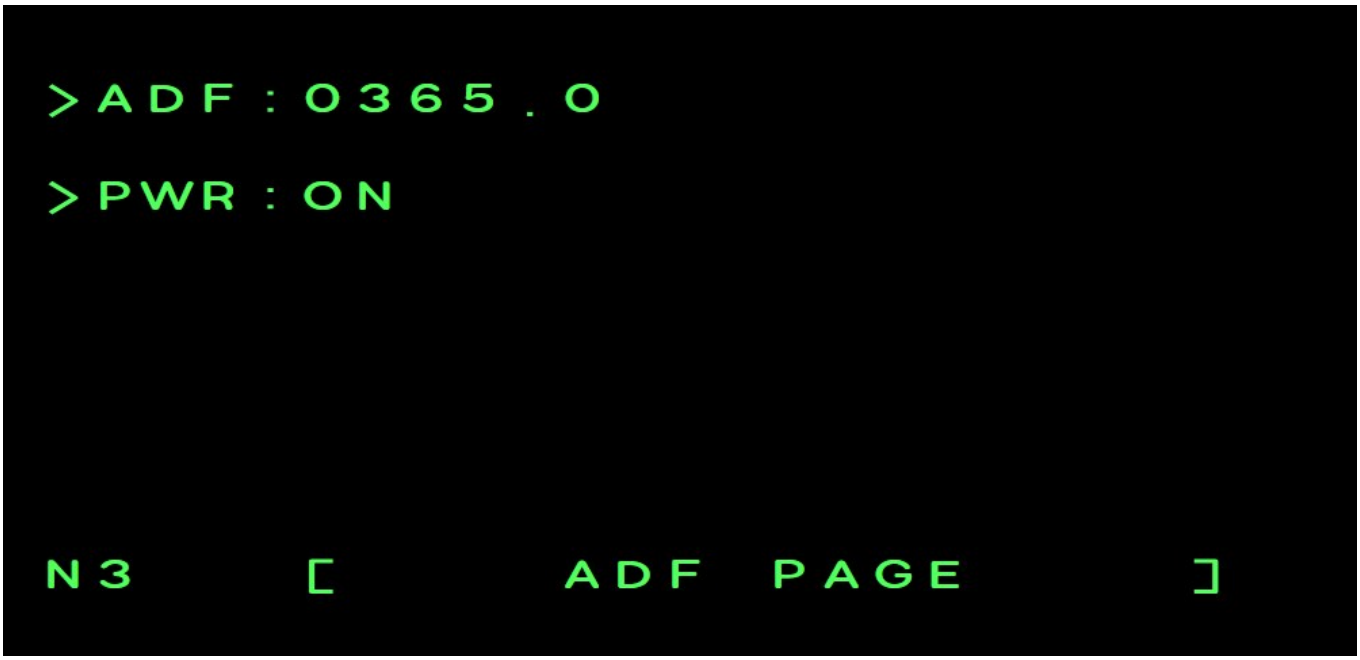
Three working pages (the HF radio is not fitted), and R1 IDENT< + ENT sends a transponder ident (IFF on, NORM or EMER); it reads ON IDENT for 5 seconds.

Example BCDU cni



The CNI key opens the radio pages from any page: IFF, ADF and ILS, plus a transponder IDENT.

Example BCDU adf



The ADF page tunes the ADF and switches it on or off, the same settings as the ADF row of MFD COM/CNI.

Example BCDU ils



The ILS page tunes the ILS (NAV 1) frequency.

- <IFF (L1): the IFF panel - see below.
- <ADF (L2): L1 ADF frequency 190-1749.5 kHz (0365.5 style), L2 PWR ON / OFF. These are the same settings as the ADF row of MFD COM/CNI.
- <ILS (L3): L1 tunes the ILS frequency (108.00-111.95). Example 110.30: type 11030 ENT.

IFF Panel and Mode S

The BCDU is a third control head on the same transponder as the UFCD IFF page and the MFD CNI page - a change on one shows on the others.

Example BCDU iff



The IFF panel sets the same transponder as the UFCD and the MFD CNI page.

Example BCDU modes



The Mode S page holds the aircraft code and the FLIGHT ID, which starts as your MSFS ATC ID.

- L1 >IFF:STBY: the scratch pad offers the next master mode (STBY → NORM → EMER), ENT selects it. EMER squawks 7700; leaving EMER puts your previous code back.
- R2: the Mode 3 code - four digits 0-7, then ENT. L2 steps Mode 3 / C: 3 ON C OFF → 3 ON C ON → OFF. REPLY shows while the transponder answers.
- R1 MODE-S> opens the Mode S page: Mode S ON / OFF, the aircraft code and the FLIGHT ID (R2, up to 8 letters and digits; it starts as your MSFS ATC ID). NULL< clears the flight ID.
- Modes 1, 2 and S can be set for realism but have no effect in the simulator. Mode 4 ON without a code gives IFF MODE 4 RPLY FAIL (see the UFCD IFF page), and the panel shows CAUTION where it shows REPLY. With the IFF switch off the page reads IFF:OFF.

FIX Key

Press FIX then ENT to record the present time and position. The fix table (NAV-1 → FIX TABLE>, 32 slots) is the same one the MFD NAV/FIX page shows. The same press also freezes the position for MAN UPDT. Like every BCDU key it only works with the AVP off.

Example BCDU fixtable



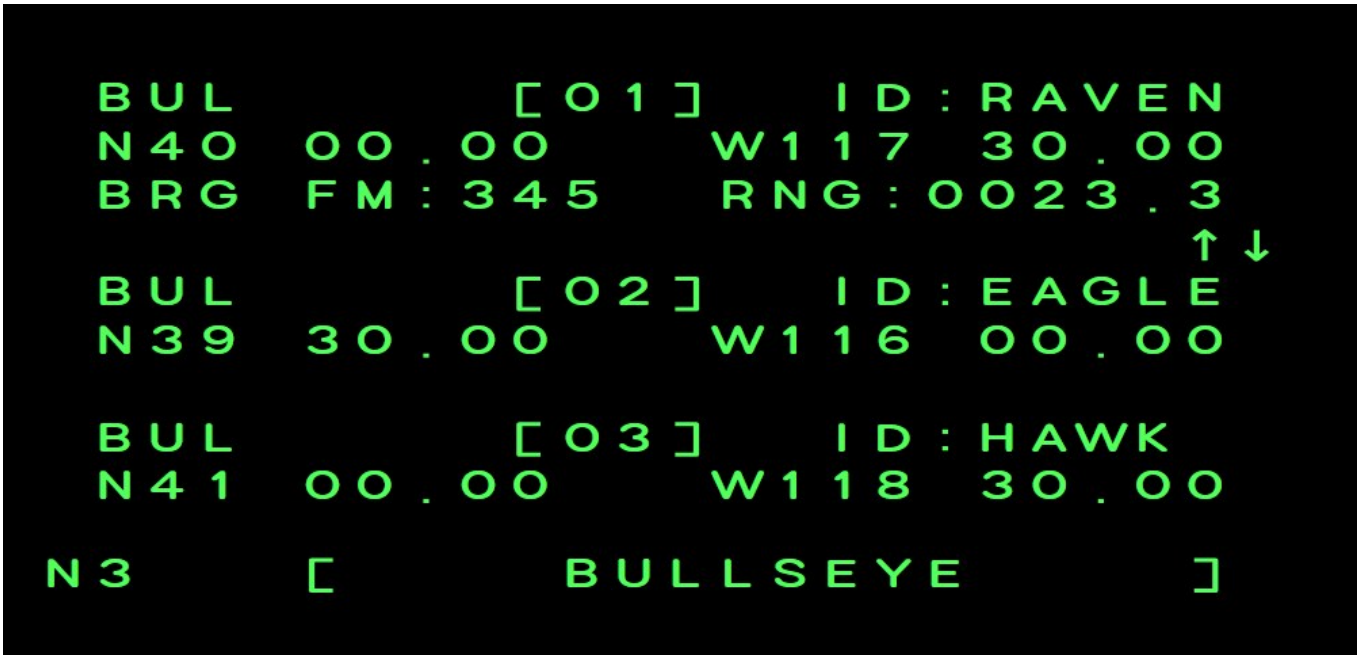
FIX and ENT store the time and INS position; NAV-1 FIX TABLE shows them four at a time.

Status and Other Pages

The BUL and EMR keys show the bullseyes and emergency airfields with bearing and range. The top EMR entry (>EMR + ENT) is an emergency direct steer to that field: as on the UFCD EMER page, it makes the EMER file the active file and is refused while the autopilot flies NAV.

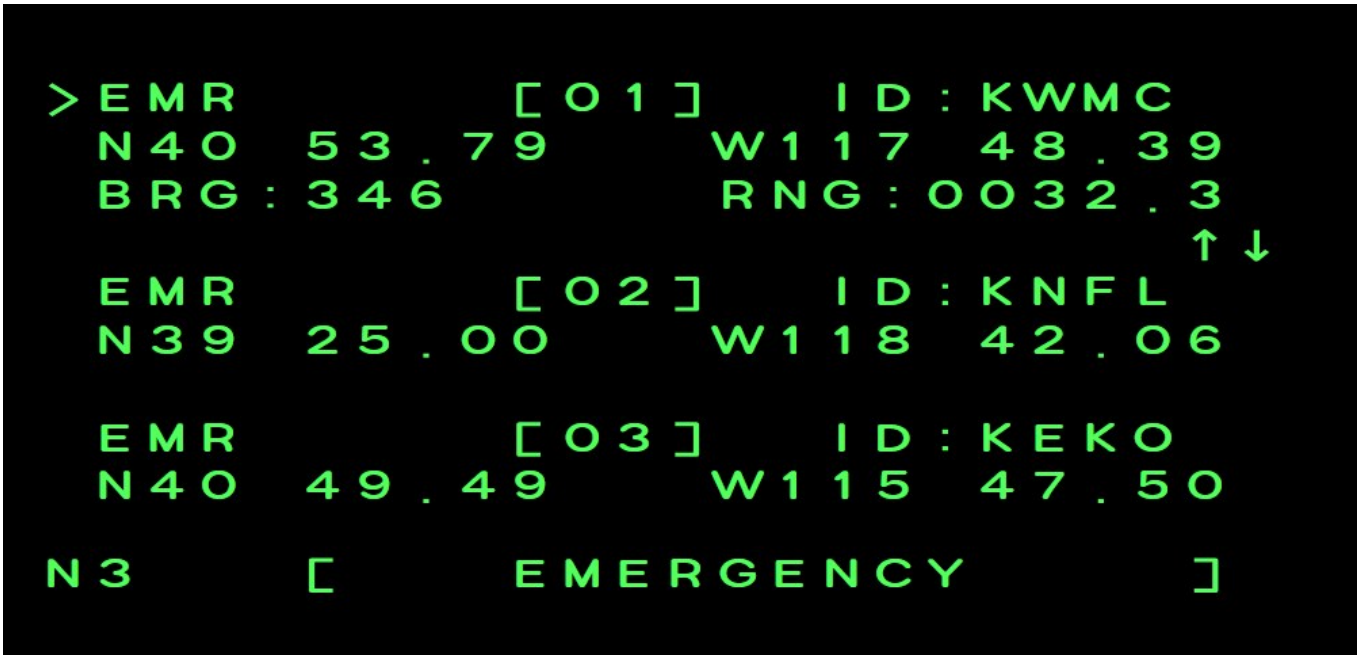
The GPS and DDL knob positions and the EW key: INOP - these pages are present for completeness and have no effect on the simulation.

Example BCDU bullseye



The BUL key lists the bullseyes, with bearing and range from the top one to you.

Example BCDU emergency



The EMR key lists the emergency airfields with bearing and range; >EMR and ENT direct steer to the top one.

Example BCDU egps



EGPS FLT DATA shows the GPS velocities, satellites, position, altitude, PDOP and time.

Example BCDU fltdata



CURRENT FLT (NAV-1 FLT DATA) shows time in NAV, position, heading, track, velocities, altitude and speeds.

Example BCDU gndtrkr



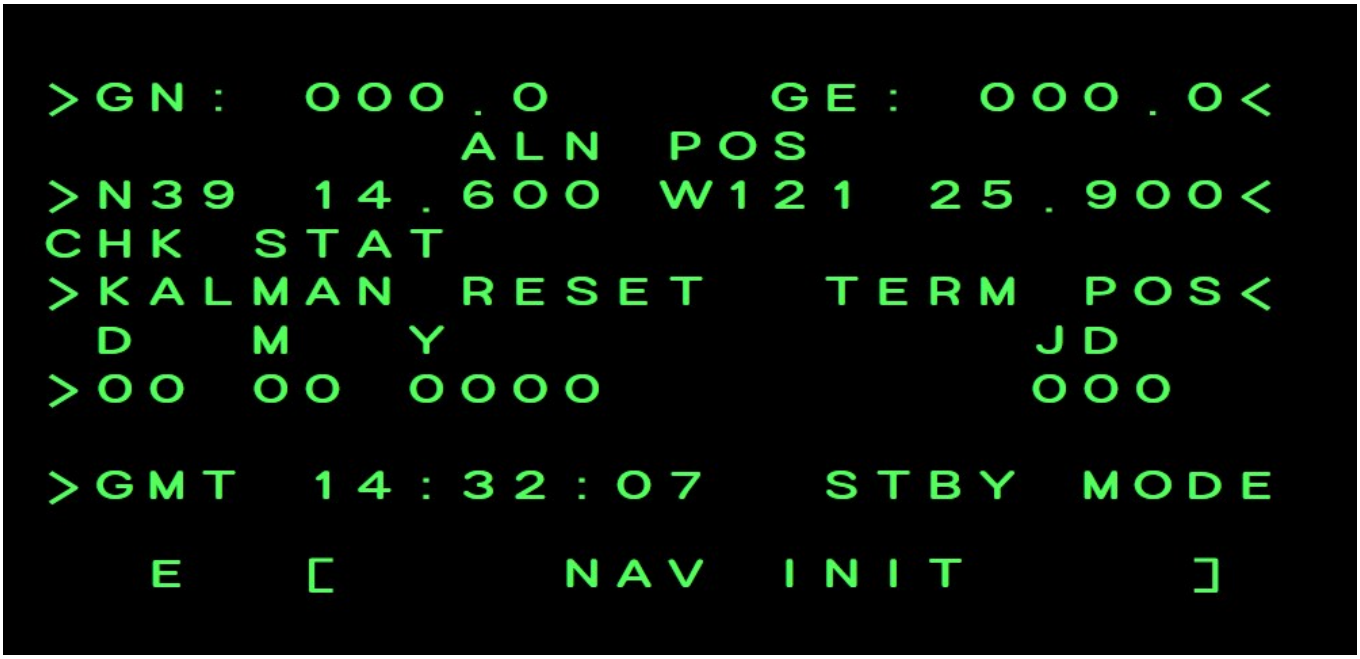
GND TRKR POS shows the aircraft's present position and elevation; R5 switches to the GPS ground reference page.

STAT - CHK STAT and ACK

In backup control the BCDU watches every subsystem. When one reports a new fault or caution (for example an ALIGN MISMATCH), CHK STAT appears on line 4 of every page, flashing. Turn the menu knob to STAT: on SYS STAT the name of that subsystem flashes.

Open its page and press L5 >ACK, then ENT, to acknowledge it. IFF, for example, flashes with IFF MODE 4 RPLY FAIL, and its IFF STAT page reads MODE 4 CAUTION.

Example BCDU chkstat



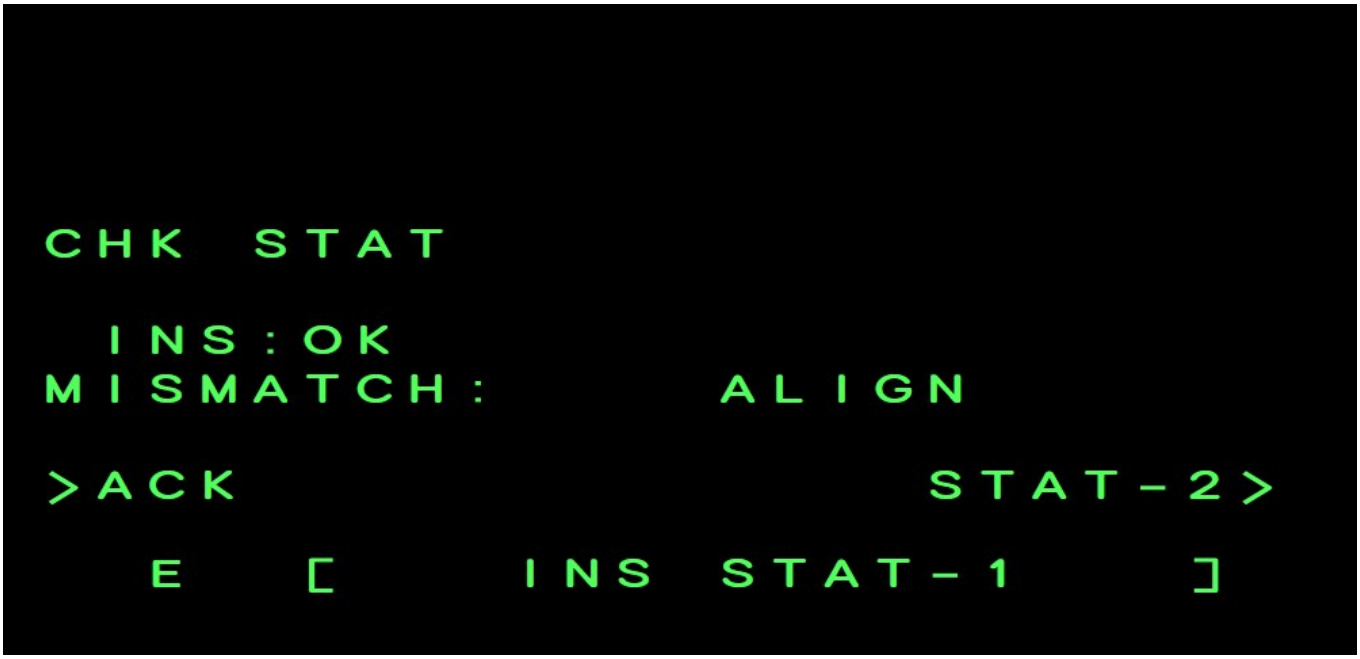
A new fault or caution - here an alignment position typed 6 NM wrong - puts a flashing CHK STAT on line 4.

Example BCDU sysstat



On SYS STAT, the top page of the STAT position, CHK STAT is steady and the name of the subsystem with the alert flashes.

Example BCDU insstat



INS STAT-1 names the caution; L5 >ACK and ENT acknowledge it and CHK STAT goes out.

Related pages: Up-Front Control Display (UFCD) · Inertial Navigation System (INS) · Navigation System (INS Steering) · Multi-Function Displays (MFDs)

Miltech Simulations U-2. SIMULATION USE ONLY. This documentation describes the simulated aircraft as delivered in the add-on and must not be used for real-world aviation.

Miltech Simulations U-2

Aircraft Systems

How each U-2S system works in the simulator: power, fuel, engine, oxygen, navigation, autopilot, flight controls, lights, landing gear, warnings, sensors and the EFB.

1 Electrical and Avionics Power	2 Fuel System
Where the Power Comes from Electrical Switches Avionics Power Switches (Right Console) The U-2 electrical system provides and distributes power to the avionics, displays, fuel pumps, flight control systems and lighting.	The Tanks How Fuel Feeds - Automatically Fuel Panel Loading Fuel Monitoring Fuel on the MFD The U-2 fuel system is designed to feed the engine from a single small sump tank in the fuselage, which is kept full automatically from the wing tanks.
3 Engine Start and Cockpit Controls	4 Cabin, Oxygen and Hypoxia
Throttle OFF / IDLE Stop Ground Start Engine Mode Switch - PRI / SEC Airstart - Emergency Start System (ESS) Seat Adjustment The U-2S is started with a pneumatic starting cart, exactly as on the real aircraft: ground crew air spins the Air Turbine Starter, ignition comes on by itself, and the pilot's job is the throttle.	Cabin Pressure and the Canopy Seal Cockpit Temperature Oxygen Hypoxia Simulation The U-2 cockpit is a small pressure vessel at the edge of space.
5 Inertial Navigation System (INS)	6 Navigation System (INS Steering)
The INS Switch INS Modes and Status Letters Ground Alignment, Step by Step In-Flight Alignment (IFA) Accuracy, GPS Updating and Alerts The Inertial Navigation System (INS) is the heart of the U-2S cockpit.	Destination Points and the Turn Radius F/T - From / To (Sequential Steering) Maintaining Track Direct Steer (DS) Overfly (OFLY) The U-2S carries its own INS steering computer.
7 AFCS System (Autopilot)	8 Angle of Attack (AOA)
The AFCS Panel Engaging Modes NAV Mode and the Navigation Source Pitch Trim Miltech Simulations U-2 features a three-axis Automatic Flight Control System (AFCS), designed to alleviate the load on the pilot during the long high-altitude cruise.	What the Number Means PFD AOA Gauge Standby AOA Gauge Glare-Shield Indexer AOA Tones The U-2 is landed by angle of attack, not by airspeed.
9 Speedbrakes and Lift Spoilers	10 Lights

| 1 Electrical and Avionics Power | 2 Fuel System |

Cockpit Controls Setting Up Your Controls How to Use Them Things to Know	Exterior Light Switches Key Bindings Cockpit Lights The exterior light switches are on the Lights and Spoiler

1 Electrical and Avionics Power	2 Fuel System
Gust Control The U-2 has two separate drag devices, and our rendition models them separately.	panel.
11 Landing Gear, Brakes and Ground Handling	**12 Warnings and Alerts**
Hydraulic System Landing Gear Brakes Steering and Taxiing The U-2 sits on one main gear under the fuselage and a steerable tailwheel, with the pogos holding the wings level on the ground.	Master Caution Alert Levels on the MFD Warning Panel Lamps MFD Alerts The aircraft alerts you in two places: the warning lamp panel in front of you, and - on the U-2S - the alert line at the bottom of every MFD.
13 Sensors	**14 Electronic Flight Bag (EFB)**
The Imaging Sensors Compared Everything the U-2S collects comes from the equipment you fit to it.	Aircraft Tab Ground Tab Flight Plan Tab Charts Tab Food & Drink Tab The U-2 EFB is an app on the standard MSFS tablet: open the tablet and choose U-2 EFB.

Related pages: Overview - Cockpit · Aircraft Displays · Specifications and Limitations

Miltech Simulations U-2. SIMULATION USE ONLY. This documentation describes the simulated aircraft as delivered in the add-on and must not be used for real-world aviation.

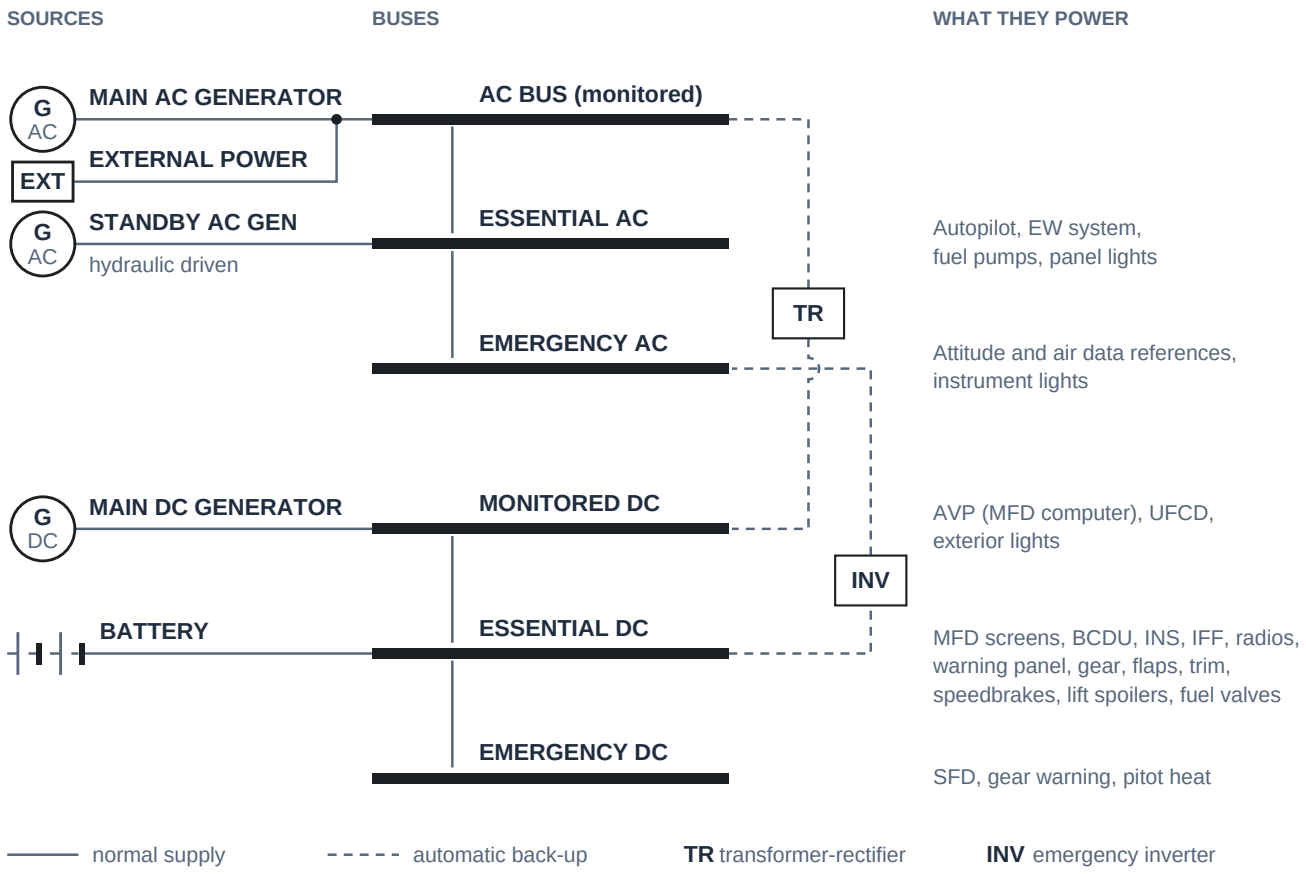
Miltech Simulations U-2

Electrical and Avionics Power

The U-2 electrical system provides and distributes power to the avionics, displays, fuel pumps, flight control systems and lighting. You do not need to understand it to fly the aircraft - leave everything in NORM and it manages itself. This page is for when a lamp comes on and you want to know why.

The electrical system consists of:

- A Main AC Generator and a Main DC Generator, both driven by the engine.
- A Standby AC Generator, driven by hydraulic pressure.
- A Battery, a Transformer-Rectifier (TR) and an Emergency Inverter.
- A connecting port for a Ground Power Unit.



Solid arrows: normal supply. Dashed arrows: automatic back-ups. On battery alone the aircraft keeps every bus alive - the generators only take over the load.

Where the Power Comes from

Source	Available	Feeds
Battery	Always	Essential and emergency DC equipment - which includes the MFD screens. In our rendition the AVP and UFCD also run on battery alone, so every display can be started without ground power. There are two batteries: the utility battery carries the buses first and the

Source	Available	Feeds
		emergency battery takes over in flight when it is nearly flat. Together they last about 45 minutes, about 83 with ESS DC SHED pressed.
External power	On the ground, parked, with the ground power unit connected on the EFB Ground tab	Everything
Main AC generator	Engine running	All AC equipment (autopilot, EW system)
Main DC generator	Engine running	All DC equipment
Standby AC generator	Automatic if the main AC generator fails. Driven by hydraulic pressure. It keeps the essential AC load when the main generator comes back: move STANDBY GENERATOR to OFF for a moment to hand the load back.	Essential AC - keeps your autopilot and the EW system alive
Transformer-rectifier (TR)	Automatic if the DC generator fails	Makes DC from AC
Emergency inverter	Automatic if essential AC is lost	Emergency AC from the battery

Switch-overs are automatic and take a little over half a second, so a display may blink when a source changes.

Electrical Switches



The electrical panel at the right end of the main instrument panel.

1. **BATTERY** - NORM / OFF / EXT PWR. NORM for flight. EXT PWR runs the DC buses straight from the ground cart and rests the battery.
2. **MAIN DC GENERATOR** - NORM / OFF / RESET. Engine-driven DC generator; in NORM after engine start it takes over the DC buses.
3. **TRANSFORMER RECTIFIER** - NORM / OFF / TEST. Makes DC from AC, automatically if the DC generator fails. TEST gives TR ON.
4. **EMERGENCY INVERTER** - NORM / OFF / TEST. Makes emergency AC from the battery automatically if essential AC is lost. TEST gives EMER INVERTER ON.
5. **EXTERNAL POWER** - ON / OFF. Connects the ground power unit, AC and DC. It works only after the cart is connected on the EFB Ground tab (Servicing, **Ground power**: *Connect*), and drops off when the aircraft is no longer parked with the brake set.
6. **MAIN AC GENERATOR** - NORM / OFF-RESET / TEST. Engine-driven main AC generator. It will not connect while external power holds the bus, and external power will not take over from a running generator. TEST

checks it without connecting.

7. **STANDBY GENERATOR** - NORM / OFF / TEST. Hydraulically driven; takes over essential AC if the main AC generator fails. Needs 2,500 psi hydraulic pressure.

The cockpit has no voltmeter; the electrical state is shown by the warning lamps and, on the U-2S, by MFD alerts.

Note
Ground power comes from the cart on your stand. The ground power unit on the EFB Ground tab is the only source of external power - the MSFS ground-services power cart is not used. On a parking start it stands beside the aircraft by itself; otherwise set it to *Shown*.
Connect it under Servicing, **Ground power**: it drives to its service point and power is available once the cable is on. Then switch EXTERNAL POWER ON. It needs the aircraft stopped off the runway with the parking brake set or the wheel chocks fitted and the cart within 35 m.
Releasing the brake, hiding the cart or moving it further away disconnects it within a second - with BATTERY still in EXT PWR that leaves the DC buses dead, so put MAIN DC GENERATOR or BATTERY in NORM first.

Avionics Power Switches (Right Console)



Right side wall: MASTER LT and FIRE tests, PITCH TRIM, the AFCS sensitivity knobs and the UFCD, AVP, SFD, BCDU and INS switches. The IFF switch is on the panel behind it.

1. **MASTER LIGHT TEST** - Lamp test: every warning lamp, MASTER CAUTION, the AOA indexer, AFCS and EW lamps. See Warnings and Alerts.
2. **PITCH TRIM MODE** - AUTO / MANUAL. Autopilot auto-trim. See AFCS System.
3. **ROLL RATE** - Autopilot roll gain, 0-10. See AFCS System.
4. **PITCH RATE** - Autopilot pitch gain, 0-10. See AFCS System.
5. **MACH/ALT** - Autopilot MACH and ALT hold gain, 0-10. See AFCS System.
6. **YAW BAL** - Autopilot rudder trim. See AFCS System.
7. **FIRE/OHEAT TEST** - FIRE TEST / OFF / OHEAT TEST. Tests the FIRE, BLEED and OVERHEAT lamps. Return it to the center.
8. **UFCD** - ON / OFF. Up-front control display: 9 s self-test, then NO COM until the AVP is up.
9. **AVP** - ON / OFF. Avionics processor behind all three MFDs; up after 7 s (Realistic 2 min). Until then the MFDs show DISPLAY BUS OR AVP FAILURE.

10. **SFD** - ON / OFF. Standby flight display: 6 s power-on test, then 10 s attitude initialization (Realistic 3 min). Keep the aircraft still.
11. **BCDU** - ON / OFF. Backup control display unit: INS alignment, destination points and steering while the AVP is off. About 15 s to start.
12. **INS** - ON / OFF / LOAD. ON powers the INS in standby. LOAD springs back to OFF after loading present position and date; then select ON.

The start-up times follow the EFB option **Avionics startup time** (Fast / Realistic). Each MFD also has its own OFF / NIGHT / DAY knob: from OFF it runs a 9-second power-on test.



Right side wall, aft of the avionics power switches: the IFF switch and the FACE HEAT knob.

1. **IFF** - OFF / ON / HOLD. Transponder power, up in standby. HOLD springs back to ON; OFF within 15 s keeps the codes, direct OFF zeroizes Mode 4: Mode 4 on again then lights the IFF lamp, with IFF MODE 4 RPLY FAIL on the alert line.
2. **FACE HEAT** - OFF / HIGH. There is no faceplate in the sim; the knob switches the windshield de-ice instead.

The IFF HOLD position keeps the stored codes when you switch the IFF off. It is spring-loaded: the switch returns to ON after 1 second, and the HOLD is remembered for 15 seconds, so select OFF within that time. Switching straight to OFF clears the secure-mode codes.

Related pages: Warnings and Alerts · Preflight and Power-Up · Cockpit Panels

Miltech Simulations U-2. SIMULATION USE ONLY. This documentation describes the simulated aircraft as delivered in the add-on and must not be used for real-world aviation.

Miltech Simulations U-2

Fuel System

The U-2 fuel system is designed to feed the engine from a single small sump tank in the fuselage, which is kept full automatically from the wing tanks. The system consists of four wing tanks, one sump tank, two boost pumps, sump and cross-transfer pumps, a fuel dump system and all associated indicators.

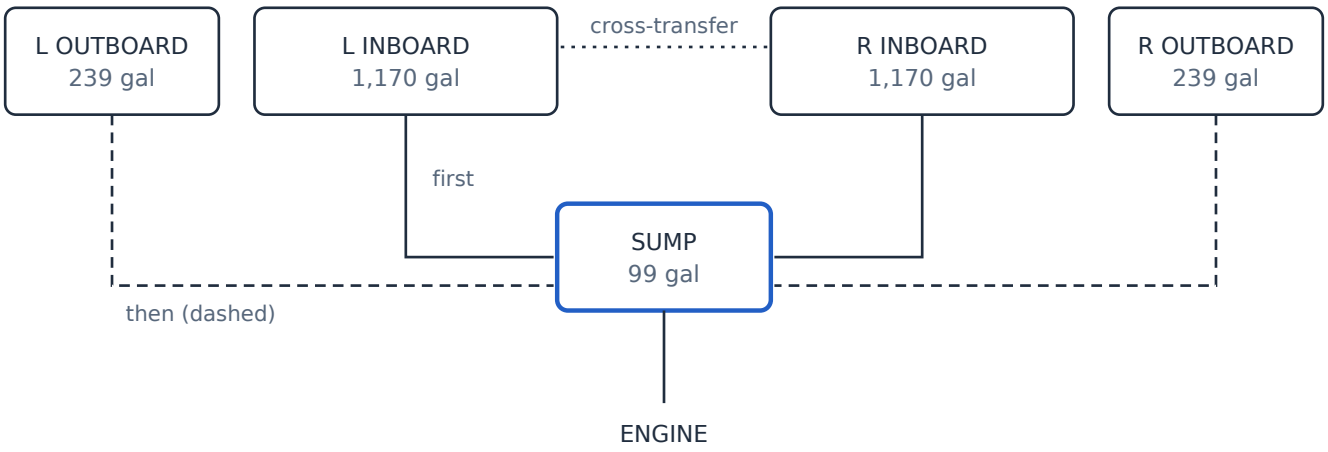
Note
Sim values. Performance values are measured in the sim. They may not accurately represent (nor do they intend to accurately represent) the performance of the real aircraft.

Most of the time the system looks after itself. Your job is to watch the sump and keep the wings balanced.

The Tanks

Tank	Name in the MSFS fuel menu	Capacity
Left inboard (wing)	LeftTank	1,170 gal
Right inboard (wing)	RightTank	1,170 gal
Left outboard (wing)	LeftAUXTank	239 gal
Right outboard (wing)	RightAUXTank	239 gal
Sump (fuselage) - feeds the engine	CenterSUMPTank	99 gal
Total		**2,917 gal ≈ 19,500 lb**

The aircraft displays work in **gallons**; one gallon weighs about 6.7 lb.



The inboard tanks feed the sump first; the outboard tanks take over when the inboards are empty. Only the sump feeds the engine.

How Fuel Feeds - Automatically

Float valves in the sump do the work. They need no electrical power and no action from you.

1. The engine burns fuel from the **sump**.
2. While the inboard tanks have fuel, they keep the sump topped up to **70 gallons**, drawing equally from left and right - unless she slips: in a sideslip the wing on the ball's side feeds less and slowly gets heavy. Centre the yaw first, then balance with the cross transfer.
3. When the inboards are empty, the outboard tanks take over and keep the sump at **50 gallons**.
4. If the sump ever sags below 48 gallons while the inboards still have fuel, the outboards join in to help.
5. The feed is pushed by engine bleed air, which pressurizes the wing tanks. With the engine stopped they feed by gravity alone: about 1.2 gal/min in level flight, more in a climb and nothing in a descent of 1,000 ft/min or more. After a flameout only the SUMP TANK transfer pumps add to that, while they still have essential AC.

Caution

Watch the sump in the climb At full power low down, the engine can burn fuel faster than the automatic feed (about 20 gal/min) can replace it, so the sump level sags. On top of that, the sump gauge **reads up to 12 gallons low with the nose up** (and up to 5 high with the nose down).

Together these can produce a FUEL SUMP LOW caution in a steep climb. Switch the SUMP TANK transfer ON, or lower the nose a little, and it recovers.

Warning

Empty sump = flameout The engine only ever drinks from the sump. If the sump runs dry, the engine stops, no matter how much fuel is in the wings.

Fuel Panel



Fuel panel, lower right of the main instrument panel. The lamps along the bottom are the dump-level and transfer lamps.

1. **FUEL BOOST PUMP PRIMARY** - PRI ON / OFF. Primary boost pump, fuel pressure to the engine; both pumps ON for flight. One off gives BOOST PRESS LOW.
2. **FUEL BOOST PUMP SECONDARY** - SEC ON / OFF. Secondary boost pump; ON with PRI for all normal flight. The engine keeps running on one pump.
3. **INBD SUMP TANK** - ON / OFF. Pumps extra fuel from both inboard tanks into the sump, 14 gal/min, while the sump is below 70 gal.
4. **OUTBD SUMP TANK** - ON / OFF. Pumps extra fuel from both outboard tanks into the sump while the sump is below 50 gal.
5. **INBD XFER** - TO LEFT / OFF / TO RIGHT. Cross-transfers fuel between the inboard tanks, 7 gal/min, toward the light wing. Blocked while INBD SUMP TANK is ON.
6. **LEFT OUTBD DUMP** - DUMP OPEN / CLOSED. Dumps the left outboard tank down to 150 gal (OUTBD 150 lamp, DUMP COMP). Close it afterwards.
7. **LEFT INBD DUMP** - DUMP OPEN / CLOSED. Dumps the left inboard tank overboard; DUMP COMP at 30 gal, but it dumps to empty - close it yourself.
8. **RIGHT INBD DUMP** - DUMP OPEN / CLOSED. Dumps the right inboard tank overboard; DUMP COMP at 30 gal, but it dumps to empty - close it yourself.
9. **RIGHT OUTBD DUMP** - DUMP OPEN / CLOSED. Dumps the right outboard tank down to 150 gal (OUTBD 150 lamp, DUMP COMP). Close it afterwards.
10. **OUTBD XFER** - TO LEFT / OFF / TO RIGHT. Cross-transfers fuel between the outboard tanks, 7 gal/min, toward the light wing. Blocked while OUTBD SUMP TANK is ON.

The XFER switches step OFF → TO RIGHT → TO LEFT → OFF with each click. ENGINE FUEL SHUTOFF (under a red guard, ON / FUEL OFF) cuts fuel to the engine: open the guard first; the valve takes about 5 seconds and needs emergency DC power. Closing the guard returns the switch to ON.

If your flight starts with the engine running, both boost pumps are already ON. From cold and dark they are OFF - switch them on before engine start.

Loading Fuel

Use the standard **MSFS Fuel & Payload** window. The aircraft reads whatever you set there.

- Always give the **sump (CenterSUMPTank) at least 70 gal**. If it starts empty the engine has nothing to drink until the automatic feed catches up.
- Fill the inboards (LeftTank / RightTank) next, outboards last, and keep left and right equal.

Monitoring Fuel on the MFD

Open SYS → PERF. You get three tapes and three computed numbers:

Item	Meaning	Normal
FUEL pressure	Boost pump pressure, psi	15-19 with both pumps, 11-15 on one pump. Yellow below 8.
SUMP	Sump quantity, gal	About 70 (50 when on outboards). Red at 38 or less.

Item	Meaning	Normal
TOTAL	The fuel counter, gal: counted down from the fuel flow, set with LOAD or 500	Turns yellow / red below your bugs. It counts the burn at the fuel's temperature, so on a long cold flight it reads high - about 60 gal at the 50-gallon sump step from a 15 °C ramp, more from a hot one: set 500 there. CHECK TOTAL FUEL uses it.
FF	Fuel flow, gal per hour	
FOB	Endurance (h:mm) at the present fuel flow	Both swing with the throttle - read them in stable cruise.
RNG	Range at the present fuel flow and ground speed	

Setting Your Fuel Bugs

Bugs are your personal reminders. There are three: a **sump** bug, a **yellow** total bug and a **red** total bug. They start switched off on every flight, and the aircraft has no built-in "low total fuel" warning - so set them.

1. On SYS/PERF press L4 EDIT. Each press moves to the next item: sump bug → yellow bug → red bug → LOAD.
2. Change the value with the increase / decrease keys, or type it on the UFCD keypad. Shortcut: L5 / L6 set the sump bug to 35 or 65.
3. L3 EXIT when done.

Falling below a bug gives you CHECK SUMP QTY or CHECK TOTAL FUEL (the red bug raises it to a warning).

SYS → CNSUM plots your fuel against a planned burn curve over the flight, together with liquid oxygen and oil.

Balancing the Wings (Cross-Transfer)

A fuel load from the simulator's fuel menu is evened out across each pair of wing tanks once it has settled, and the automatic feed draws equally from both sides in balanced flight. The wings go out of balance in a sideslip (the wing on the ball's side feeds less), or if you dump or cross-transfer unevenly.

To fix it, set the XFER switch *towards the light wing* and watch the wing come up. Transfer is slow - about 47 lb per minute.

- FUEL XFER ON shows while any transfer switch is on, and FUEL XFER 2 MINUTES reminds you every two minutes to check the balance.
- XFER PRESS LOW on a cross-transfer means nothing is flowing - the source tank is empty. Switch off. During a SUMP TANK transfer it also shows while the sump is still below its shut-off level, which is normal; it goes out as the sump fills, unless the source tank is empty.
- Cross-transfer is blocked while the SUMP TANK switch for the same pair of tanks is on.

Dumping Fuel

1. Open the dump switch for each tank you want to dump. Dumping starts immediately. L INBD DUMP OPEN etc. show on the MFD.
2. Watch for DUMP COMP (complete): inboards at 30 gal, outboards at 150 gal.

3. ↔ **Close the switches yourself** - they do not close automatically, and an inboard tank will dump to zero.

Tank	Rate (each side)	Stops at	Time from full
Inboard	37.5 gal/min	empty	≈ 31 min
Outboard	30 gal/min	150 gal	≈ 3 min

The sump keeps feeding the engine normally during a dump. After dumping everything you are left with about 370 gallons.

Fuel Messages on the MFD

Message	Why	What to do
BOOST PRESS LOW	A boost pump is off or not delivering	Both boost pumps ON
FUEL PRESS LOW	Fuel pressure below 8 psi	Boost pumps ON, check the sump
FUEL SUMP LOW	Sump gauge at or below 38 gal (it reads up to 12 gal low nose-up)	SUMP TANK transfer ON; reduce pitch or power
CHECK SUMP QTY	Sump below your sump bug	As above
SUMP QTY HIGH	Sump above 95 gal for 10 minutes	Not expected: the float valves hold the sump near 70 gal, and even an over-filled sump burns below 95 gal within a few minutes
CHECK TOTAL FUEL	Total below your yellow / red bug	Plan your recovery
FUEL XFER 2 MINUTES	A transfer has been running 2 more minutes	Check balance, switch off when done
XFER PRESS LOW	Transfer on but nothing flowing	Switch the transfer off
... DUMP OPEN / ... DUMP COMP	Dump valve open / tank has reached its dump level	Close the switch when complete

The annunciator panel also has a FUEL SUMP lamp (actual sump at 38 gal or less), which triggers the master caution.

Note
Pause and sim rate The fuel system follows simulator time: it stops when you pause and speeds up with sim rate.

Related pages: System Pages (SYS) · Specifications and Limitations

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Miltech Simulations U-2

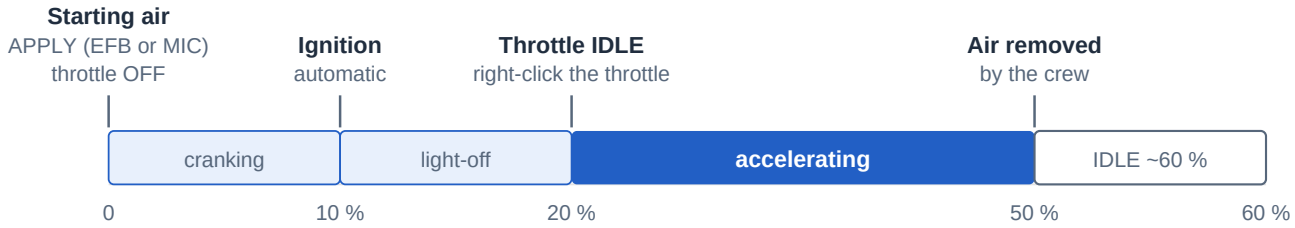
Engine Start and Cockpit Controls

The U-2S is started with a pneumatic starting cart, exactly as on the real aircraft: ground crew air spins the Air Turbine Starter, ignition comes on by itself, and the pilot's job is the throttle. This page also covers the other cockpit controls that were added with the engine start: the throttle OFF / IDLE stop, the engine mode switch, the emergency start system, the canopy seal and the seat adjustment.

Note

Sim values. Performance values are measured in the sim. They may not accurately represent (nor do they intend to accurately represent) the performance of the real aircraft.

GROUND START - WHAT HAPPENS AT WHICH N2



Lamps out by idle: SEC (54 %), AMAD (about 38 %), OIL, HYD. Hydraulic pressure is up by about 16 % N2.

Throttle OFF / IDLE Stop



Throttle quadrant on the left console, seen from above: throttle (SPEED BRAKE switch and the SPOILER, MIC and AIRSTART buttons on the grip), flap lever, aileron trim, friction and vernier wheels.

1. **AIL TRIM** - Aileron trim switch: hold left or right. Needs DC power and MANUAL TRIM POWER ON on the yoke. It is slow and small: a second held moves the ailerons about 0.4°, and it ends at about 2°. Small inputs only above 150 KIAS. A roll at speed with the lift spoilers up may be their uneven blow-down: check with them in before you trim it out.
2. **THROTTLE VERNIER** - Outer wheel: turn for fine throttle adjustment, a quarter of a percent per step with the friction at 0, finer as you add friction (0.05 % at 100).
3. **FLAPS** - Spring-loaded switch: left click extends, right click retracts, 5° per click from faired to 35°. With GUST CONTROL UP it stays at OFF and does nothing.
4. **THROTTLE FRICTION** - Inner wheel, 0-100 in steps of 5. More friction gives smaller steps when you wheel or drag the throttle lever and the vernier - at 100 they are a fifth of the normal step. A hardware throttle axis keeps its full range.

5. **THROTTLE** - IDLE to FULL. Below 10 %, right-click moves it between OFF (cutoff) and IDLE. Grip: SPEED BRAKE switch, SPOILER, MIC and AIRSTART buttons. On the ground, parked with the air-start unit on the stand, a press of MIC (here or on the yoke) calls the crew to apply the starting air.

The throttle has a cutoff stop below the idle position. With the throttle below 10 %, **right-click the throttle** (tooltip THROTTLE IDLE STOP) to move it between OFF and IDLE. Moving the lever forward while in OFF also selects IDLE. From your controller, bind **Increase Cowl Flap 4** - see Keybinds Guide.

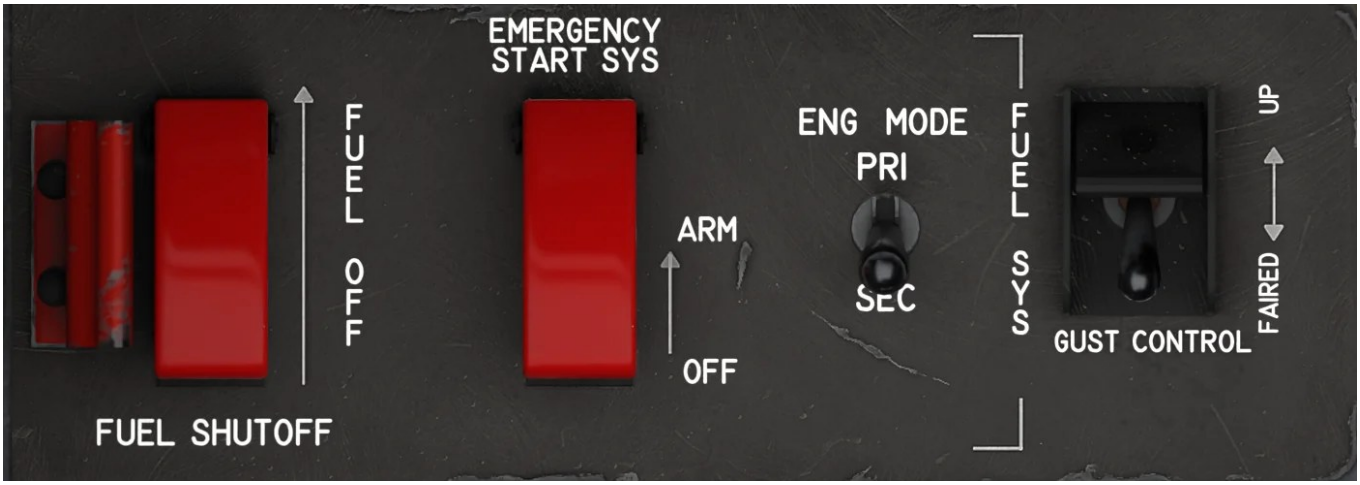
Note
Your throttle axis covers idle to full power only. The cutoff is a separate click or key, so it cannot be hit by accident.

Ground Start

1. Parked off the runway with the PARKING BRAKE set. Battery and ground power on (ground power unit connected on the EFB Ground tab), both FUEL BOOST PUMP switches ON, ENGINE FUEL SHUTOFF ON, ENG MODE in PRI. Bring up SYS → PERF on an MFD.
2. Throttle OFF (right-click below 10 %).
3. Open the EFB Ground tab, Servicing, **Air Supply Unit**: *Attach*, then *Apply*.*Attach* brings the air-start unit (out of hiding if need be) to its service point and connects the hose; *Apply* supplies the air once it is connected. The engine begins to turn; ignition is switched on for you. The air only flows while you stay parked with the brake set - otherwise the selection drops back to Off. A press of MIC on the yoke or throttle selects *Apply* the same way, as your call to the ground crew; taking the air off again is the EFB's *Off*, or the crew's once the engine runs.
4. At **20 % N2** right-click the throttle to IDLE. Fuel flows, EGT rises and the engine accelerates.Below about 18 % N2 the engine does not light; wait for 20 %.
5. At about 50 % N2 the crew removes the air by itself; the hose comes off when you release the parking brake or move. The engine settles at ground idle: about 60 % N2 / 22 % N1 and about 420 °C EGT at a sea-level field.
6. Check the lamps: SEC goes out at 54 % N2, AMAD at about 38 %, OIL and HYD as pressures build.If SEC or AMAD comes back on during the start, that repeat does not light the master caution again (on the ground, below 55 % and 48 % N2). The first time still does.

Caution
There is no starter switch for the ground start: your starter key is the throttle AIRSTART button and does nothing on the ground. Without starting air applied nothing turns, and the air drives the starter only below 50 % N2.

Engine Mode Switch - PRI / SEC



Left console, just aft of the throttle: FUEL SHUTOFF and EMERGENCY START SYS under their red guards, ENG MODE PRI / SEC and GUST CONTROL.

1. **ENGINE FUEL SHUTOFF (under its guard)** - ON (lever aft) / FUEL OFF (lever forward, at the arrow). FUEL OFF closes the engine fuel valve (about 5 s) and stops the engine. Closing the guard returns it to ON; every flight starts with it ON under a closed guard.
2. **EMERGENCY START SYS (under its guard)** - OFF / ARM. Arms the hydrazine airstart, one per flight; the AIRSTART button fires it below 50 % N2. Closing the guard disarms it.
3. **ENGINE MODE** - PRI / SEC. Engine control mode; PRI for flight. SEC lights SEC and takes up to 10 % of the thrust; the throttle still goes to full. SEC then PRI resets an automatic transfer.
4. **GUST CONTROL** - FAIRED / UP. UP unloads the wing in turbulence: flaps 6.25° up and ailerons 7.5° up by themselves, the nose comes up, the flap lever is out of use, red line 241 KIAS.

The ENG MODE switch on the left console selects the engine's primary or secondary control mode. The engine runs in **secondary mode** during every start (until about 54 % N2, when the engine control has power) and whenever the switch is in SEC: the SEC lamp and ENG MODE SECONDARY show, the thrust is up to 10 % lower at full throttle and nothing limits the EGT.

Leave the switch in PRI for flight: there the engine control holds the EGT at 840 °C. If the engine transfers to secondary by itself (an engine control fault), it stays there until you select SEC and then PRI with the fault gone.

In either mode the MEC cuts the fuel if N2 reaches 110.25 %; bring the throttle below 10 % to clear it.

Airstart - Emergency Start System (ESS)

In flight the normal starter does nothing. If the engine flames out:

1. Open the red cover and set EMERGENCY START SYS to ARM. EMER START ARMED appears.
2. Below 50 % N2, click the AIRSTART button on the throttle grip, or press your starter key (**Toggle Starter 1**). A short click is enough. Master CAUTION, the H-70 LEAK lamp and H70 LEAK come on without a tone, and 1 to 4 seconds later (later still when the system has cold-soaked) the hydrazine gas generator drives the starter for about 40 seconds with ignition on.
3. Throttle IDLE once N2 is rising.

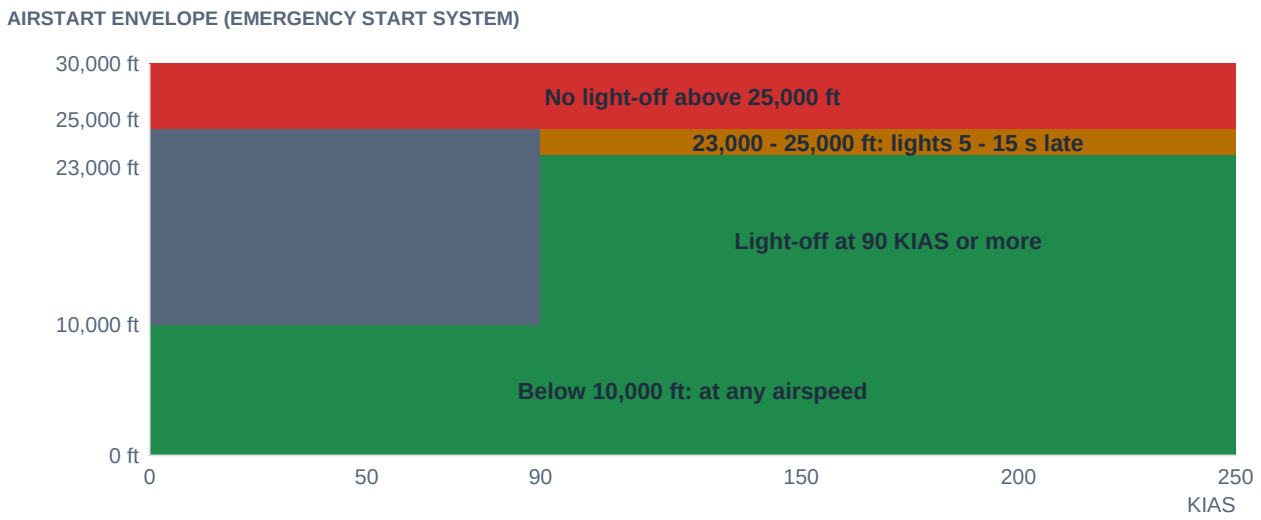
The engine only lights at **25,000 ft or lower** with at least 90 KIAS (at any airspeed below 10,000 ft); between 23,000 and 25,000 ft the light-off comes 5 to 15 seconds late. The system is good for **one attempt**

per flight.

Afterwards the H-70 LEAK lamp and H70 LEAK stay on until the system is serviced: 10 seconds parked with the engine off once the ground crew has refitted the pogos. Close the cover to disarm.

The system only fires with its **ground safety pin** out. The runway crew pulls that pin just before the pogo pins, and after a landing puts it back with the pogos: with the pogos still on (or no runway crew) there is no airstart.

Air starts come with it out. With the pin out, ARM and AIRSTART fire the system on the ground too. The EFB Ground tab's **Emergency start system** card shows the pin, the nitrogen bottle pressure (read on the ground) and whether the hydrazine is serviced or used.



Where an airstart with the emergency start system can light the engine. It is good for one attempt per flight; the starter runs for 40 seconds.

Seat Adjustment

The SEAT ADJ switch on the lights and spoiler panel (left side wall) moves your eye point. Hold the left mouse button for UP, the right button for DOWN; the switch springs back to OFF when released. It needs DC power.

Fuel Shutoff

The ENGINE FUEL SHUTOFF switch is under a red guard. Open the guard and select FUEL OFF to shut the engine down; the valve takes about 5 seconds to close and needs emergency DC power. Closing the guard returns the switch to ON.

Power and EGT

The engine runs on corrected speed, so N1, N2 and EGT at a given lever position change with altitude. EGT follows engine speed and the outside air temperature: the SYS → PERF gauge, the standby dial and EGT HIGH all use the same figure. Climb power is full throttle, then the vernier back to hold the EGT.

Condition	N1	N2	EGT
Ground idle, sea level	about 22 %	about 60 %	about 420 °C
Full throttle, takeoff	about 94 %	about 101 %	about 760 °C

Condition	N1	N2	EGT
Climb power, 45,000 - 66,000 ft	93 - 95 %	98 - 99 %	650 - 725 °C
Full throttle above about 55,000 ft	about 96 %	99 - 101 %	about 830 °C at 55,000 ft, then held at 840 °C by the engine control in PRI (no limit in SEC)
Idle, descending above about 18,000 ft (flight idle)	65 - 75 %	80 - 85 %	about 400 - 500 °C

Standard day. A day 20 °C above standard shows about 830 °C at full throttle on takeoff.

High up the EGT sits near 650 °C over a wide band of N2, from about 94 % to about 98.5 %, then climbs quickly: about 690 °C at 99 %, about 780 °C at 100 %. Move the vernier in small steps.

Flight idle comes down above 50,000 ft, to about 69 % N1 and 81 % N2 at 70,000 ft, so the aircraft can slow down up there.

Standby Engine Gauges

Three round gauges below the right MFD show **N2** (% rpm), **EGT** (°C) and **fuel flow** (gallons per hour × 100). They read straight from the engine and keep working when the MFDs are dark.



1. **N2** - Standby N2 in % rpm, read straight from the engine; keeps working with the MFDs dark. About 60 % at ground idle.
2. **EGT** - Standby exhaust gas temperature in °C, read straight from the engine, independent of the MFDs.
3. **FUEL FLOW** - Standby fuel flow in gallons per hour x 100, read straight from the engine, independent of the MFDs. Its window is the fuel totalizer: the fuel remaining in gallons, counted down from the fuel flow - the same count as SYS/PERF TOTAL, set with LOAD or 500 there.

Related pages: Quick Start Guide · Preflight and Power-Up · Engine Start and Taxi · Chase Car and Ground Support Equipment

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Miltech Simulations U-2

Cabin, Oxygen and Hypoxia

The U-2 cockpit is a small pressure vessel at the edge of space. The Environmental Control System (ECS) keeps it pressurized and at a comfortable temperature, two liquid-oxygen converters feed your mask, and if either fails our rendition simulates what happens to the pilot.

The system consists of the canopy seal, the cabin pressure regulator and dump, the air-conditioning pack with its bypass valves, the windshield anti-fog, two LOX converters and the hypoxia model.



Cabin Pressure and the Canopy Seal

The cockpit only pressurizes with the CANOPY SEAL T-handle ON and the canopy closed. It stays at outside pressure up to 7,500 ft, holds a 7,500 ft cabin up to about 18,300 ft, and from there holds a 3.88 psi differential - about 29,000 ft cabin altitude at a 70,000 ft cruise, which is why you wear the mask.

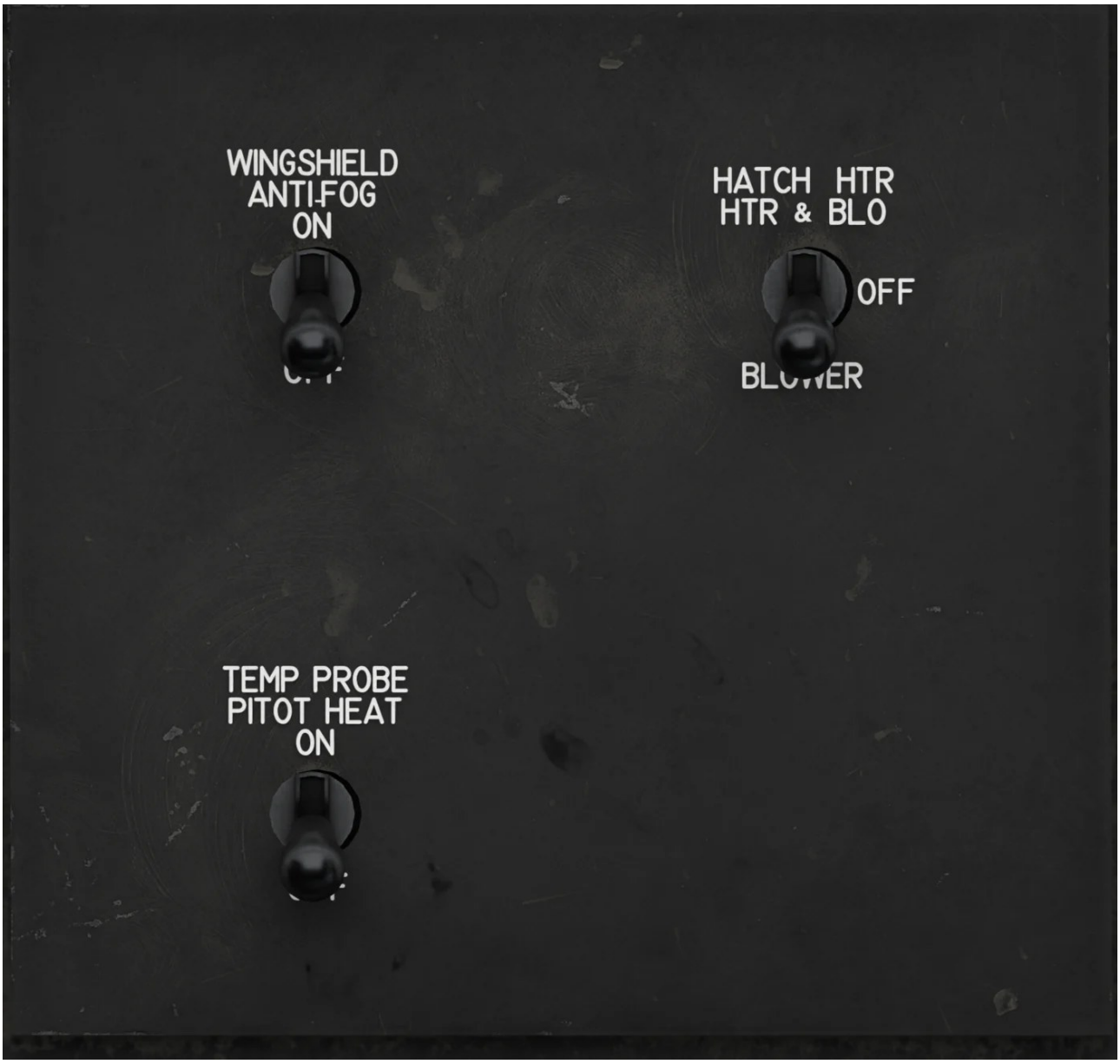
The cabin is dumped to outside pressure by RAM AIR (guarded switch), by opening the canopy, or by setting the seal OFF. Cabin and Q-bay altitude are on MFD SYS → PERF; CABIN ALTITUDE HIGH / Q-BAY ALTITUDE HIGH appear if either is higher than it should be for your flight level, SEAL PRESS OFF while the hatch and nose seals are not pressurized (on the ground until the engine has run for 20 seconds, and again 10 seconds after shutdown - not the canopy seal), CKPT AIR DUMP OPEN with RAM AIR on.

- The seal inflates only with the canopy closed, and the canopy latch does not open while the seal is ON.
- Cold and dark: the seal starts OFF. Set it ON after you close the canopy, before takeoff. A runway or air start has it ON.
- After landing: seal OFF, then the **CANOPY LATCH** placard opens the canopy (on the ground only).

Cockpit Temperature



Left of the main panel: RAM AIR, REFRIG BYPASS, TURBINE BYPASS and the CABIN HEAT knob, beside the gear handle.



Right side wall: WINDSHIELD ANTI-FOG, HATCH HTR and TEMP PROBE / PITOT HEAT.

Gear handle and cabin air controls

1. **RAM AIR (under its guard)** - Red guard over the RAM AIR ON / OFF switch. ON shuts the air conditioning off, dumps cabin pressure and ventilates with outside air - strongly low and fast, weakly up high, not at all standing still; the cockpit drifts toward the outside temperature.
2. **LANDING GEAR HANDLE** - See Landing Gear.
3. **REFRIG BYPASS** - NORMAL / CLOSE. CLOSE forces full cold air from the air-conditioning pack; NORMAL lets the CABIN HEAT knob set the temperature. Cold and Dark leaves it in CLOSE (or where your last flight in this sim session left it); runway, taxi and air starts come up in NORMAL.
4. **TURBINE BYPASS** - NORM/9TH / NORM / CLOSE. Cooling turbine and water separator: in NORM they work below 25,000 ft with the engine above 70 % N2 and are bypassed otherwise; NORM/9TH adds 9th-stage bleed air at low power (below about 76 % N2); CLOSE runs the turbine always, with less air flow. Cold and Dark leaves it in CLOSE (or where your last flight in this sim session left it); runway, taxi and air starts come up in NORM.

5. **CABIN HEAT - AUTO CONTROL** - Inner knob: click or scroll to set the automatic cockpit temperature, 55-85 °F in 5° steps; selects AUTO. Outer ring: HOT / HOLD / COLD; its tooltip shows AUTO, HOT, HOLD or COLD.

Anti-fog and heater panel

1. **WINDSHIELD ANTI-FOG** - ON / OFF. Heats the windshield so it stays clear of fog, mainly in the descent. ANTIFOG INVRTR ON when it runs on the emergency inverter.
2. **HATCH HEATER** - HTR & BLO / OFF / BLOWER. Q-bay hatch heater, for the photo hatch of the OBC. Without the OBC in the Q-bay, or with the monitored AC bus dead, HTR & BLO gives HATCH HEATER HOT as a wrong-setting alert; BLOWER does nothing.
3. **PITOT HEAT** - ON / OFF (legend TEMP PROBE / PITOT HEAT). Pitot heat; ON in cloud or precipitation near or below freezing. It heats the temperature probe too: on the ground SYS/PERF FAT climbs within seconds, and standing still the probe overheats in about a minute - APCU FAULT and FAT dashes until it cools. So check it on the ground, then OFF until just before takeoff (the EFB Ready for takeoff preset switches it on).

COCKPIT FAN (HIGH / OFF / LOW) mixes the cockpit air: the temperature follows the setting faster and canopy fog clears sooner.

The air conditioning runs on engine bleed air whenever the engine runs and RAM AIR is off; the flow builds from about 30 % N2 and is full from about 75 %. CABIN HEAT AUTO needs essential AC power (without it the valve stays where it is); the valves need essential DC power, and without it - or with ESS DC SHED pressed - the pack goes full cold.

A duct temperature of 200 °F drives the valve toward cold in any mode. CABIN TEMP HIGH appears above 95 °F for 30 seconds. Cabin temperature is shown on SYS/PERF. The temperatures are our own estimates, not manual data.

Oxygen



Oxygen panel on the left console: OXY SYS 1 and 2 switches with the system pressure gauge.

1. **OXYGEN SYSTEM 1** - ON / OFF. Liquid-oxygen converter 1 to your mask; both systems ON for flight. The left SYSTEM PSI needle only shows ON or OFF.
2. **OXYGEN SYSTEM 2** - ON / OFF. Liquid-oxygen converter 2 to your mask; both systems ON for flight. The right SYSTEM PSI needle only shows ON or OFF.

Two independent liquid-oxygen (LOX) converters of 10 liters each, with their own OXY SYS 1 / OXY SYS 2 switches. A fresh aircraft has 8-10 liters in each; the two-needle LIQUID OXYGEN gauge beside the gear handle shows both quantities (one needle per converter, 0-10 liters), and the EFB Ground tab shows the quantities, pressure and endurance.

Servicing is on the same tab (25 / 50 / 75 % / Full): it needs the oxygen cart on the stand, the engine stopped and the aircraft parked with the brake set, and fills both converters together at about 3.3 liters a minute - 3 minutes from empty to full.

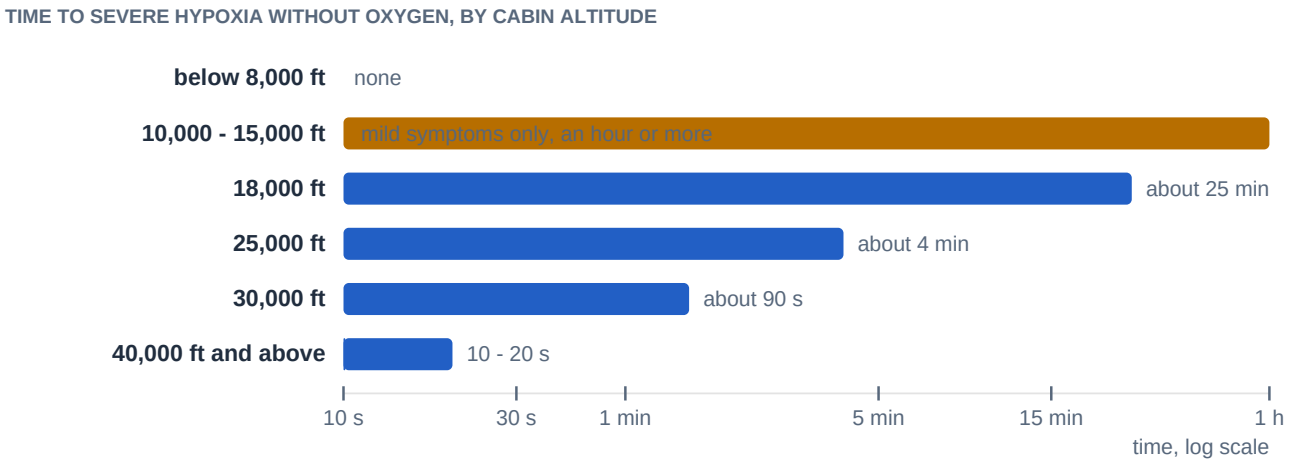
A level below the present quantity drains nothing, and the fill stops if one of the conditions is lost. Consumption rises with cabin altitude - about 4 liters of gas per minute at sea level, 8 at a 29,000 ft cabin, shared between the converters that are on - which comes to roughly half a liter of LOX per hour, so the oxygen lasts far longer than the fuel - the EFB Ground tab shows about 34 hours at cruise with both converters full. Quantities are also on MFD SYS/PERF (LOX 1, LOX 2) and the CNSUM trend.

Alerts: the OXY lamp, NO. 1 OXY / NO. 2 OXY (a converter off, below 50 psi or below 1 liter), LOW OXY QTY (both below 2 liters), HIGH OXY CONSUM RATE (more than 2 liters an hour over the last 15 minutes; it would mean a leak, and no leak is simulated, so you will not see it).

Hypoxia Simulation

If you have no usable oxygen - both converters off, empty or without pressure - and the cabin altitude is above 8,000 ft, hypoxia sets in. The view narrows to a soft tunnel, then dims to black. How fast depends on the cabin altitude, as it does for a real pilot:

Cabin altitude	Time to severe hypoxia without oxygen
below 8,000 ft	none
10,000 - 15,000 ft	mild symptoms only, over an hour or more
18,000 ft	about 25 minutes
25,000 ft	about 4 minutes
30,000 ft	about 90 seconds
40,000 ft and above	10-20 seconds



The higher the cabin, the faster the screen narrows and goes dark. Oxygen back on clears it in 45 seconds.

A rapid decompression (the cabin climbing faster than 1,500 ft/s above 18,000 ft) doubles the rate for a minute. **Recovery:** oxygen back on - a converter switch, quantity and pressure - clears the symptoms in 45 seconds; descending to a lower cabin altitude without oxygen takes 90 seconds.

With the canopy seal OFF the cabin is at outside altitude, so a seal left off on the climb is the usual way to meet it.

Note
The simulation can be switched off on the EFB Settings tab (**Hypoxia simulation**); with the EFB **Autosave** on, your choice is kept for the next flight. It is purely visual - the aircraft keeps flying.

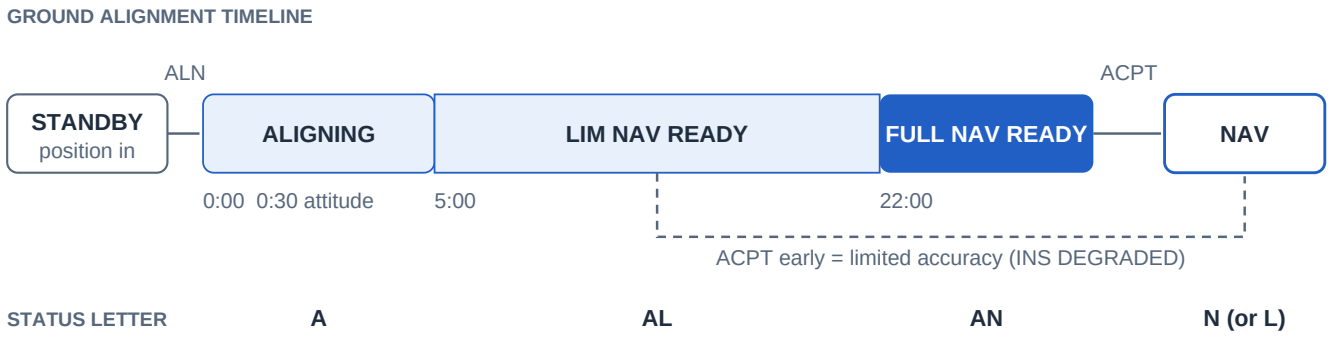
Related pages: Electronic Flight Bag (EFB) · Preflight and Power-Up

Miltech Simulations U-2. SIMULATION USE ONLY. This documentation describes the simulated aircraft as delivered in the add-on and must not be used for real-world aviation.

Miltech Simulations U-2

Inertial Navigation System (INS)

The Inertial Navigation System (INS) is the heart of the U-2S cockpit. It supplies the attitude on your PFD, the heading on the HSI, and the navigation solution the autopilot follows. Before it can do any of that it has to be aligned - and that takes time.



You start the alignment (ALN) and you accept it (ACPT). The INS never goes to NAV by itself on the ground.

Tip
Two things make this quick: (1) if you start a flight on the runway or in the air, the INS is already fully aligned; (2) the EFB **Settings** tab has an **INS alignment time** option - *Full* (22 min), *Short* (3 min) or *Instant* (5 s). Your choice is remembered.

The INS Switch

On the right console, three positions:

Position	Function
ON (up)	Powers the INS. It wakes up in **standby** and waits for you to start the alignment.
OFF (center)	Off. An interruption shorter than 8 seconds is ignored; longer than that and the alignment is lost.
LOAD (down, springs back)	The easy way to tell the INS where it is: loads the aircraft's present position and today's date. The switch springs back to OFF - move it up to ON afterwards.

INS Modes and Status Letters

The INS status letter is shown at the top of the PFD (left of the autopilot box). On the PFD it is followed by a digit for the GPS navigation mode and, while overfly is selected, an O; the L or N flashes 21 seconds before a turn point, and 21 seconds before the last DP of the file.

The BCDU shows the same information in five fixed positions at the bottom left - see BCDU, Advisory Letters.

Letter	State	Attitude on PFD?	Navigation?
E (BCDU)	Powered, but the alignment position and the gravity deflection are not both entered yet	No	No

Letter	State	Attitude on PFD?	Navigation?
blank	Standby, position entered, waiting for you to start the alignment	No	No
A	Aligning	After 30 s	No
AL	Aligning - *limited* navigation is available if you accept it now	Yes	Not yet
AN	Alignment complete - *full* navigation is ready to accept	Yes	Not yet
L	Navigating, limited accuracy	Yes	Yes
N	Navigating, full accuracy	Yes	Yes

Ground Alignment, Step by Step

1. **Power.** Battery on, then on the right console switch BCDU and AVP ON.The BCDU takes about 15 seconds to start, the AVP (which drives the MFDs) 7 seconds - or 2 minutes with the EFB option *Avionics startup time* on *Realistic*. See "Power-up". If you want to type the position by hand (step 2), leave the AVP off until it is in - the BCDU pages only work while the AVP is off.
2. **Tell the INS where it is.** Easiest: flick the INS switch to LOAD.
   Or do it by hand on the BCDU, with the AVP still off: menu knob to NAV-1 → <NAV INIT → enter latitude and longitude, then the gravity deflection GN / GE (zeros will do; see the BCDU chapter), then switch the AVP on. The EFB **Flight plan** tab shows your current position in exactly the format to type. The MFD NAV/INIT page shows the alignment position but cannot edit it.
3. **INS switch ON.** The MFD NAV/INIT page shows INS MODE: STBY.If you skipped step 2 it shows ENTER POS / LOAD and the alignment cannot be started.
4. **Start the alignment** - either
   • MFD NAV → INIT: press R1 ALN, then R2 YES; or
   • BCDU NAV INIT (AVP off, INS ON): press the key beside STBY MODE<, the scratchpad shows ALN MODE, press ENT.
5. **Wait, and do not move the aircraft.**

Time	What happens
0:30	Attitude appears on the PFD
5:00	LIM NAV READY - you may accept now for a quick departure with reduced accuracy
22:00	FULL NAV READY

The AQ (align quality) number counts down from 300 as the alignment improves - lower is better.

6. **Accept.** The INS does not go to NAV by itself on the ground - either
   • MFD NAV/INIT: R1 now reads ACPT. Press it, then R2 YES; or

- BCDU (AVP off): NAV-1 → <MODE STAT → press the key beside >FULL NAV READY (or LIM), then ENT.

The status letter changes to N (or L). You are ready to taxi.

> Caution
> **If you move during alignment** Taxiing faster than 3 knots before anything is ready restarts the alignment from zero (ACFT MOVED); it begins again once you stop. If LIM or FULL NAV READY was already showing, the INS simply takes that level and goes to NAV.

Limited Versus Full

If you accept at LIM NAV READY you get the advisory INS DEGRADED. The INS keeps refining in the background and upgrades to full accuracy by itself about ten minutes after the full alignment would have finished.

In-Flight Alignment (IFA)

If the INS loses power in flight for more than 8 seconds, it realigns itself using GPS as soon as power returns: attitude after 30 seconds, full navigation after **7 minutes**, no acceptance needed. You can also command one yourself on MFD NAV/INIT with R4 IFA and confirm YES, or, with the AVP off, on BCDU NAV INIT (>KALMAN RESET key, choice IFA RESTART). Fly straight and level on the standby display until the attitude returns.

About 80 seconds into the in-flight alignment (sooner with the Short alignment option) the INS asks for a heading change: a magenta **CHG HDG 45°** appears beside AQ on NAV/INIT and below AQ on the PFD, and the BCDU MODE STAT page reads IFA CHG HDG 45.

Turn about 45° (40° is enough) and it goes out. The turn is optional - the alignment finishes on time either way. It is not shown with the Instant option.

Accuracy, GPS Updating and Alerts

The INS aligns to the position *you gave it*. Using LOAD gives a perfect start. If you type a wrong position, the INS believes you:

- ALIGN MISMATCH - the entered position is more than 1 NM from where the aircraft really is. Re-enter it before accepting.
- Once in NAV, GPS updating (on by default) quietly pulls the INS position back to the truth within about a minute.
- If you switch GPS updating off (MFD NAV → DATA, "NAVIGATION UPDATE"), any entry error stays and the INS also drifts about 0.6 NM per hour. INS GPS MISMATCH appears when the INS and GPS positions differ by more than 1,000 ft north/south or east/west (2,000 ft in a bank of more than 5°) or 3,000 ft in altitude - with updating off that takes about a quarter of an hour.

It is not tested for 5 minutes after GPS aiding comes back, so the INS can pull itself in first.

The NAV/INIT page also shows the INS unit temperature (INU TEMP): green in normal operation, with alerts at 115, 125 and 135 °F.

Manual Position Update

If you know the INS has drifted, you can correct it over a known point. On MFD NAV → DATA press L4 MAN, select the destination point you are flying over, press R5 FIX exactly overhead, check the DIFF line and press R6 ACPT.

The difference is applied to the INS position. REJ throws it away. With the AVP off, the BCDU does the same update on NAV-2 → <MAN UPDT.

Related pages: Navigation System (INS Steering) · Backup Control Display Unit (BCDU) · Up-Front Control Display (UFCD) · Electronic Flight Bag (EFB)

Miltech Simulations U-2. SIMULATION USE ONLY. This documentation describes the simulated aircraft as delivered in the add-on and must not be used for real-world aviation.

Miltech Simulations U-2

Navigation System (INS Steering)

The U-2S carries its own INS steering computer. It takes the route from the ACTIVE destination point file and the position from the INS, and from those it works out where to fly next: the leg to hold, where to start each turn, and how steeply to bank.

Everything else in the cockpit shows or follows that one result - the flight director on the PFD, the MILES / TTG read-outs, the track on the map, the NAV pages, the UFCD and BCDU, and the autopilot in NAV mode.

INS Steering Computer

Reads	Computes	Drives
ACTIVE destination point file (up to 99 DPs, each with a turn radius) INS position - the INS must be in NAV Your steering selection: mode, TO DP, course, distance, overfly, orbits	Desired track, cross-track error, turn points Bank command for the turns Bearing, MILES, DTG, TTG, TT and 21-seconds-to-turn	PFD flight director, HSI course and NAV block MAP track, turn circles and DS / OFLY lines NAV DATA, UFCD NAV / HOM, BCDU NAV PRIM and RT page AFCS NAV mode (bank steering)

One computer, one answer. The MSFS flight plan is not part of it.

Note
You change the steering from any of these places, and the others follow: MFD NAV → DATA (EDIT, the STEERING DATA block), NAV → DPS (DS), NAV → RPLAN (EXEC), the UFCD NAV page, the UFCD HOM page steering line, the UFCD EMER page (DIR STR), or the map (DS / OFLY). With the AVP off, the BCDU can set a direct steer and the steering mode.

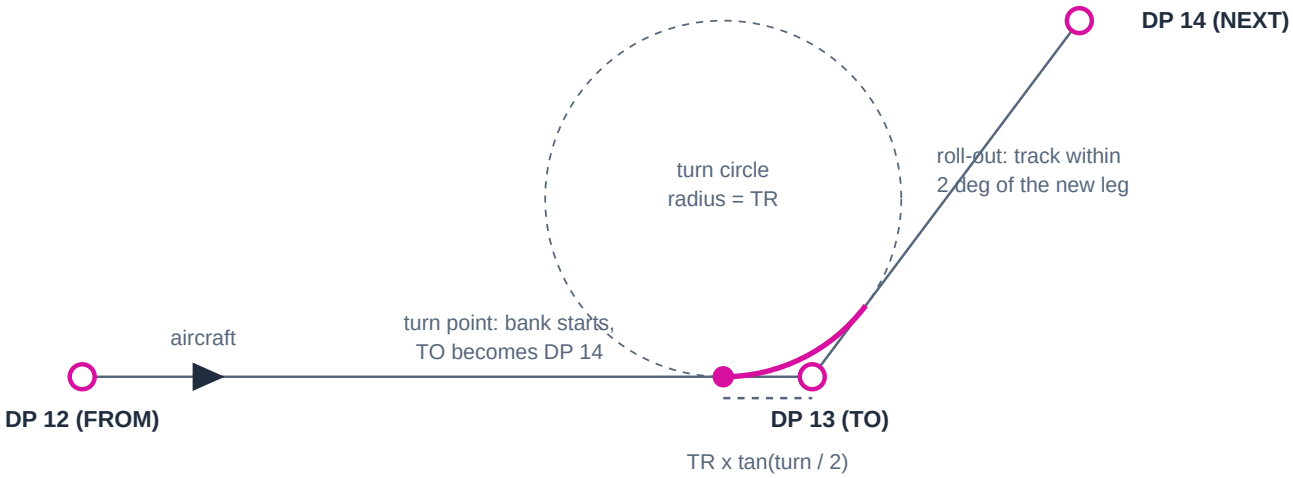
Destination Points and the Turn Radius

A destination point (DP) is a position with a name and a **turn radius** (TR, in NM, default 6.7). The turn radius is not decoration: it is the radius of the circle the aircraft flies when it turns at that DP.

At U-2 speeds a 6.7 NM radius is a turn of about 22° of bank at cruise ground speed; pick a larger TR for a gentler turn, a smaller one (5.5 NM minimum) for a tighter one. Set it on the NAV/DPS page (TURN), on the UFCD DP page or on the BCDU.

F/T - From / To (Sequential Steering)

The normal mode. The aircraft flies the file in order: from the last DP to the TO DP, turns, and continues to the next one.



F/T: the turn starts before the DP so the aircraft rolls out on the next leg. The TO DP switches at the turn point, not over the DP.

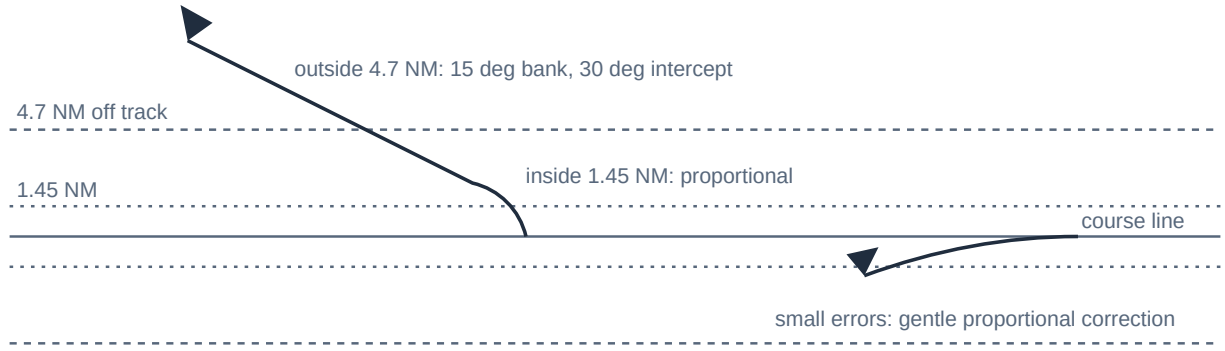
- **Turn point:** TR × tan(turn angle / 2) before the DP. A 90° turn with TR 6.7 starts 6.7 NM before the DP; a 45° turn 2.8 NM before it.
- **In the turn** the bank comes from the TR and your ground speed (so wind is corrected) plus a correction for being off the circle, limited to 15° - the autopilot's normal bank limit in NAV. A turn that is too tight for that at your ground speed is flown wider, on the radius a 13° bank gives.
- **A turn that does not fit between its DPs** gets a smaller radius, for that turn only, so it stays a curve and not a corner. A leg too short for the turns at both its ends is shared between them. Your TR stays in the file; the TURN column on NAV/DPS shows the radius in use in yellow.

This is the one case where NAV banks past 15°: as far as the turn needs, up to 25°. That room closes back to 15° between about 75 % and 87 % of the stall angle. Past the limit the aircraft swings wider than the small radius, and the map draws the turn at the radius it can fly.

- **TT** on the NAV block is the *time to turn*, and 21 seconds before the turn point the DS line on the map and the TT flash (21 seconds to turn).
- **Turns over 140°** cannot be flown on the circle: the turn point stays at the 140° position and the steering shows NAV STEERING (overshoot turn). The aircraft rolls out beside the next leg and steers along the line the map draws from there to the next turn point, unless that line is more than 25° off the leg; then it goes back to the leg.
- **Last DP in the file** (or a blank DP next): once past it the aircraft flies a continuous 15° right turn until you select something else. If it passes the DP more than 1.45 NM away, it first steers back to the DP.

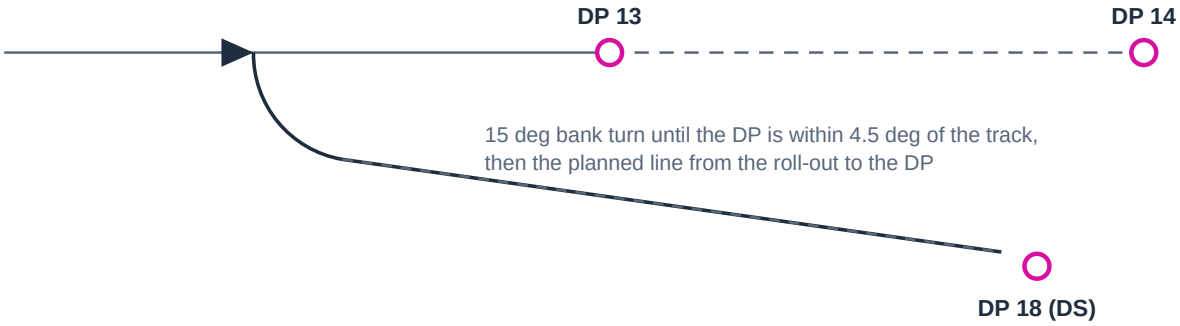
Maintaining Track

Between turns the computer holds you on the great-circle line between the two DPs. The map draws that same line, turns included, so the aircraft stays on the line you see.



- Within 4.7 NM of the line the correction is proportional to the error - a gentle, continuous steer.
- Further out the computer flies a 30° intercept at 15° of bank (the PFD steering source shows the intercept), and hands back to proportional steering 1.45 NM from the line.
- XTK on the NAV DATA page and the box under the aircraft symbol on the HSI show the error; R = right of course.
- The steering reads your heading and a smoothed drift angle, not the raw GPS track, so a gust does not swing the steering bar from side to side.

Direct Steer (DS)



A direct steer takes you straight to any DP from where you are. When it starts, the computer plans the path: a 15° bank turn from your present position and track, then the straight line from the end of that turn to the DP.

It flies the turn until the DP is within 4.5° of the track and then holds that line. The HSI deviation and XTK show how far you are off this path, in the turn as well as on the line, so they stay centered while you follow the steering.

(If the turn cannot line up with the DP - the DP is inside the turn circle, or it would take more than 270° of turn - the aircraft holds its track until it can, so it does not circle the DP.

There is no planned path until then, and the deviation shows only from there.) When you arrive, sequential steering continues from that DP. Select it with DS on the map or on NAV → DPS (both also offer DP 00, the position the INS was aligned at), by entering a new TO DP on NAV/DATA or the UFCD HOM / NAV page, or with >DR STR DP on the BCDU (AVP off).

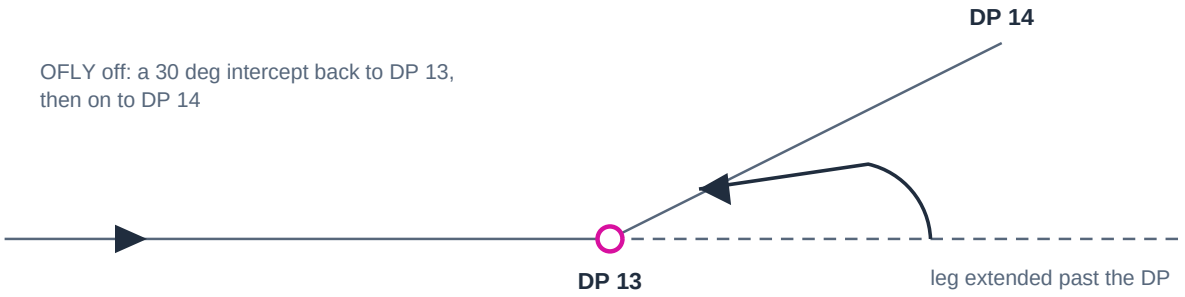
A dashed cyan line on the map shows the proposed track before you confirm it, and a solid cyan line the direct steer once it is sent, from whichever panel - see MAP.

To a TP. NAV → DPS also steers direct to a targeting point. The path is the same, but a TP is a point, not a DP of the file, so there is no next DP: on arrival the aircraft goes into a continuous right turn at 15° of bank and

stays there until you make another steering selection.

The TO DP reads 00 meanwhile, and a magenta line on the map shows the leg to the TP. It is not available while EMER is the active file.

Overfly (OFLY)

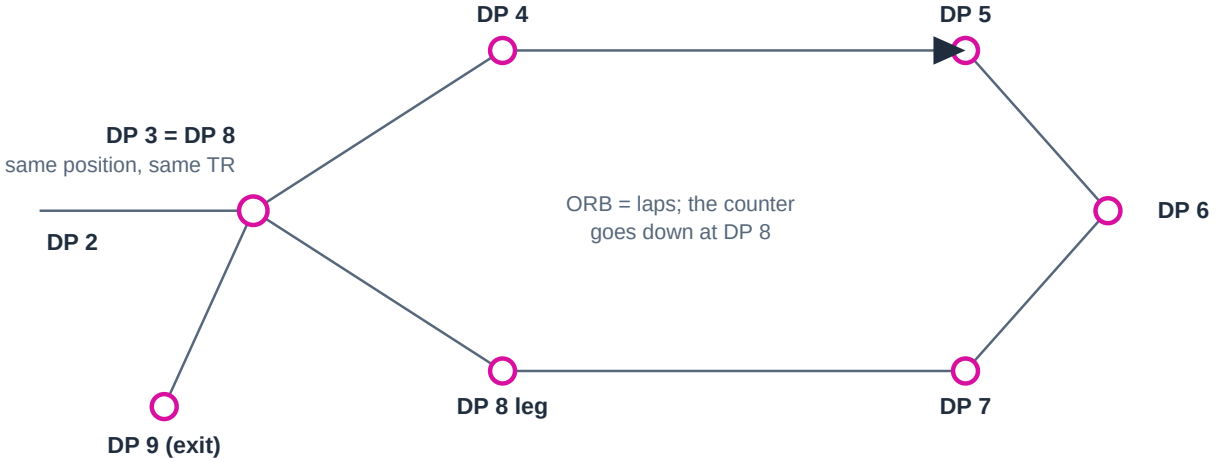


With overfly ON the computer ignores the turn point and flies straight over the TO DP, extending the leg beyond it. When you switch OFLY off (or press it again) it turns back with a 30° intercept to the overflown DP and then continues to the next one.

The PFD steering source reads OFLY in yellow while it is on. Overfly is only available in F/T and is refused while a turn is in progress. It is also the trigger for an orbit adjust, below.

Orbits

An orbit is a loop inside the route that the aircraft flies a number of times - for example while a sensor collects over an area. You do not draw the loop; you build it into the file:



Enter the same position twice (here DP 3 and DP 8). With ORB set, the aircraft flies 3-4-5-6-7-8, goes back to DP 4 instead of DP 9, and leaves for DP 9 on the last lap.

1. In the ACTIVE file, enter the loop's start point twice: once where the loop begins and again where it ends, with the same latitude / longitude and the same turn radius (the "double DP").
2. Put the exit DP right after the second copy, and leave the DP after that blank.
3. Steering mode F/T, and set ORB (2 to 15) on the NAV DATA page, the UFCD HOM / NAV page or the BCDU NAV PRIM page. ORB then shows in green on the map top bar while the orbit is active, and counts down each lap. Entering 0 ends the orbit at the next end DP.

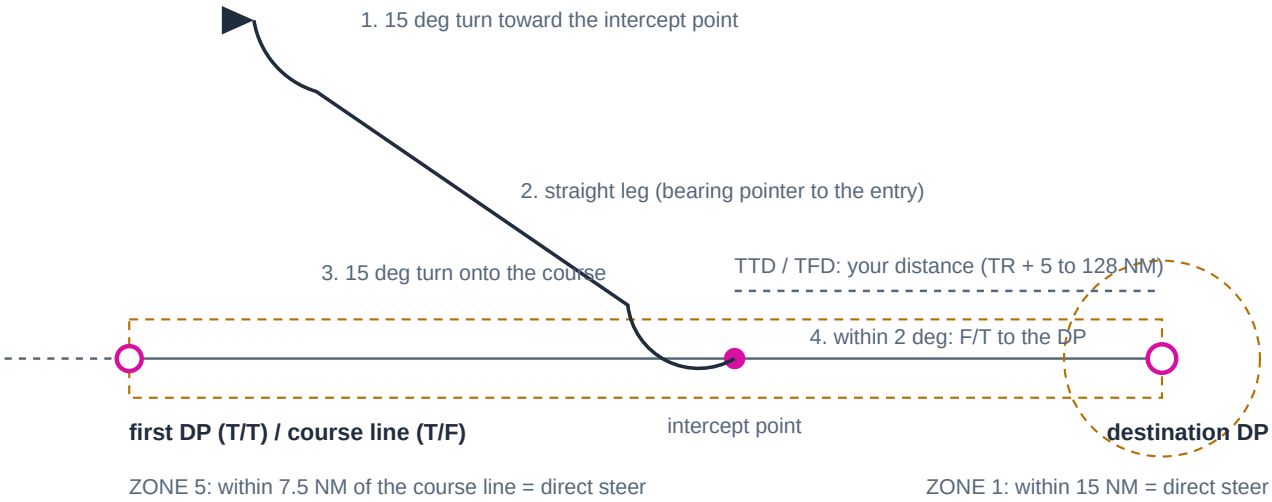
- ORBIT REJECT means the file has no usable double DP: no matching pair, the two copies with different turn radii, no exit DP after the second copy, no blank DP after the exit, or the loop crosses a hemisphere. Orbits only exist in F/T - in the other modes the ORB field is greyed out.
- Three of the shipped routes contain an orbit (DP 3 = DP 8): CROSS US (ACTIVE), DEBORAHA (STORE 2) and JOANR001 (STORE 4). Selecting a store file on the DPS page only shows it - use LOAD to make it ACTIVE.
- **Orbit adjust:** on a leg that has a parallel leg two turn radii away (± 2 NM), pressing OFLY arms an adjust and pressing it again turns the aircraft once onto that parallel leg - the way a real U-2 shifts its orbit sideways. The TO / FROM DPs change at the start of the turn.

T/T, T/F, TTD, TFD - Intercept Steering

These four modes bring you onto a chosen course into a DP - established on a track, not just pointed at a point - rather than flying the file in order. They differ in how the course is defined and in whether you choose where you join it.

Mode	You enter	Use it to...
T/T to / to	DP a / DP b	Join a leg of the route partway along, lined up on the a → b track, instead of going direct to b. Typical cases: after departure vectors, after a weather or ATC detour, or when a collection line has to be flown exactly on its planned track. A direct steer would get you to b on whatever inbound course the geometry gives you; T/T gets you established on the actual leg.
TTD	DP a / DP b / distance	Like T/T, but you choose how far before b you are established on the course. Use it when you need a set length of stable straight track before the point - so a sensor run starts settled, or to stay clear of airspace. The distance is limited to between TR + 5 NM and 128 NM.
T/F to / from	DP / inbound course	Arrive at a DP on a course that isn't a leg in the file. Examples: a gate or entry point that needs a set inbound heading, a target or bullseye run with a fixed look direction, or lining up with a runway course at an arrival fix. It needs no first DP.
TFD	DP / inbound course / distance	T/F plus your choice of how far out you're established on that course. The same distance limits as TTD apply.

Note
A limit that applies to all four: selecting any of them more than 400 NM from the destination DP just gives a direct steer.



How it is flown: a 15° turn toward the intercept point, a straight leg, a second 15° turn onto the inbound course, and as soon as the track is within 2° of the bearing to the destination the computer snaps a course to it and the mode becomes F/T to that DP.

It does the same if the track has already passed that bearing or the DP ends up inside the turn circle, so a missed intercept does not become a circle. Through both turns the bearing pointer, MILES, DTG and XTK are frozen at their entry values; on the straight leg the bearing pointer points at the entry to the intercept turn. TT shows the total time to the destination.

For T/T and T/F the intercept point depends on where you are ("zones"):

- Closer than **15 NM** to the destination (zone 1), or within **7.5 NM** of the inbound line (zone 5): the computer flies a **direct steer** to the DP instead and the NAV block shows it.
- Behind the destination, within 30° of the outbound course (zone 2): the intercept is placed TR + 5 NM before the DP.
- T/T only, beyond the first DP on the far side (zone 4): direct to the first DP, then along the line to the destination.
- Anywhere else (zone 3): a 30° intercept geometry, never further than 128 NM from the destination.
- More than **400 NM** away, or an entered distance over 128 NM: the computer defaults to a direct steer and NAV STEERING shows 400 MAX / 128 MAX.

EMER - Emergency Field

Selected with DIR STR on the UFCD EMER page, with DS on the EMER file of MFD NAV/DPS, or with the BCDU EMR key. The steering computer copies the EMER file over the ACTIVE file (the active file is then named EMER and your route is no longer in it), flies a direct steer to the chosen field and, once over it, holds a right-hand turn so you can set up an approach. You can still direct steer to another field of the file.

- **Leaving EMER:** the mode stays EMER until another file is loaded into ACTIVE - LOAD a store file on NAV/DPS (or on the BCDU TRACK ID page). Then select the steering mode and DPs you want. Keep your route in a store file if you want it back.
- **Not under autopilot NAV:** an emergency direct steer is refused while the autopilot is engaged in NAV mode on the INS steering. The UFCD DIR STR flashes and the NAV/DPS key reads ANAV. Leave autopilot NAV first (for example select HDG).

Entering a Steering Selection

Where	How
MFD NAV/DATA	L2 EDIT: the mode field first, then the DP / course / distance fields that belong to it, then ORB and OFLY. Defaults are filled in for you - second DP = TO + 1, course = present track, distance 50 NM. Values by INC/DEC or the UFCD pad.
UFCD NAV page	LS1 steps the mode candidate, ENT confirms it; LS2 holds the DPs / course / distance for that mode; LS4 overfly.
UFCD HOM page	The F/T line: TO DP and ORB.
MAP page	DS and OFLY.
MFD NAV/DPS	Direct steer: with the ACTIVE file shown, L3 DS, pick the DP with the right rocker (DP 00 = the alignment position), R1 YES. With the EMER file shown, L3 DS, pick the field with L1 / L2, R1 YES - an emergency direct steer. With the TP file shown, L3 DS, pick the TP with L1 / L2, R1 YES - see Targeting Points. While the autopilot flies NAV the key reads ANAV and does nothing.
MFD NAV/RPLAN	L4 LN and L3 / L4 pick a line, R6 EXEC, R6 YES: a direct steer to that line's DP, then the legs as planned - including reverse, out-of-sequence and direct-steer steps built with PLAN - to the END point, then a direct steer to the next DP of the file (or the right-hand turn if there is none). When the plan ends, or another steering entry or a new ACTIVE file ends it, RPLAN DISABLE shows. Not available while EMER is the active file.
UFCD EMER page	LS4 DIR STR, ENT: emergency direct steer (see EMER above).
BCDU (AVP off)	NAV-2 → BRG/RNG >DR STR DP (direct steer to an active-file DP); NAV PRIM steering-mode key L5 (↑ ↓ pick the mode, type the DPs, ENT), OVFLY< and ORBITS<; the EMR key for an emergency direct steer.

> Caution
> The steering computer needs the INS in NAV. Without it the PFD NAV block is hidden, MILES shows ---- and the autopilot refuses NAV mode. If the autopilot is in NAV and the INS drops out, the autopilot falls back to heading hold.

What the Displays Show

- **PFD NAV block:** mode and DPs, e.g. F/T 12/13, T/T 02/03, T/F 02/270, TFD 02/270/050; the bearing and range to the TO DP; TTG; and TT.
- **PFD steering source:** NAV, or OFLY while overflying.
- **Map:** magenta legs on the great circle and curved turns, the next DP in green, a cyan direct-steer line, a yellow overfly line, and ORB in the top bar while orbiting.
- **NAV DATA:** the STEERING DATA block with the steering status message in magenta (128 MAX, 400 MAX, ZONE 1, ZONE 5, OVERSHOOT TURN), DTG / TTG to the turn point, XTK.
- **Alerts:** NAV STEERING (128 MAX, 400 MAX, zone 1, zone 5, overshoot turn) and ORBIT REJECT.

Related pages: Inertial Navigation System (INS) · Navigation Pages (NAV) · Up-Front Control Display (UFCD) · AFCS System (Autopilot) · Targeting Points

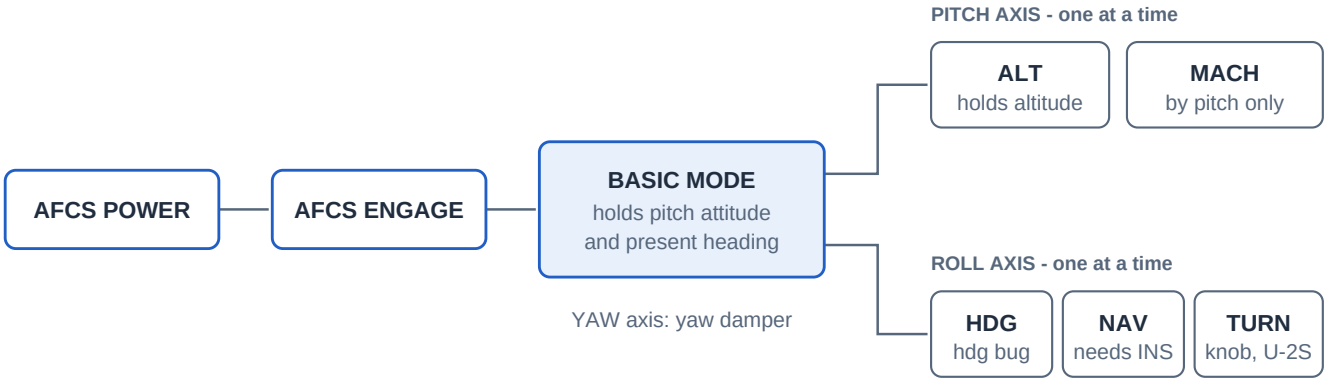
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Miltech Simulations U-2

AFCS System (Autopilot)

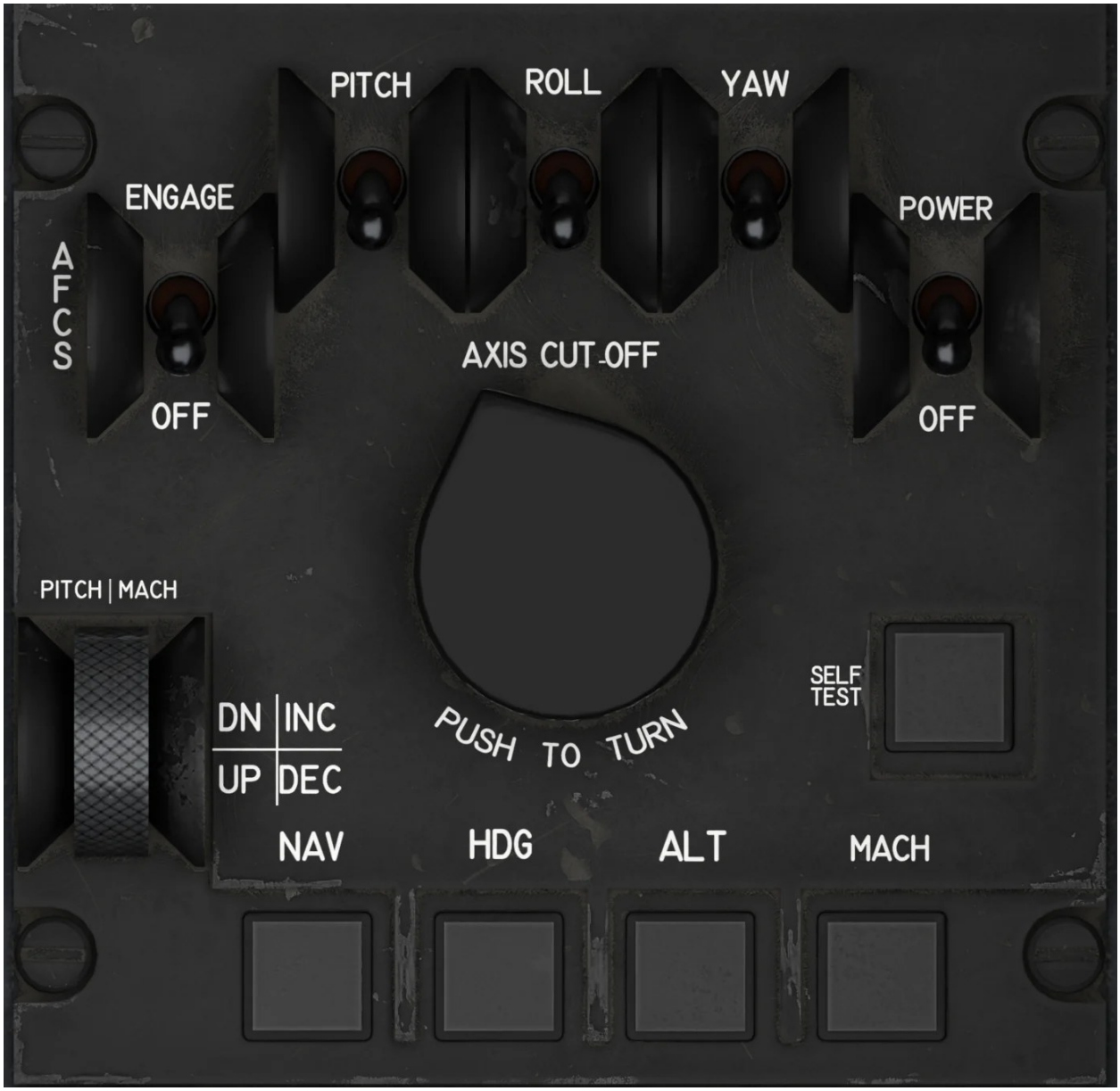
Miltech Simulations U-2 features a three-axis Automatic Flight Control System (AFCS), designed to alleviate the load on the pilot during the long high-altitude cruise. The system holds attitude, heading, altitude or Mach number and can follow your navigation source. It never touches the throttle - thrust is always yours.

Note
Sim values. Performance values are measured in the sim. They may not accurately represent (nor do they intend to accurately represent) the performance of the real aircraft.



AFCS mode map. Pressing a lit mode button returns that axis to the basic mode.

The AFCS Panel



AFCS panel on the right console. The ROLL RATE, PITCH RATE, MACH/ALT and YAW BAL knobs are on the right side wall (see Electrical and Avionics Power).

1. **AFCS PITCH** - ON / OFF. Pitch axis cut-off. With AFCS POWER on, any axis OFF lights AUTOPILOT. A trip leaves it ON; cycle it OFF and ON again to reset the axis.
2. **AFCS ROLL** - ON / OFF. Roll axis cut-off; pitch hold stays with it OFF. A trip leaves it ON; cycle it OFF and ON again to reset the axis.
3. **AFCS YAW** - ON / OFF. Yaw axis (yaw damper) cut-off. A trip leaves it ON; cycle it OFF and ON again to reset the axis. All three axis switches are ON on a runway or air start and OFF after a Cold and Dark start.
4. **AFCS ENGAGE** - ENGAGED / OFF. Engages the autopilot, like your autopilot master key; drops back if it cannot (the tooltip says why). Needs INS attitude.
5. **AFCS POWER** - ON / OFF. Powers the autopilot; needs AC power (generator or ground power) and the essential DC bus, so ESS DC SHED drops it too. Switching it OFF disconnects the autopilot. It is OFF after a Cold and Dark start (hangar or apron) and ON on runway, taxi and air starts.

6. **PUSH TO TURN** - Turn for 5° of bank per click, 40° max, cancelling HDG or NAV. Back to centre, the autopilot rolls out and holds that heading.
7. **PITCH MACH** - Adjusts what the pitch axis holds: 0.001 Mach in MACH, 100 ft in ALT, or ¼° of pitch in basic hold, per click.
8. **AFCS SELF TEST** - Lamp test: hold it on the ground with AFCS power on and the ALT, HDG, MACH, NAV and SELF TEST lamps light. The autopilot's built-in test is not simulated.
9. **AFCS NAV MODE** - Tracks the source chosen on the PFD: INS steering (INS in NAV), TACAN / VOR course or ILS localizer. Refused without a valid source.
10. **AFCS HDG MODE** - Follows the heading bug on the PFD. Lit while active; press again to cancel. Not together with NAV.
11. **AFCS ALT MODE** - Holds the altitude at the press; the PITCH MACH wheel changes it 100 ft per click. Lit while active; press again to cancel.
12. **AFCS MACH MODE** - Holds the Mach number at the press, by pitch only; the PITCH MACH wheel changes it 0.001 per click. Not together with ALT.

Control	Function
YAW BAL knob	Rudder trim, 0 to 10 with 5 = neutral, up to 2° either way: 0.2° for each half step of the knob, and the trim follows at 0.5° a second. Works only while the autopilot and yaw axis are engaged; with them off the trim runs back to neutral.
ROLL RATE, PITCH RATE, MACH/ALT knobs	Force setting, 0 to 10. **5 is the norm.** Above 5 the autopilot is sharper, below 5 softer and slower. ROLL RATE sets how fast it rolls and how hard it steers for a heading or the NAV steering, PITCH RATE how hard it moves the pitch, and MACH/ALT the climb rate in ALT and the pitch range in MACH. Low rate settings (1-3) or high MACH/ALT settings (7-10) can bring a gentle oscillation; in turbulence the real procedure is MACH/ALT towards 3 and PITCH RATE towards 7.
AUTOPILOT DISCONNECT (yoke)	Disconnects the autopilot. A keybind or hardware disconnect shows the button pressing too.

Tip
Your normal MSFS **Autopilot master** key or hardware button does exactly the same as the ENGAGE switch, and the cockpit switch follows it. It also ends a ground engagement.

Engaging

1. AFCS POWER on (the aircraft needs AC power - engine generator running, or external power on the ground).
2. Check PITCH, ROLL and YAW switches are ON (they are OFF after a Cold and Dark start).
3. Fly the aircraft to a stable attitude, then AFCS ENGAGE. The INS must be supplying attitude (aligned, or 30 seconds into an alignment).With no mode selected the autopilot holds the pitch attitude and heading you had at that moment, and switches the yaw damper on.

Modes

Mode	What it holds	Details
Basic (no lamp)	Pitch attitude and present heading	Pitch limited to ±20°. HDG and NAV turns are limited to 15° of bank (up to 25° in a NAV turn forced tighter between close DPs, see Navigation System); the PUSH TO TURN knob goes to 40°.
ALT	Altitude	Holds the altitude at the moment you press ALT, and aims to stay within 10 ft of it. To change it, turn the PITCH MACH wheel (100 ft per click), use your sim altitude keys, or set the PFD altitude bug and close its field with R1 - the autopilot climbs or descends at up to 900 ft/min (the MACH/ALT knob scales this) and levels without overshoot. **Hold your speed with the throttle**: the autopilot only pitches, and if the speed falls towards the stall it stops at 87 % of the stall angle and lowers the nose rather than hold the altitude. **Don't engage ALT at high altitude while the aircraft is heavy, or with the speed no more than 10 KIAS above the stall** - a caution of the real procedure (11.10.2.7).
MACH	Mach number, by pitching up or down	Holds the Mach number at the moment you press MACH, and aims to stay within .001 of it; the wheel changes it by 0.001 per click. From 60,000 ft up (fading in from 50,000 ft) it is extra careful: it pitches gently and slowly, within about 1° of trim, and lets small Mach errors ride, opening up again only past about .006 - so a gust cannot pull the nose far, and a .010 change on the wheel takes about 3 minutes up there. Below that it pitches more, up to three times as much by 40,000 ft, because holding the Mach takes it there. From 50,000 ft up (fully from 60,000 ft) it also opens up when the speed itself runs away, as in a descent from the cruise with the throttle back and the drag out: once the Mach is more than .006 off it pitches up to twice as far and trims three times as fast, until the Mach is back within .002. **You set the thrust**; the autopilot climbs or descends to keep the Mach. Near the stall it will not hold the nose up: it stops at 87 % of the stall angle and lets the Mach run above your selection to keep that margin. ALT and MACH cannot be on together.
HDG	The heading selected on the PFD	Follows the heading bug live, set on the PFD or with your sim heading keys. From 40,000 ft up (fully from 50,000 ft), where the bank hold answers slowly in the thin air, HDG and NAV steer on a smoothed bank so they don't rock the wings. HDG and NAV cannot be on together. The heading comes through the AVP: with the MFDs down HDG will not come on, and drops to heading hold. ALT and MACH need valid air data in the same way (no IAS or ALT flag): without it they drop to pitch hold.
NAV	Track to the selected navigation source	See "NAV mode" below.

PITCH MACH Wheel

- In MACH: 0.001 Mach per click.
- In ALT: 100 ft per click.
- In basic pitch hold: ¼° of pitch per click.
- Your sim keys work too. With ALT on, the autopilot altitude keys move the held altitude, 100 ft a press from the altitude held, not from the bug. With MACH on, the autopilot speed and Mach keys move the held Mach, 0.001 a press.

PUSH TO TURN Knob

Each click commands 5° of bank, up to 40° at eight clicks. HDG and NAV keep their own limits, 15° (25° in a forced tight NAV turn). Turning the knob away from center cancels HDG or NAV and the aircraft holds that bank. Return the knob to center and the autopilot rolls out and holds the heading it has as the bank comes back through 15°.

NAV Mode and the Navigation Source

What NAV follows is chosen on the PFD side keys:

PFD key	Source	NAV mode behavior
L4 NAV	INS steering computer	Flies the ACTIVE destination point file - legs, turns, direct steers and orbits - along the path the map draws. **Requires an aligned INS.** If the INS is not in NAV, the mode is refused and the autopilot stays in heading hold; if the INS drops out in flight, the autopilot falls back to heading hold.
L5 TAC	TACAN / VOR (NAV 1)	Tracks the selected course. With the TACAN switched off (TACAN knob on the audio panel at its stop) NAV is refused and the roll axis stays in basic heading hold.
L6 ILS	ILS localizer (NAV 1)	Tracks the localizer only. There is no glideslope capture - fly the descent yourself.
R4 ADF	ADF	Bearing only - NAV mode is not available.

Pitch Trim

Our rendition moves the stabilizer the way the trim motor does: about 1° every 3 seconds, from 3.5° nose up to 1.5° nose down - roughly 15 seconds from stop to stop. The PFD trim scale runs a little further than that, to 3.8° and -1.8°, so with the stabilizer at a stop its tab does not quite reach the end.

The autopilot pitches through the trim, and while it flies pitch it may run the trim past these stops. In AUTO the stabilizer follows as far as its travel goes; in MANUAL it stays where you left it. After a disconnect the trim runs back to the stabilizer at the same 1° every 3 seconds, so it comes back inside the stops with no step in pitch.

The trim needs three things. With any of them missing the stabilizer stays where it is, autopilot trim included:

- DC power (essential DC bus). ESS DC SHED takes it away.
- MANUAL TRIM POWER ON - the slide switch on the yoke. It is ON at every start; OFF also stops the aileron trim.
- Hydraulic pressure - with the engine stopped the trim does not move.

Control	What it does
Yoke PITCH TRIM switch	Hold left click for nose down, right click for nose up; each mouse-wheel notch gives a short burst. Spring-loaded to off.
Your trim keys and trim wheel	Act as the yoke switch, with the same rate and the same rules. A trim wheel axis drives the stabilizer towards the matching position at the motor rate. The yoke switch moves when you use them.

Control	What it does
PITCH TRIM AUTO / MANUAL (right console)	AUTO with the autopilot engaged in pitch: the autopilot trims, and your switch, keys and wheel are locked out. MANUAL, or AUTO without the pitch axis engaged: only you trim. With the autopilot engaged in pitch its servo then holds the elevator and the PITCH sync indicator shows the out-of-trim force. Whenever the autopilot is engaged without auto trim (MANUAL, pitch axis off, or auto trim failed) the MFD shows AUTOPILOT MAN TRIM.

Leave the switch in AUTO for autopilot flight.

ROLL and PITCH Sync Indicators

The two bars beside the SFD show the force the autopilot servos are holding. They stay centered with the autopilot off or without AFCS power. With the autopilot engaged they move with the load on the pitch and roll servos - a PITCH bar that stays off center in MANUAL trim means trim until it is centered again. During the ground preflight check they show the commanded control stroke instead.

What You See on the PFD

- AP in a box - autopilot engaged.
- HDG or NAV to its left - active lateral mode (blank in basic heading hold).
- To its right - the held value: Mach as .720M, or the held altitude as a flight level, e.g. FL650 for 65,000 ft.
- Far left - the INS status letter (see the INS chapter).

Automatic Disconnects

In flight, the AFCS watches each axis and cuts it out if the aircraft is being thrown around more than the autopilot should allow:

Axis	Trips when...	MFD message
Pitch	Pitch is more than 15° away from the target, or pitching faster than 4.4°/s	PITCH DISC
Roll	Bank exceeds 45°, or a fast roll beyond 25° bank	ROLL DISC
Yaw	Yawing faster than 8°/s	YAW DISC
All three	Moderate turbulence above 60,000 ft, lasting 8 seconds	PITCH DISC, ROLL DISC, YAW DISC

The rate limits leave out the rate a steady turn gives by itself, so a 40° knob turn does not trip them. If all axes are lost the autopilot disconnects. **A trip leaves that axis switch ON: cycle it OFF and ON again to reset the axis.** After a disconnect the DISC advisory of every disengaged axis stays on the MFD until the autopilot is engaged again.

Related pages: Flying the U-2S · Navigation System (INS Steering) · Keybinds Guide

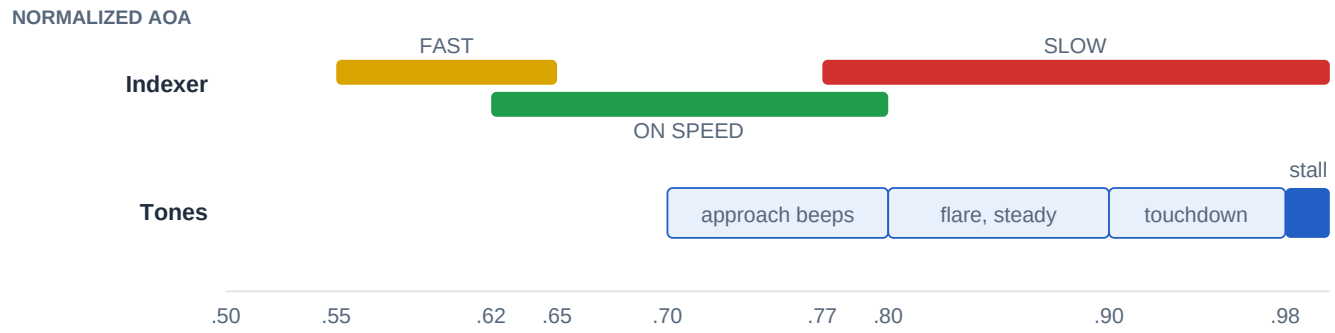
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Miltech Simulations U-2

Angle of Attack (AOA)

The U-2 is landed by angle of attack, not by airspeed. Our rendition of the U-2S gives you three AOA cues: a gauge on the PFD, a three-light indexer on the glare shield, and audio tones in your headset.

Note
Sim values. Performance values are measured in the sim. They may not accurately represent (nor do they intend to accurately represent) the performance of the real aircraft.



Where the bars overlap, two indexer symbols are lit together. 1.00 = stall.

What the Number Means

The aircraft does not show AOA in degrees. It shows **normalized AOA**: how much of the wing's available lift you are currently using. .50 means half, 1.00 means the wing is stalled. Because flaps and spoilers change how much lift is available, the number already accounts for them - .70 is the right approach AOA whatever your weight or configuration.

PFD AOA Gauge

A vertical tape beside the attitude display, numbered 1 to 9 (= .10 to .90), with a digital readout such as .70.

- White wide tick at **.45** - best range.
- White triangle at **.60** - maximum endurance.
- A color strip appears once AOA rises above .50: **yellow** .55 - .65, **green** .65 - .80, **red** above .80. The indexer lamps follow these bands.

Standby AOA Gauge

A round AOA gauge at the lower left of the main panel repeats the normalized AOA with a needle. It works whenever the AOA system has power, gear up or down.



The standby AOA gauge sits on the lights panel, beside the PANEL, UFCD/SFD and INSTRUMENT light knobs.

1. **PANEL LIGHTS** - Dims the panel and switch legend lighting and the console glow. Fully anticlockwise is off; runs on essential AC, so it goes out when both AC generators are lost.
2. **STANDBY AOA** - Repeats the normalized AOA with a needle, independent of the PFD. Works whenever the AOA system has power, gear up or down.
3. **UFCD/SFD LIGHTS** - Brightness of the UFCD and SFD displays.
4. **INSTRUMENTS LIGHTS** - Dims the instrument lighting: standby engine and AOA gauges, oxygen gauges, gear indicators. Fully anticlockwise is off; runs on emergency AC, so the emergency inverter keeps it after the generators are lost (EMER INV in NORM).

Spotlights. One on each side console. Scroll on the lamp to turn its knob: off, then 10 to 100 % in 10 % steps. Hold a click on it for full brightness while you hold it (the full-bright button), whatever the knob says. They run on the essential DC bus: in a flameout they and the instrument lights are what is left.

Glare-Shield Indexer



Three symbols stacked vertically, exactly where you look during the flare.

Normalized AOA	Lit symbols	You are...	Do this
below .55	- (dark)	well above approach speed	-
.55 - .62	▲ yellow	fast	Slow down / raise the nose
.62 - .65	▲ yellow + ● green	slightly fast	Small correction
.65 - .77	● green	on speed	Hold it
.77 - .80	● green + ▼ red	slightly slow	Small correction
above .80	▼ red	slow	Lower the nose / add power

Note
Gear up or down The indexer follows the AOA whatever the landing gear position. It is dark below .55 AOA, so at high speed seeing nothing is normal. On the ground the AOA reads about .65 at the two-point attitude, so the green donut, or yellow and green, is normally lit on the ramp. It needs DC power (essential or monitored DC); MASTER LIGHT TEST lights all three symbols.

AOA Tones

As you slow through the approach and into the flare, the tone in your headset changes. This lets you keep your eyes outside during the landing.

Normalized AOA	Tone	Sound
.70 - .80	Approach	Low (300 Hz) beeps, 1 per second speeding up to 3 per second
.80 - .90	Flare	Steady mid (500 Hz) tone
.90 - .98	Touchdown	Higher (700 Hz) beeps, 3 per second speeding up to 6 per second
above .98	Stall	High (1450 Hz) tone

- Tones work with the gear up or down.
- At landing speeds the AOA scale goes with the aircraft's weight, so the tones come at the right speeds for your weight. With flaps 35 at 1 g, T-speed reads about .80 where the steady flare tone starts, the touchdown beeps start about 4 kt below T and the stall tone about 7 kt below T, just before touchdown. The wing itself stalls under a knot later.
- Close to the runway the gauge reads the same way, by speed. The ground effect lets the wing fly several knots below the stall tone, so in the flare you will often hold her off in the stall tone before she settles.
- High up the gauge reads low in the cruise (it corrects for Mach), but close to the stall it follows the angle of attack: the chevron and the tones come before the stall as they do low down, and above 45,000 ft any tone is a stall warning - see High-Altitude Handling.
- They are muted on the ground. They become active 3 seconds after lift-off and stop 3 seconds after touchdown.
- During a long steady tone you may hear a very short gap roughly every 18 seconds. That is normal.

Note
The AOA knob on the left-console volume panel silences the approach tones at its stop; the stall tone stays. If you hear no tones at all, check that knob and MASTER VOL, then run the self-test below.

Power

The AOA system works whenever the aircraft has normal DC power (either of its two supplies is enough). Without electrical power the indexer is dark and the tones are silent.

Self-Test (on the Ground)

1. Make sure the aircraft has electrical power.

2. Press and **hold** the MASTER LIGHT TEST button for more than 3 seconds.All three indexer symbols light as soon as you press.
3. Keep holding: six tones play one after the other - two approach tones, the flare tone, two touchdown tones and the stall tone - 1.5 seconds each, repeating until you let go.

Stall Strips

With the EFB option **Cockpit handle** on *Parking brake* (the default) the wing's stall strips move by themselves: **out** at 24° of flap or more, **in** below 20°. On *Stall strip* they follow the handle right of the main panel and nothing else: pull it for **out**, push it for **in**.

They do not change the stall speed. With both out the wings stall alike; with them in a wing may drop at the stall, more with the flaps out, when heavy or slipping (Stall Recovery). If only one comes out, its wing stalls first and drops: on the *Stall strip* option push the handle in so both are in.

STALL STRIP IN / STALL STRIP OUT advise when the strips do not match the gear handle position (gear down with strips in, or gear up with strips out above 18,000 ft).

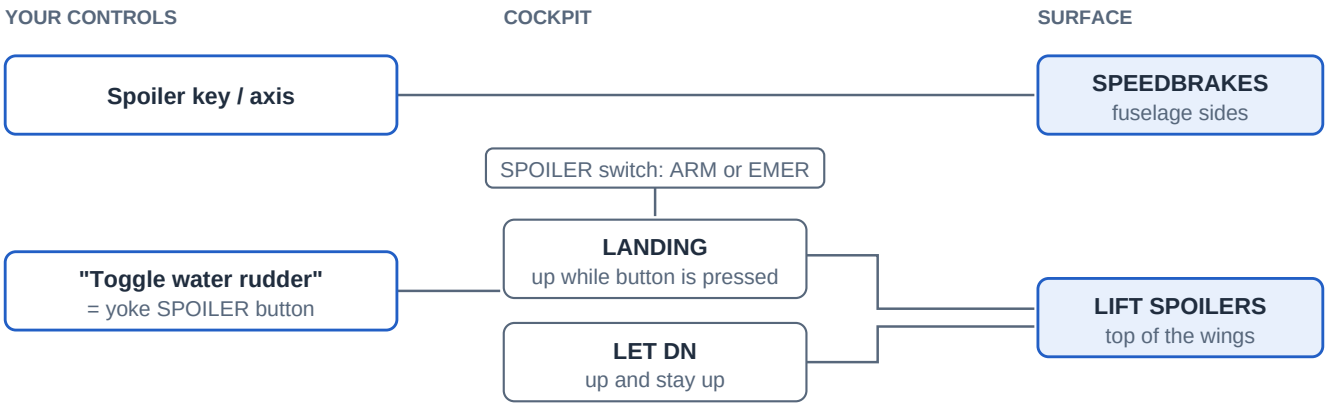
Related pages: U2 101 - The Basics · Flying the U-2S · Landing · Specifications and Limitations

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Miltech Simulations U-2

Speedbrakes and Lift Spoilers

The U-2 has two separate drag devices, and our rendition models them separately. Your normal spoiler key moves only one of them - read this page before your first landing.



Two controls, two surfaces. The lift spoilers need the SPOILER switch in ARM (hydraulic pressure) or EMER (accumulator).

Speedbrakes

The panels on the **sides of the fuselage**. Moved by your normal MSFS spoiler key or axis. Used to slow down and descend. Out, they raise the nose a little, most of it near full travel.



Speedbrake fully out on the left side of the aft fuselage.

1. **Speed brake (open)**

2. **Speed brake actuator**
3. **Tail gear**
4. **Main gear**

Lift Spoilers

The panels on **top of the wings**. Moved by the cockpit SPOILER switches and the yoke SPOILER button. They kill lift - used on descent and to make the aircraft stay on the runway after touchdown.



Lift spoiler up on the left wing; the roll spoiler beside it stays down.

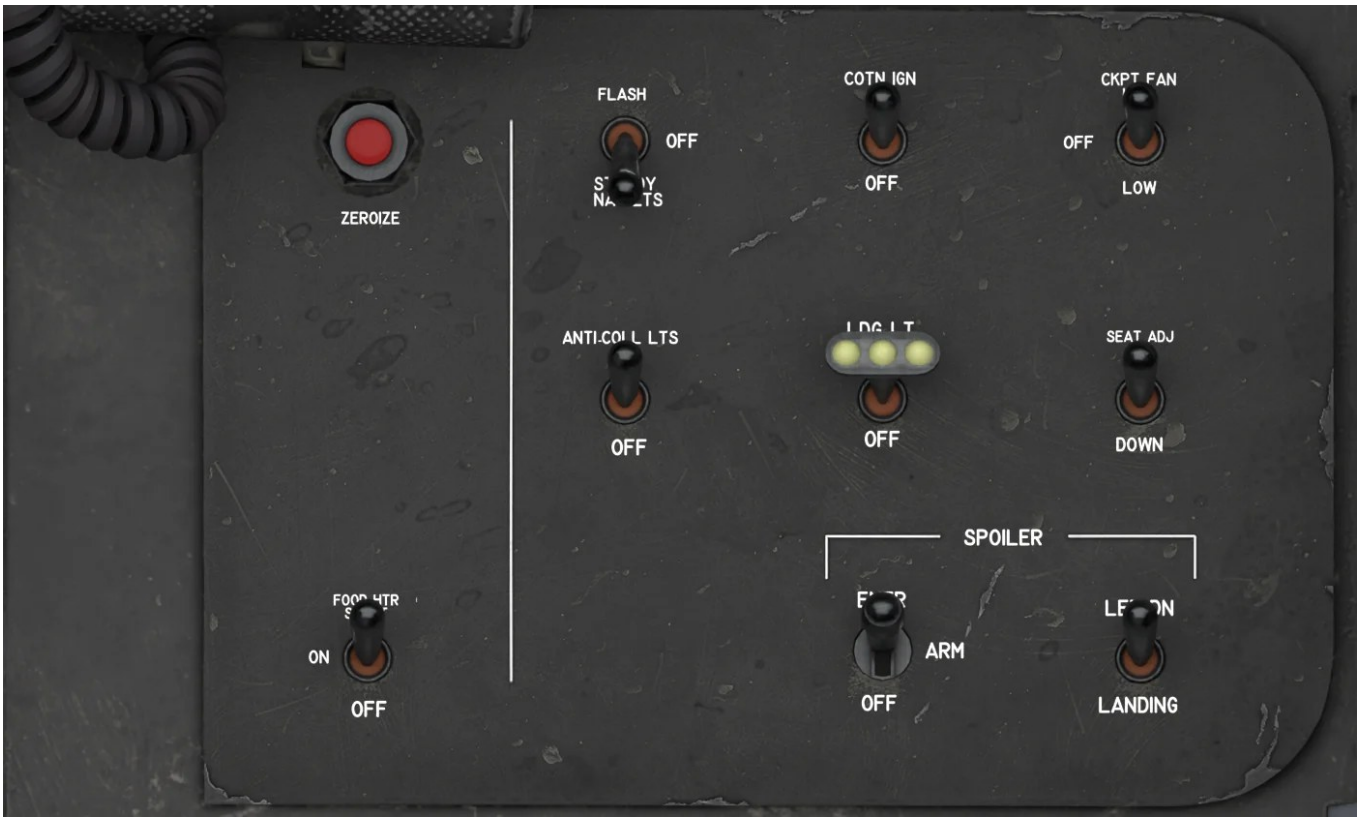
1. **Lift spoiler (up)**
2. **Roll spoiler (stowed)**
3. **Flap (up)**
4. **Superpod**
5. **Pogo**

Each device gives half of the total available drag; with both out you have all of it. Speedbrakes take about 5 seconds for full travel either way; lift spoilers take about 0.2 seconds, up or down. The roll spoilers on the outer wings work by themselves with the ailerons: turn the yoke past 38° (about a third of its 120° travel) and the one on the low wing pops all the way up as the aileron gets there, like a switch, in about a quarter of a second, for more roll rate and some drag on that wing; it goes down again with the aileron, in 0.2 seconds.

With GUST CONTROL UP the yoke stops at 77° and the roll spoiler comes at the same 38°. With the speedbrakes or lift spoilers out, a roll spoiler that pops also takes their drag off the other wing while it is up, because the simulator runs them all on one spoiler surface (the panels you see do not show it).

Raising the lift spoilers lifts the nose a little (light to moderate), as full speedbrakes do. Up high, turning close to the buffet, the stowed roll and lift spoiler panels float up a little and add to the shake.

Cockpit Controls



Left side wall: the SPOILER switch (OFF / ARM / EMER) and the LANDING / LET DN switch at the lower right. The exterior light switches on this panel are on the Lights page.

1. **ZEROIZE** - Hold 3 s with the AVP up: erases the DP files, fixes, COM presets, IFF codes and squawk, and resets the INS.
2. **CONTINUOUS IGNITION** - ON / OFF. Keeps the engine igniters on continuously; OFF leaves ignition automatic. ON for takeoff, OFF after landing.
3. **COCKPIT FAN** - HIGH / OFF / LOW (up / center / down). Mixes the cockpit air: faster temperature changes, and it helps clear canopy fog.
4. **SEAT ADJ** - UP / OFF / DOWN. Hold left click to raise, right click to lower your eye point; springs back to OFF. Needs monitored DC.
5. **FOOD HEATER** - OFF / ON / START. START, which springs back to ON, heats a Dragon Food tube; FOOD READY shows when it is hot. OFF resets it.
6. **SPOILER** - OFF / ARM / EMER. Lift spoiler power: ARM main hydraulics (normal flight), EMER the accumulator (takeoff, hydraulic failure). OFF retracts them.
7. **LANDING SPOILERS** - LANDING / LET DN. LET DN raises the lift spoilers and keeps them up; LANDING raises them only while the SPOILER button is pressed.

The NAV LIGHTS, ANTI-COLLISION LIGHTS and LANDING LIGHT switches on this panel are on the Lights page.

SPOILER Switch - OFF / ARM / EMER

Position	What it does
OFF	Lift spoilers retract and cannot be deployed.
ARM	Normal position for flight. Lift spoilers are powered by the main hydraulic system. They need hydraulic pressure: nothing below 500 psi, full travel from 1500 psi.
EMER	For take-off (see Checklists) and after a hydraulic failure. Lift spoilers run from a stored-pressure accumulator, which is good for roughly 3 deployments; the ISS pump refills one deployment in about 4 seconds. A partly used accumulator gives only partial deployment.

The lift spoilers also need DC electrical power. If power is lost they retract.

> Note
> When you move the switch from OFF to ARM (or EMER) with pressure available, the lift spoilers twitch up briefly and settle again.

Landing Spoilers Switch - LANDING / LET DN

Position	What it does
LANDING	Lift spoilers come up only while the SPOILER button is pressed (see below).
LET DN	"Let-down" = descent. Lift spoilers deploy and **stay** up until you return the switch to LANDING.

SPEED BRAKE Switch (Throttle)

Three positions, IN / OFF / OUT, spring-loaded to OFF. Hold left click for OUT, right click for IN: the speedbrakes move while you hold it and stop where they are when you let go. Each mouse-wheel notch gives a quarter of a second of travel, up to the full 5 seconds queued.

Your spoiler key and axis keep working as well, and the switch shows OUT or IN while they drive the brakes.

SPOILER Buttons (Yoke and Throttle)

Hold a SPOILER button and the lift spoilers stay up while you hold it. A quick click (shorter than about a third of a second) latches them up; click again and they retract. Selecting LET DN or OFF clears the latch. It only works with the SPOILER switch in ARM or EMER *and* the other switch in LANDING.

Setting Up Your Controls

MSFS control	What it does in the U-2
Spoilers toggle / extend / retract / spoiler axis	**Speedbrakes only.** The axis is proportional.
Toggle water rudder recommended	The yoke SPOILER button (lift spoilers). One press = one click.
Arm auto-spoilers (toggle)	Same as above - one click of the SPOILER button.
Arm auto-spoilers ON / OFF	SPOILER button press / release - useful for a true "hold" button.

1. In MSFS open **Settings → Controls** and pick your joystick or keyboard.

2. Search for **water rudder** and assign a button to **Toggle water rudder**.The U-2 has no water rudder, so the add-on borrows this control.
3. Press once to deploy the lift spoilers, press again to retract. If you would rather hold the button, set the binding to fire on both press and release.

How to Use Them

Descent

1. SPOILER switch ARM.
2. Landing spoilers switch to LET DN - the lift spoilers rise and stay up.
3. Add speedbrakes with your normal spoiler key if you need more drag.
4. Before the approach, return the switch to LANDING and retract the speedbrakes as needed.

Landing

1. SPOILER switch ARM, other switch LANDING.
2. At touchdown press your ▣ **SPOILER button** binding. The wing stops flying and the aircraft stays down.There is no automatic deployment on touchdown - it is always your press.
3. Press again to retract once you have slowed.

Things to Know

- **Blow-down:** above 105 knots the airflow pushes the lift spoilers partly down. At 150 knots you get about half deflection, at 210 knots about a quarter. One wing's panels, picked per flight, give a little more than the other's: with the lift spoilers up above about 100 KIAS the aircraft drifts slowly in roll toward the other wing, and the drift stops when they come in. Check for it before you trim a roll out.
- **Stall:** lift spoilers up raise the stall speed about 2 kt, and the AOA tones and the stall tape move with it. The speedbrakes do not move the stall.
- SPOILER NOT DOWN appears if the lift spoilers stay up more than 5 seconds after you commanded them down.
- The speedbrakes need hydraulic pressure and DC power too: below 500 psi they do not move (full speed from 1,500 psi), and without pressure or power the airflow slowly pushes open speedbrakes closed in flight.

Gust Control

The GUST CONTROL switch (FAIRED / UP) is the U-2's way of unloading the wing in turbulence. In UP the switch moves both surfaces by itself in 3 - 4 seconds: the flaps go 6.25° up on hydraulic pressure (the PFD flap symbol shows them 6° up and the number under it reads -7) and the ailerons 7.5° up on electric power.

The nose pitches up a little as they go, and down again when you go back to FAIRED - trim it out: in UP the stabilizer keeps her trimmed all the way to the 241 KIAS red line. From about 150 KIAS the change is hardly noticeable.

While it is UP the flap lever stays at OFF and does nothing, and a flap key or axis is taken straight back to the gust position. The cockpit yoke stops at ±77° instead of ±120° at low speed, so the ailerons have less travel there.

From about 125 KIAS your strength runs out before the wheel gets to the stop, so the roll is the same as faired: about 15°/s at 160 KIAS and 10°/s at 210. The roll spoilers still pop at 38° of wheel. Without hydraulic

pressure the flaps stay where they are.

A surface that has not got there 7 seconds after the switch moved lights CONFIG with FLAP GUST MISMATCH (the flaps, either way) or AIL GUST MISMATCH. The speed limit also changes - 241 KIAS with gust control UP against 181 faired below 43,000 ft, but only with both surfaces up; from 43,000 to 49,499 ft it is 181 KIAS either way (see the red band on the SFD and PFD). Fly with it UP in rough air at low level, FAIRED for take-off and landing with flaps.

Related pages: Lights · Keybinds Guide · Landing · Flying the U-2S

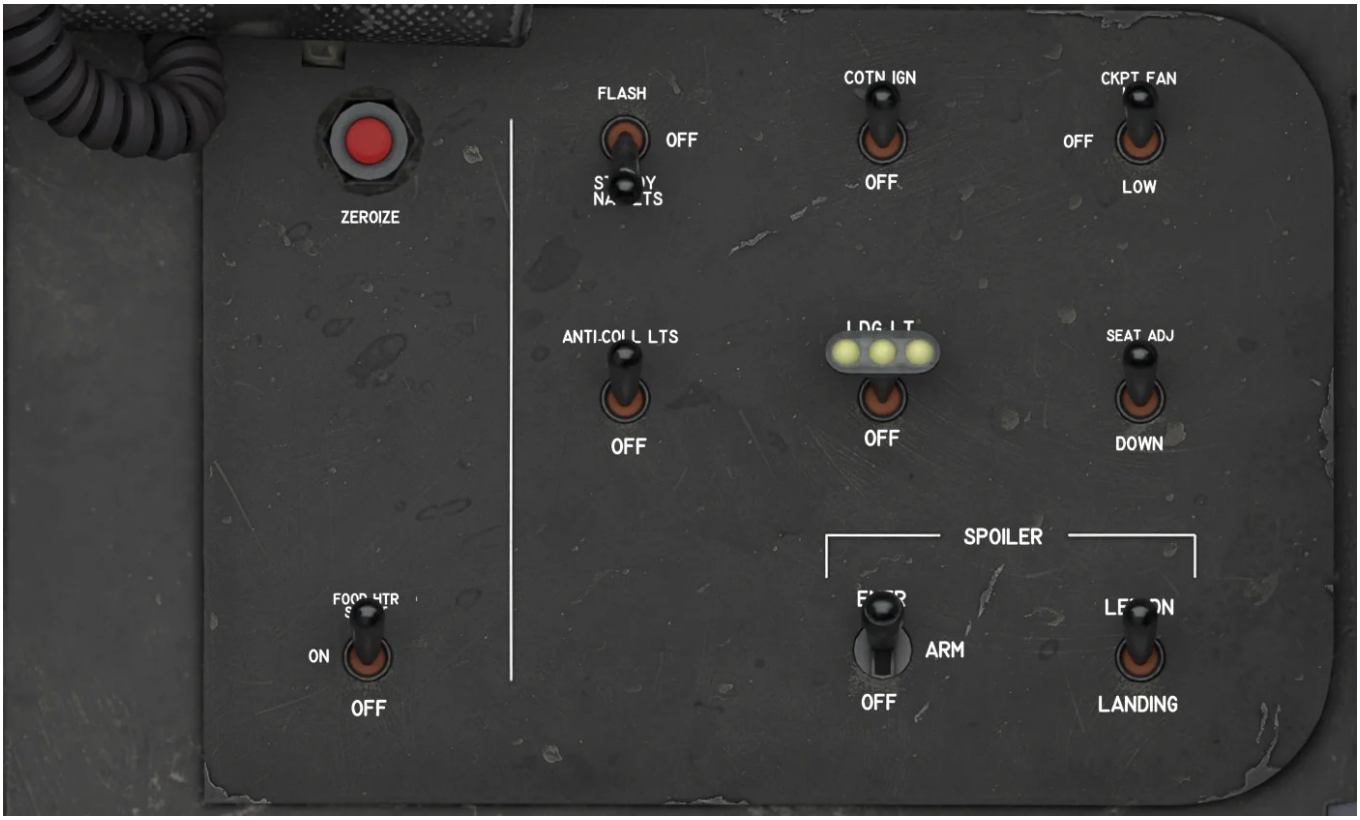
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Miltech Simulations U-2

Lights

The exterior light switches are on the Lights and Spoiler panel, on the left side wall. The cockpit light knobs are on a different panel, the Lights panel.

Exterior Light Switches



Lights and Spoiler panel, left side wall: the three exterior light switches.

1. **NAV LIGHTS** - FLASH / OFF / STEADY. Navigation lights; they need monitored DC power.
2. **ANTI-COLLISION LIGHTS** - ON / OFF. Anti-collision (beacon) lights.
3. **LANDING LIGHT** - ON / OFF. Landing light; it only lights with the gear down.

Key Bindings

Two MSFS bindings move the cockpit switches. For all bindings, see the Keybinds Guide.

Light	MSFS binding	Effect
Landing light	TOGGLE LANDING LIGHTS	Moves the LANDING LIGHT switch.
Navigation lights	TOGGLE NAV LIGHTS	Moves the NAV LIGHTS switch.

Cockpit Lights

The PANEL, UFCD-SFD and INSTRUMENT light knobs and their circuit breakers are on the Lights panel, with the standby AOA gauge. See Overview - Cockpit for its location.

MASTER LIGHT TEST is a lamp test for the warning lamps, not a light switch. See Warnings and Alerts.

Related pages: Speedbrakes and Lift Spoilers · Electrical and Avionics Power · Keybinds Guide · Overview - Cockpit

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Miltech Simulations U-2

Landing Gear, Brakes and Ground Handling

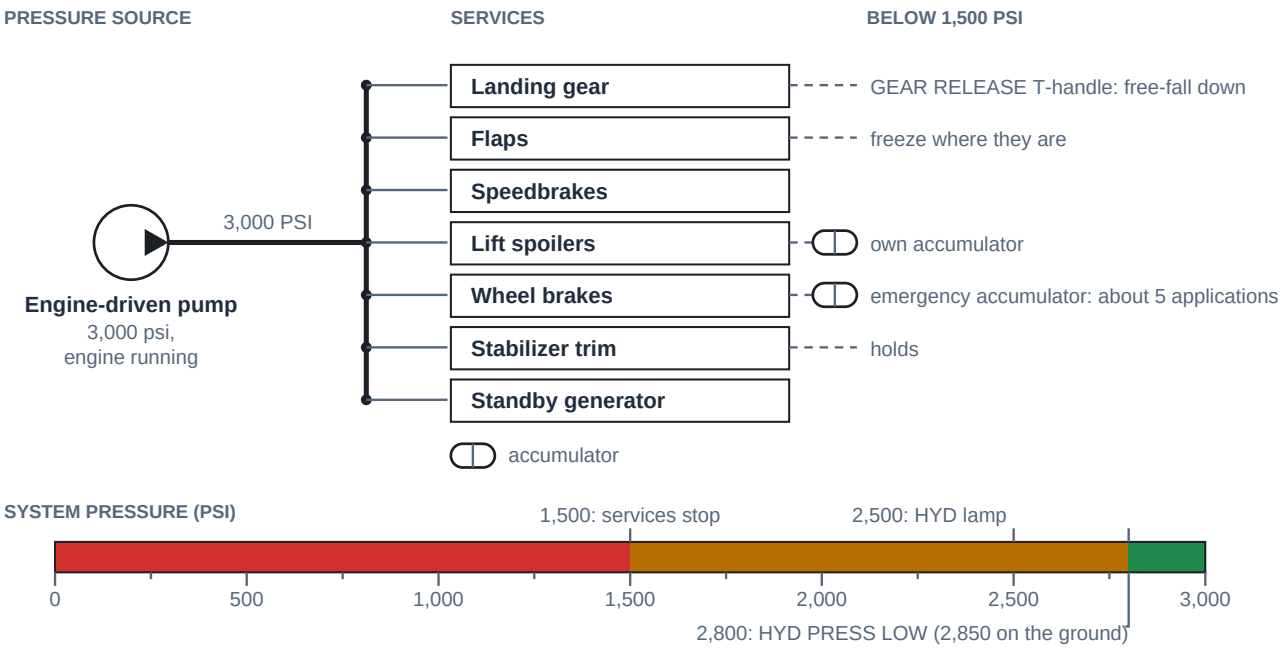
The U-2 sits on one main gear under the fuselage and a steerable tailwheel, with the pogos holding the wings level on the ground. The pogos are explained under Introduction; this page covers the rest.

Note
Sim values. Performance values are measured in the sim. They may not accurately represent (nor do they intend to accurately represent) the performance of the real aircraft.

Hydraulic System

One engine-driven pump, nominally **3,000 psi**, reached about ten seconds into the engine start. It powers the landing gear, flaps, speedbrakes, lift spoilers, wheel brakes and the standby generator. With the engine stopped on the ground the pressure bleeds away within seconds.

After a flameout in flight the pump runs down with the engine: under 2,500 psi after about 100 seconds, under 1,500 psi after about 2.4 minutes. The HYD lamp lights below 2,500 psi and the MFD shows HYD PRESS LOW below 2,800 psi in flight (2,850 psi on the ground), after 5 seconds.



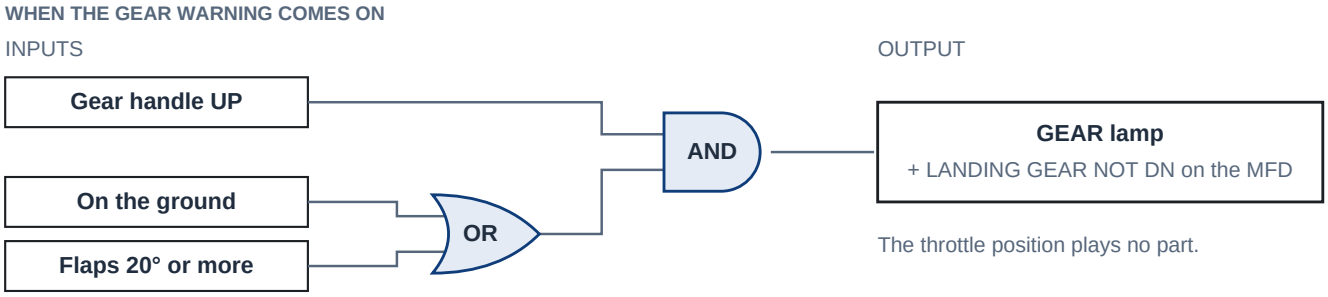
What the one hydraulic pump powers, the back-ups when the pressure is gone, and the pressure at which each warning comes on.

Below 1,500 psi the hydraulic services stop: the flaps freeze where they are, the stabilizer trim holds, the gear no longer follows its handle in flight, and the normal brakes are gone. What you still have: the GEAR RELEASE T-handle lets the gear free-fall down (it cannot be raised again), and an emergency brake accumulator gives about five firm brake applications.

The lift spoilers have their own accumulator - see Speedbrakes and Lift Spoilers. The flight controls are on cables and stay free without pressure.

Landing Gear

- **Gear handle** (left of the main panel, UP / DOWN): click, drag or scroll. The gear moves with hydraulic pressure; below 1,500 psi, or with ESS DC SHED on (the gear control is on the shed bus), it does not follow the handle in flight. MANUAL GEAR RELEASE still lets it down.
- **MAIN GEAR and TAIL GEAR indicators** beside it show each gear up or down. The light in the gear handle is on while the gear is not where the handle says.
- **Gear warning:** GEAR and LANDING GEAR NOT DN with the handle up and the flaps at 20° or more, or on the ground.
- **MANUAL GEAR RELEASE** (pull handle, tooltip MANUAL GEAR RELEASE): lets the gear free-fall down without hydraulic pressure. It is one way - the gear cannot be raised again, by handle or key, until the flight is reloaded.
- **Touchdown:** above 750 ft/min of sink the gear is damaged (with MSFS crash damage on). Above 8.3 ft/s (500 ft/min) up to 24,300 lb, falling to 2.4 ft/s at 40,000 lb, the cyan HARD LANDING advisory shows the sink rate of the touchdown in ft/s, on the MFD alert line and in STAT/HIST. It stays until you have been back in the air for 30 seconds.



Lower the gear before the flaps pass 15°.

Brakes

- The brakes act on the main wheel only. Either pedal (or brake key) brakes it - there is no differential braking, so you steer with the tailwheel, and there is no antiskid.
- **Normal brakes** use hydraulic pressure through the gear-down line: they need the gear handle DOWN, DC power and pressure; full braking from about 2,000 psi.
- **Emergency accumulator:** charged from the hydraulic system to 3,000 psi, it takes over on the ground (or without DC power) when there is no pressure - about five applications, each weaker than the last. Do not pump the brakes.
- **PARKING BRAKE**: T-handle at the lower right of the main panel, left of the electrical panel; pull to set, push to release. The EFB Ground tab and the ground carts (ground power, starting air, oxygen servicing) need it set; the runway crew does not. The EFB **Set up aircraft** presets set it for you.
- **Wheel chocks**: separate from the parking brake and from the EFB Settings option **Cockpit handle**. Click them away in the walkaround or with **Wheel Chocks Off** on the EFB Ground tab, and put them back with **Wheel Chocks On** there, stopped on the ground. The carts need the parking brake set or the chocks in place.
- **Gear pins**: one click on the main or tail gear pins in the walkaround removes both; the EFB **Set up aircraft** *Ready* presets remove them too. The pogo pins are the runway crew's - see Takeoff.

Steering and Taxiing

- The tailwheel steers with the rudder pedals. It follows them about half a second late and eases in, so plan your turns ahead. Full pedal holds a 189 ft radius at the main wheel, with the wheel turning between 6.5° and 20° as needed. The full turn is there up to about 20 kt and fades to about 1.4° by 25 kt, where the rudder takes over. With the outside wing tip on the ground the turn comes out wider.
- **Breakaway:** stopped with the engine running, the aircraft stays put at idle, with the brake pedals about a third down. It starts to roll at about 78 % N2 (a little more when heavy); then ease the power back to what keeps it rolling.
- Taxi slowly and use wide turns: the long wing and the pogos need room. Without the pogos keep the yoke fully into the turn, or the outer wing goes down.

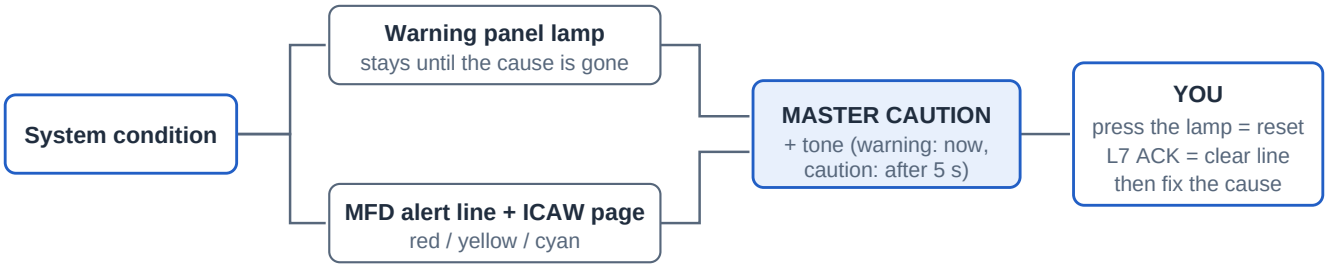
Related pages: Introduction · Flying the U-2S · Chase Car and Ground Support Equipment

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Miltech Simulations U-2

Warnings and Alerts

The aircraft alerts you in two places: the warning lamp panel in front of you, and - on the U-2S - the alert line at the bottom of every MFD. Both feed the Master Caution.



Advisories (cyan) do not trigger the Master Caution.

Master Caution





The MASTER CAUTION lamp lights for every new warning or caution (not for advisories). **Press the lamp itself to reset it** - that also silences the tone, which sounds at once for a warning and 5 seconds later for a caution (MASTER VOL at its stop mutes it, as it mutes all headset audio).

The EFB Settings tab option **Master caution tone** mutes this tone for good; the lamp still lights. The individual lamp or message stays until the problem is gone.

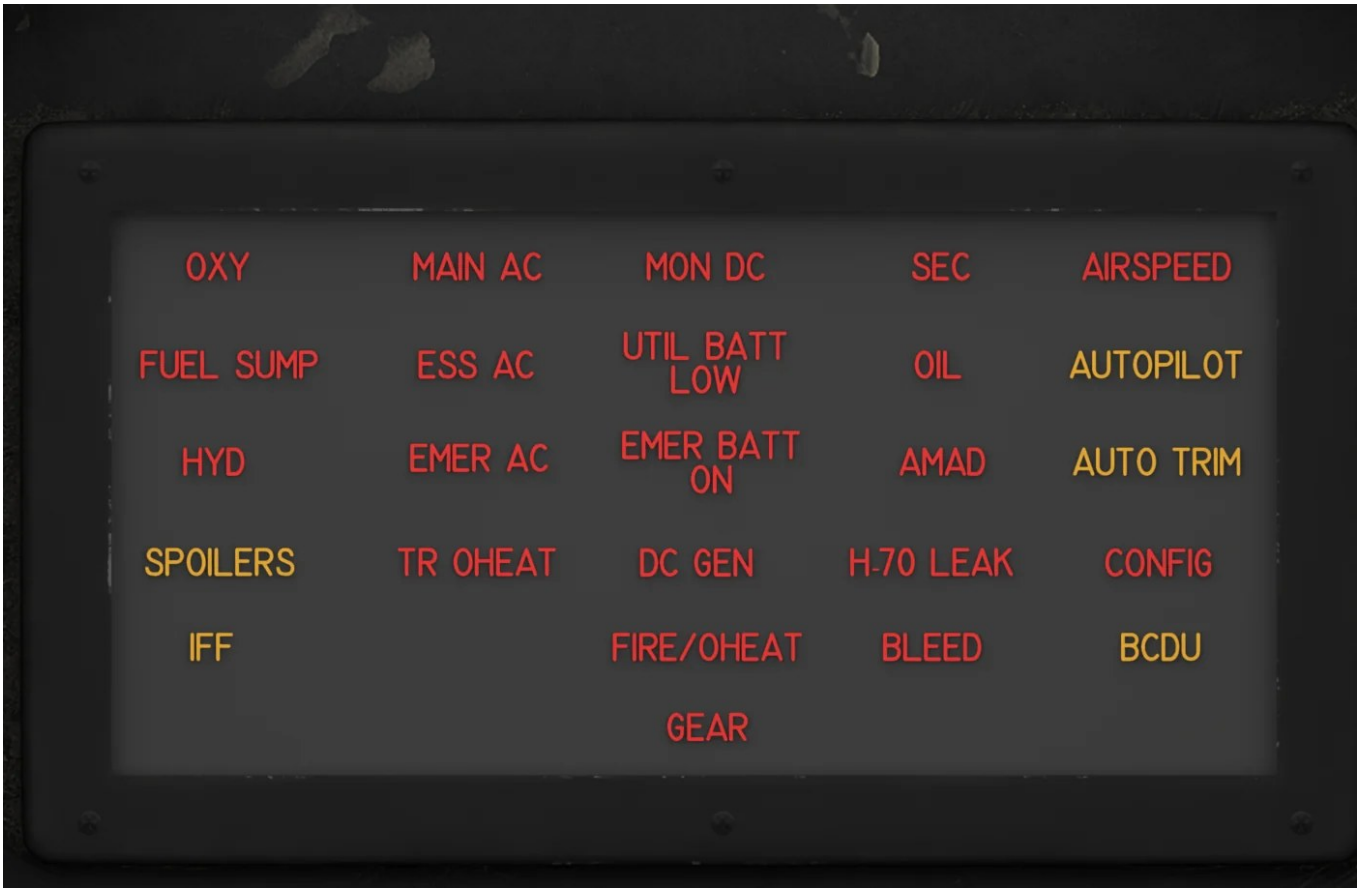
- An alert you inhibit on STAT → HIST no longer lights the master caution - neither from the MFD nor through its warning panel lamp.
- Engine start: on the ground, a *repeat* of SEC below 55 % N2 or of AMAD below 48 % N2 does not light it again. The first one still does.
- The INBD 30 and OUTBD 150 fuel lamps light without the master caution unless a fuel dump is selected.

Alert Levels on the MFD

Level	Color	Meaning
Warning	RED	Act now.
Caution	YELLOW	Act soon.
Advisory	CYAN	For your information.

L7 ACK acknowledges the newest alert. STAT → ICAW lists everything that is active, and on STAT → HIST you can inhibit nuisance alerts so they no longer light the Master Caution - see Status Pages.

Warning Panel Lamps



The warning panel sits behind the control column.

Lamp	Comes on when...
FIRE / OVERHEAT	Engine fire / overheat, or the FIRE/OHEAT TEST switch
DC GEN	DC generator not on line (normal before engine start)
MAIN AC	Main AC generator not on line (normal before engine start and on external power)
ESS AC / EMER AC	That AC bus has no power
MON DC	Monitored DC bus at 25 V or less (or dead) for 15 seconds; out as soon as it is back above 25 V. The MFD message MON DC VOLTS LOW uses 25.5 V and goes out at 27 V
UTIL BATT LOW	The utility battery at half charge (24 V) or less
SHED	In the ESS DC SHED button on the main panel, right of the instruments: pressed, the secondary essential DC loads are off (see Battery only); press again to restore. It lights the master caution while shed. Every flight starts unshed
EMER BATT ON	In flight only: the utility battery has run down to 10 % (about 21 V) and the emergency battery has taken over. Stays on until BATTERY is held OFF for 5 seconds
HYD	Hydraulic pressure below 2,500 psi
SPOILERS	Spoiler emergency accumulator pressure low

Lamp	Comes on when...
OIL	Oil pressure below 10 psi
AMAD	AMAD oil temperature 200 °F or more, or AMAD oil pressure low (it goes out near idle on the start) - normal with the engine stopped
FUEL SUMP	Sump tank at 38 gal or less
OXY	An oxygen system is off, low on pressure, or below 1 liter
GEAR	Gear up with flaps 20° or more, or on the ground
H-70 LEAK	The emergency start system has been fired (hydrazine used); serviced when parked with the engine off
INBD 30 L/R · OUTBD 150 L/R	That tank has reached its fuel-dump level
XFER PRESS LOW	A cross-transfer is on but nothing is flowing, or a sump-tank transfer is filling a low sump
AIRSPEED	180 KIAS or more (230 with gust control up)
AUTOPILOT	AFCS powered with an axis switched off or tripped
CONFIG	Gust-control surfaces not where the switch says (e.g. no hydraulic pressure)
SEC	Engine in secondary control: ENG MODE in SEC, an automatic transfer, or the engine stopped or still below 54 % N2 in a start
IFF	Transponder off, or Mode 4 on with no code to reply with
AUTO TRIM	Autopilot auto trim failed (AFCS powered, PITCH TRIM MODE in AUTO)
BCDU	BCDU fault
TR OHEAT	Transformer-rectifier overheat
BLEED	Bleed air leak, or the FIRE TEST position
EW REC · EW RPT	Beside the SFD. REC: the EW system (EW CONT in REC or RPT, self-test done) is tracking a threat - in our rendition sim traffic within 5 NM and 1,000 ft, moving faster than 20 kt. RPT flashes while the system is jamming it in RPT; REC is always on when RPT is.

Lamp test: hold MASTER LIGHT TEST (the AOA indexer, the AFCS lamps, EW REC / RPT and the red gear handle light too, the MFDs show LANDING GEAR NOT DN, and the LOX needles run down towards zero, which brings both oxygen warnings after about 9 seconds; held for more than 7 seconds it also gives FLAP GUST MISMATCH and AIL GUST MISMATCH).

Fire detection test: move the FIRE/OHEAT TEST switch each way, then back to center - FIRE TEST gives FIRE and BLEED AIR LEAK, O'HEAT TEST gives OVERHEAT.

MFD Alerts

Each MFD message, with when it comes on, when it goes away and what to do, is in the ICAW Message Dictionary.

Related pages: ICAW Message Dictionary · Status Pages (STAT) · Emergency Procedures · Electrical and Avionics Power

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Miltech Simulations U-2

ICAW Message Dictionary

Every message the MFD alert system can put on the alert line at the bottom of each MFD and on STAT → ICAW, A to Z: what it means and what to do. The warning panel lamps and the master caution are explained in Warnings and Alerts, the ICAW and HIST pages in Status Pages.

Note
How the three levels behave. A red **warning** lights the MASTER CAUTION lamp and sounds the tone at once. A yellow **caution** lights it and sounds the tone 5 seconds later, unless you press the lamp first. A cyan **advisory** never lights it.
L7 ACK clears the alert line; the message stays on STAT → ICAW for as long as its cause. An alert you inhibit on STAT → HIST no longer lights the master caution. Where a message behaves differently, its row says so.

A to Z

A B C D E F G H I L M N O P Q R S T U X Y

Message	What it means	What to do
ADF SIGNAL Advisory	The ADF is on but has had no bearing for 5 s. Normal after a start until you tune an NDB in range.	Tune an NDB in range, or set ADF PWR OFF. See Communication Pages (COM), Primary Flight Display (PFD).
ADI FAULT Warning	No INS attitude: INS off, not yet aligning, or the first 30 s of an alignment. Red ADI flag, blank horizon, autopilot off. Normal on every cold start.	Fly on the SFD. INS ON and start the alignment. Re-engage the autopilot when attitude is back. See Inertial Navigation System (INS), Primary Flight Display (PFD).
ADSU NO RESPONSE Advisory	The air data unit has no power (ESS DC SHED or essential DC lost). IAS FAIL and ALT FAIL come with it.	Fly on the SFD. Release ESS DC SHED or restore essential DC. See Primary Flight Display (PFD), Electrical and Avionics Power.
AIL GUST MISMATCH Caution	Lamp test only: MASTER LIGHT TEST held 7 s or more. Lights the CONFIG lamp.	None. Release the test. See Engine Start and Cockpit Controls, Flying the U-2S.
AIRCRAFT OVERSPEED Warning	At or past the red line: 181 KIAS (241 with GUST CONTROL UP below 43,000 ft), or the Mach limit (.651 between 30,500 and 42,999 ft, otherwise .751).	Overspeed checklist: throttle back, nose up gently, speed brakes out. See Specifications and Limitations, Primary Flight Display (PFD).
AIRSPEED DEVIATION Caution	Airspeed outside the PFD ALIM window for 5 s. Only with ALIM on, in the air.	Fly back inside the window, or change or switch off ALIM on the PFD. See Primary Flight Display (PFD).
AIRSPEED HIGH Caution	Above 180 KIAS (230 with gust control UP). Comes with the AIRSPEED lamp.	Slow down: power back, speed brakes out. See Primary Flight Display (PFD), Specifications and Limitations.
ALERT TIME Advisory	The UFCD TIME flight-time counter passed another ALERT interval (default 1 h).	ACK. Set ALERT to 0 on the UFCD TIME page to stop it. See Up-Front Control Display (UFCD), Navigation Pages (NAV).

Message	What it means	What to do
ALIGN MISMATCH Caution	The INS alignment position is more than 1 NM from where the aircraft really is.	Re-enter the position (BCDU NAV INIT) or use INS LOAD before you accept the alignment. See Inertial Navigation System (INS), Backup Control Display Unit (BCDU), Preflight and Power-Up.
ALT FAIL Caution	No valid PFD altitude: altimeter failure or air data unit without power. Red ALT box; no ALT hold.	Fly the SFD altimeter. Release ESS DC SHED or restore essential DC. See Primary Flight Display (PFD).
ALTITUDE DEVIATION Caution	More than 200 ft off the PFD altitude bug after you reached it.	Return to the bug altitude, or set a new bug. See Primary Flight Display (PFD), AFCS System (Autopilot).
AMAD OIL PRESS LOW Warning	AMAD oil pressure below 80 psi. Normal on a start until about 38 % N2; in flight it means a pushover under 0.2 g.	On a start: nothing. In flight: back to 1 g. If it stays with the engine running, land as soon as practical. See Engine Start and Cockpit Controls, Engine Start and Taxi.
ANTIFOG INVRTR ON Advisory	Windshield anti-fog runs from the emergency inverter (essential AC lost), or EMER INV TEST.	None. On emergency power use anti-fog only as needed. See Cabin, Oxygen and Hypoxia, Electrical and Avionics Power.
APCU FAULT Caution	The FAT probe is out of range, usually from pitot heat left on while standing still.	Pitot heat OFF until just before takeoff. See AFCS System (Autopilot), Status Pages (STAT), Preflight and Power-Up.
APCU NO RESPONSE Advisory	ESS DC SHED is selected: the autopilot computer has no power.	Fly by hand. Release SHED when you can. See AFCS System (Autopilot), Electrical and Avionics Power.
APPROACHING SET ALT Advisory	Within 1,000 ft of the PFD altitude bug, before you reach it.	None. Level off at the set altitude. See Primary Flight Display (PFD).
AUTOPILOT MAN TRIM Caution	The autopilot is engaged but not auto trimming (PITCH TRIM MODE MANUAL, or the pitch axis off).	PITCH TRIM MODE AUTO, or trim by hand. Centre the PITCH sync bar before you disconnect. See AFCS System (Autopilot).
AVP LOAD FAIL Advisory	A file on that MFD's STAT/LOAD page failed to load (for example SimBrief).	Read the reason on STAT/LOAD, fix it and LOAD again. See Status Pages (STAT), Electronic Flight Bag (EFB).
BCCU FAULT Caution	The emergency battery is not available: utility battery at half or less on the ground, or under 10 % in flight after a reset.	On the ground: no takeoff until the batteries are serviced. In flight: Battery Only checklist, land as soon as possible. See Electrical and Avionics Power.
BLEED AIR LEAK Caution	Fire warning test only (FIRE TEST). Comes with the BLEED lamp.	Return the test switch to the centre. See Preflight and Power-Up, Warnings and Alerts.
BOOST PRESS LOW Caution	A boost pump is off or unpowered, or the sump is nearly empty, with the engine running.	Both FUEL BOOST PUMP switches ON. Check essential AC and the sump. See Fuel System.

Message	What it means	What to do
CABIN ALTITUDE HIGH CABIN ALTITUDE HIGH Warning / Caution	Cabin pressure lost: yellow above the schedule, red above 35,000 ft cabin. Usually CANOPY SEAL OFF or RAM AIR on.	Oxygen ON. CANOPY SEAL ON, RAM AIR OFF. If it stays high, emergency descent. See Cabin, Oxygen and Hypoxia, System Pages (SYS).
CABIN TEMP HIGH Caution	Cockpit above 95 °F for 30 s. Common on the ground on a warm day with the engine off.	Cooler CABIN HEAT setting. On the ground the air conditioning needs the engine. See Cabin, Oxygen and Hypoxia.
CHECK SUMP QTY Caution	The sump indication is below your sump bug (SYS > PERF). Can come and go in a climb.	Check the wing tanks. In a climb lower the nose or select INBD SUMP TANK ON. See Fuel System, System Pages (SYS).
CHECK TOTAL FUEL CHECK TOTAL FUEL Warning / Caution	Total fuel below your yellow or red total-fuel bug (SYS > PERF).	Yellow: plan the recovery. Red: land as soon as possible. See Fuel System, System Pages (SYS).
CKPT AIR DUMP OPEN Advisory	RAM AIR is ON: cockpit pressure dumped.	If not intended: RAM AIR OFF. See Cabin, Oxygen and Hypoxia.
COM 1 FAULT COM 2 FAULT Caution	That COM radio has failed (simulator failure only).	Use the other COM radio, or COMM CNTL BACKUP. See Communication Pages (COM).
COUNT DOWN ALERT Advisory	The UFCD DN timer has reached zero.	None. Reset the timer on the UFCD TIME page. See Up-Front Control Display (UFCD).
COUNT UP ALERT Advisory	The UFCD UP timer has reached its set time.	None. Reset the timer on the UFCD TIME page. See Up-Front Control Display (UFCD).
CRS FAIL Caution	No valid course guidance for the PFD source (ILS receiver failure). Red CRS flag.	Disregard the course bar; select another steering source. See Primary Flight Display (PFD).
DATA ZEROIZED Warning	ZEROIZE held 3 s: mission data, codes and the INS alignment are erased.	None. Reload the mission data and start a new INS alignment. See Cockpit Panels, Navigation Pages (NAV), Inertial Navigation System (INS).
DC GEN OUT Warning	The main DC generator is off line after the engine has run. Normal after shutdown.	DC Generator Failure checklist: MAIN DC GENERATOR reset, then NORM; TR NORM. See Electrical and Avionics Power.
DDL2 FAULT Caution	The datalink is on but its uploads have failed for 30 s.	Check the EFB Datalink tab and your network, or switch the datalink off. See Electronic Flight Bag (EFB), Mission Equipment (PME), Status Pages (STAT).
DPS RECEIVED Advisory	A datalink upload (route or airports from the EFB) waits in the UPLD file.	Accept it into a store or reject it. See Electronic Flight Bag (EFB), Navigation Pages (NAV), Backup Control Display Unit (BCDU).
EGT HIGH Warning	EGT 842 °C or more (890 °C on a start). In practice in SEC at full throttle above about 55,000 ft.	Reduce throttle until it goes out. See Engine Start and Cockpit Controls, System Pages (SYS).

Message	What it means	What to do
ELEC BUS FAIL Warning	Both AC buses and the essential DC bus without power. You rarely see it: the MFDs go dark too.	BATTERY ON, then the Battery Only checklist. See Electrical and Avionics Power.
EMER AC FAIL Warning	The emergency AC bus has no power (inverter off with essential AC lost), or EMER INV TEST. Shows on a cold aircraft until the inverter is at NORM.	EMERGENCY INVERTER NORM, STANDBY GENERATOR NORM. After the TEST check, back to NORM. See Electrical and Avionics Power.
EMER BATT ON Warning	In flight, the utility battery is down to 10 % and the emergency battery has taken over: about 40 minutes left (70 with ESS DC SHED).	Battery Only checklist: land as soon as possible and shed load. See Electrical and Avionics Power.
EMER INVERTER ON Advisory	The emergency inverter carries the emergency AC bus. Normal on battery before engine start.	After the start check: NORM. In flight with ESS AC FAIL: ESS AC Failure checklist. See Electrical and Avionics Power, Engine Start and Taxi.
EMER START ARMED Advisory	EMERGENCY START SYS is in ARM.	Arm only for an airstart; otherwise OFF and close the cover. See Engine Start and Cockpit Controls, Engine Start and Taxi.
ENG MODE SECONDARY Caution	The engine is in secondary control: switch at SEC, below 54 % N2 (every start) or an automatic transfer.	Normal on a start. Otherwise SEC, then PRI. If it comes back, stay in SEC (up to 10 % less thrust). See Engine Start and Cockpit Controls, Engine Start and Taxi.
ENG OIL PRESS LOW Warning	Engine oil pressure 10 psi or less in flight: the engine is stopping.	Engine stopped: Engine Flameout - Airstart. Running: minimum power, land as soon as possible. See System Pages (SYS), Specifications and Limitations.
ENG OIL TEMP HIGH Warning	Engine oil 160 °C or more. Normal flying does not get there.	Reduce power and land as soon as practical. See System Pages (SYS), Specifications and Limitations.
ENG OIL TEMP LOW Warning	Engine oil -40 °C or colder: only an extremely cold-soaked engine.	On the ground warm up at idle. In flight see Engine Flameout - Airstart. See System Pages (SYS).
ESS AC FAIL Warning	The essential AC bus has no power: main generator off line and the standby generator not taking over. The autopilot loses power.	ESS AC Failure checklist; fly by hand. See Electrical and Avionics Power.
EW IBIT TIMEOUT Advisory	An EW BIT did not finish within 40 s.	With EW CONT on and the startup BIT done, run the BIT again. See Status Pages (STAT), Map, Traffic and Checklists, Standby Flight Display (SFD).
EW NO RESPONSE Advisory	The EW system does not answer: EW CONT OFF or no power. Normal until EW CONT goes to REC.	EW CONT to REC when you want the EW system. See Map, Traffic and Checklists, Standby Flight Display (SFD), Status Pages (STAT).

Message	What it means	What to do
FIRE Warning	FIRE TEST, or an engine fire from the simulator's failures. FIRE lamp on the glare shield.	Test: switch to centre. Real fire: Engine Fire or Overheat checklist. See Warnings and Alerts.
FLAP GUST MISMATCH Caution	7 s after a GUST CONTROL move the flaps are not where it sends them (usually no hydraulic pressure). Also in the lamp test.	Check hydraulic pressure. Keep to 130 KIAS or less until they match. See Engine Start and Cockpit Controls, Flying the U-2S.
FLAPS DOWN Warning	Flaps out above 130 KIAS (more than 5°), or above 45,000 ft (more than 3°).	Flaps up, or slow below 130 KIAS. See Specifications and Limitations.
FOOD READY Advisory	The Dragon Food tube is hot, about 10 minutes after FOOD HEATER START.	None. FOOD HEATER OFF when done. See Electronic Flight Bag (EFB), Speedbrakes and Lift Spoilers.
FUEL PRESS LOW Caution	Fuel pressure below 8 psi: both boost pumps off or the sump nearly empty.	Both FUEL BOOST PUMP switches ON; check essential AC and the sump. See Fuel System.
FUEL SUMP LOW Caution	The sump indication is at or below 38 gal: the engine is draining it faster than the wing tanks refill it.	Lower the nose or reduce power; INBD SUMP TANK ON until the sump is near 70 gal. See Fuel System, System Pages (SYS).
FUEL XFER 2 MINUTES Caution	A fuel transfer switch has been on for 2 minutes. Repeats every 2 minutes.	Check the balance and the sump; switch the transfer OFF when done. See Fuel System.
FUEL XFER ON Advisory	A fuel transfer or sump-tank switch is on.	None while you transfer. Switch off when done. See Fuel System, Cruise.
FWD LINK NOT KEYED AFT LINK NOT KEYED Advisory	The datalink is on but not sending yet (connecting, or the last upload failed).	Wait, or check the EFB Datalink tab; switch the datalink off if you do not use it. See Electronic Flight Bag (EFB), Mission Equipment (PME), Status Pages (STAT).
GS FAIL Caution	ILS steering with a localizer, and the ILS receiver has failed (simulator failure). Red GS flag.	Disregard the glideslope; fly a localizer-only approach. See Primary Flight Display (PFD), Emergency Procedures.
H70 LEAK Caution	The Emergency Start System has been fired. Stays until it is serviced on the ground.	Land: one airstart per flight. The crew services it once the pogos are back on. See Engine Start and Cockpit Controls.
HARD LANDING Advisory	A touchdown faster than the limit for your weight; the line shows the sink rate.	None. Nothing is damaged: use the sink rate to judge your flare. See Flying the U-2S, U2 101 - The Basics, Landing Gear, Brakes and Ground Handling.
HATCH HEATER HOT Advisory	HATCH HEATER in HTR & BLO with no OBC fitted, or without monitored AC.	HATCH HEATER OFF. See Cabin, Oxygen and Hypoxia, Preflight and Power-Up, Optical Bar Camera (OBC).
HIST FILE 80% FULL Advisory	That MFD's alert history holds 160 entries or more (of 200).	None. Clear it on STAT/HIST if you want. See Status Pages (STAT).

Message	What it means	What to do
HIST FILE CLEARED Advisory	That MFD's alert history reached 200 and emptied itself.	None. See Status Pages (STAT).
HYD INDICATOR Caution	In flight, the hydraulic pressure signal is lost (essential AC dead). Normally with ESS AC FAIL.	ESS AC failure steps. The hydraulics still work. See Electrical and Avionics Power.
HYD PRESS LOW Warning	Hydraulic pressure below 2,800 psi in flight: mainly when the engine stops. Comes with the HYD lamp.	Hydraulic Failure checklist. Below 1,500 psi: gear by the GEAR RELEASE T-handle, lift spoilers on EMER. See Electrical and Avionics Power, System Pages (SYS).
IAS FAIL Caution	No valid PFD airspeed: pitot ice, airspeed failure, or air data unit without power. No MACH hold.	Fly the SFD airspeed. Pitot heat ON; release ESS DC SHED. See Primary Flight Display (PFD), Electrical and Avionics Power.
IFF MODE 4 RPLY FAIL Caution	The IFF has Mode 4 on but no Mode 4 code (zeroized, or switched off without HOLD).	Select Mode 4 OFF. See Up-Front Control Display (UFCD), Status Pages (STAT), Backup Control Display Unit (BCDU).
ILS FAULT Caution	The ILS receiver has failed (simulator failure).	Fly a non-precision approach, or use NAV or TAC steering. See Emergency Procedures, Standby Flight Display (SFD).
INS DATE MISMATCH Caution	The sim date or time changed with the INS on, and the clocks differ by more than 2 minutes.	No effect on navigation. Set the sim date back, or leave it. See Inertial Navigation System (INS).
INS DEGRADED Advisory	The INS went to NAV with a limited alignment (accepted early, or you moved before FULL NAV READY).	None. It upgrades by itself. See Inertial Navigation System (INS).
INS GPS MISMATCH Caution	The INS position is over 1,000 ft from the GPS. Usually GPS updating OFF on NAV/DATA.	Set GPS updating ON, or make a manual position update. See Inertial Navigation System (INS), Navigation Pages (NAV).
INU TEMP Advisory	INS unit temperature 115 °F or more: a very hot ramp with the INS on.	None. Keep ground time short on a hot ramp. See Inertial Navigation System (INS), Navigation Pages (NAV).
L INBD DUMP COMP R INBD DUMP COMP L OUTBD DUMP COMP R OUTBD DUMP COMP Advisory	Dumping from that tank and it is down to 30 gal (inboard) or 150 gal (outboard).	Close that DUMP switch. See Fuel System.
L INBD DUMP OPEN R INBD DUMP OPEN L OUTBD DUMP OPEN R OUTBD DUMP OPEN Advisory	That tank's DUMP switch is open: fuel goes overboard.	None while you dump on purpose. If not intended, close the switch now. See Fuel System.
LANDING GEAR NOT DN Warning	Gear handle UP on the ground, or in flight with the flaps at 20° or more. Also in the lamp test.	Gear handle DOWN, or flaps below 20° if you are not landing. See Landing Gear, Brakes and Ground Handling.

Message	What it means	What to do
LOW OXY QTY Caution	Both LOX converters together hold less than 2 L.	Descend to a lower cabin altitude and land. On the ground, service the LOX. See Cabin, Oxygen and Hypoxia.
MACH DEVIATION Caution	Mach outside the PFD MLIM window for 5 s. Only with MLIM on, in the air.	Fly back inside the window, or change or switch off MLIM on the PFD. See Primary Flight Display (PFD).
MACH RATE Caution	Mach rising fast enough to reach .75 within 5 s.	Stop the acceleration: nose up slightly, power back a little. See Primary Flight Display (PFD), High Altitude and the Cruise Climb.
MAIN AC GEN OUT Warning	The main AC generator is off line after the engine has run. Normal after shutdown.	Main AC Generator Failure checklist: OFF-RESET then NORM. See Electrical and Avionics Power.
MON DC VOLTS LOW Caution	The monitored DC bus below 25.5 V for 15 s. Normal shortly after shutdown on the battery.	Check the DC generator and the TR. If neither comes back, Battery Only checklist. See Electrical and Avionics Power.
N1 FAN OVERSPEED Warning	Fan speed N1 above 102 %.	Reduce throttle until it goes out. See Engine Start and Cockpit Controls, System Pages (SYS).
N2 CORE OVERSPEED Warning	Core speed N2 above 106.3 %. At 110.25 % the fuel is cut.	Reduce throttle until it goes out. See Engine Start and Cockpit Controls, System Pages (SYS).
NAV STEERING Advisory	The INS steering computer cannot fly the selection as entered (status word in magenta).	Read the magenta status on the NAV page; re-enter the steering if needed. See Navigation System (INS Steering), Navigation Pages (NAV).
NO. 1 OXY NO. 2 OXY Warning	That oxygen system is OFF or empty. Shows in a cold cockpit.	OXYGEN SYSTEM 1 / 2 ON. If a converter is empty, use the other and descend. See Cabin, Oxygen and Hypoxia.
ORBIT REJECT Advisory	F/T steering with ORB set, but the ACTIVE file has no usable orbit; the line gives the reason.	LOAD a file with a valid orbit, or set ORB to 0. See Navigation System (INS Steering), Up-Front Control Display (UFCD).
OVERHEAT Warning	OHEAT TEST only: no engine-bay overheat is simulated.	Return the switch to the centre. See Warnings and Alerts.
PITCH DISC Advisory	The autopilot pitch axis is not engaged (after a disconnect, switch off or a trip).	Fly by hand. After a trip, cycle the PITCH switch and re-engage. See AFCS System (Autopilot).
Q-BAY ALTITUDE HIGH Q-BAY ALTITUDE HIGH Warning / Caution	The equipment bay is above its pressure schedule. Comes with every cabin pressure loss.	Restore cabin pressure, then descend. See Cabin, Oxygen and Hypoxia, System Pages (SYS).
RESET BARO Advisory	The AVP has just started: the altimeter is not set yet. Red ALT box on the PFD.	Set the altimeter (PFD BARO or the SFD knob). See Primary Flight Display (PFD), Preflight and Power-Up.

Message	What it means	What to do
ROLL DISC Advisory	The autopilot roll axis is not engaged (after a disconnect, switch off or a trip).	Fly by hand. After a trip, cycle the ROLL switch and re-engage. See AFCS System (Autopilot).
RPLAN DISABLE Advisory	An executed replan has stopped (END DP reached, new steering or a new ACTIVE file).	None if done; EXEC again if you still want it. See Navigation System (INS Steering), Navigation Pages (NAV).
SEAL PRESS OFF Advisory	Hatch and nose seal pressure low. Normal until 20 s after engine start.	None. See Cabin, Oxygen and Hypoxia, Engine Start and Taxi.
SPOILER PRESS LOW Caution	The emergency lift-spoiler accumulator is low, after every EMER deployment.	Spoiler switch EMER to let it recharge (about three deployments when full). See Speedbrakes and Lift Spoilers.
STALL STRIP IN Advisory	Gear handle DOWN with the stall strips in.	Set the landing flaps (24° or more), or pull the stall strip handle. See Cabin, Oxygen and Hypoxia, Landing, Descent and Approach.
STALL STRIP OUT Advisory	Gear handle UP with the stall strips out, above 18,000 ft.	Push the stall strip handle in, or raise the flaps. See Cabin, Oxygen and Hypoxia, Takeoff and Climb, Electronic Flight Bag (EFB).
STBY AC GEN ON Advisory	The standby generator carries essential AC, or STBY GEN TEST.	After the start check: NORM. In flight with MAIN AC GEN OUT: Main AC Generator Failure checklist. See Electrical and Avionics Power, Engine Start and Taxi.
SUMP INDICATOR Advisory	In flight the sump gauge has no power (EMER AC lost): it stands at 62 gal.	Restore EMER AC. Plan fuel on the total count and time. See Fuel System, Electrical and Avionics Power.
TACAN FAULT Advisory	The TACAN has no power: its volume knob at the OFF stop, or no DC power.	Turn the TACAN volume knob up if you need TACAN. See Up-Front Control Display (UFCD), Communication Pages (COM).
TP DESIGNATE FAILED Advisory	A designate made no TP: all 10 slots full, or no sensor aimed.	Aim a sensor at the ground, or clear a TP on NAV/DPS. See Targeting Points, SYERS-2A Camera, ASARS-2 Radar.
TP LIST FULL Advisory	All 10 targeting point slots are full.	Clear a TP on NAV/DPS. See Targeting Points, Navigation Pages (NAV).
TR ON Advisory	The TR supplies the DC buses. Normal on ground power with BATTERY NORM.	After the start check: NORM. In flight with DC GEN OUT: DC Generator Failure checklist. See Electrical and Avionics Power, Engine Start and Taxi.
UTIL BATT LOW Caution	The utility battery is at half charge or less (batteries alone on the DC buses).	Get a generator or the TR back; shed load and land as soon as practical. On the ground, ground power or engine. See Electrical and Avionics Power.
XFER PRESS LOW Caution	A transfer pump runs without delivering: source tank empty, or normal while the sump is filling.	If it stays, switch the transfer OFF. See Fuel System.

Message	What it means	What to do
YAW DISC Advisory	The autopilot yaw axis is not engaged (after a disconnect, switch off or a trip).	Fly by hand. After a trip, cycle the YAW switch and re-engage. See AFCS System (Autopilot).

No message matches the filter.

Related pages: Warnings and Alerts · Status Pages (STAT) · Emergency Procedures

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Miltech Simulations U-2

Sensors

Everything the U-2S collects comes from the equipment you fit to it. There are five places to put it: the nose, the Q-bay behind the cockpit, the wing pods, the spine and the belly. You choose the fit on the EFB Aircraft tab, and this chapter tells you what each item is on the real aircraft and what it does in ours.



Where everything sits, drawn here with all of it fitted at once: ASARS-2 nose, Senior Ruby pods with Senior Spear, SPAN and the dorsal and belly sensors.

1. **Nose** - ASARS-2 radar, SYERS-2A camera or the Standard nose, which carries no sensor.
2. **Q-bay** - The optical bar camera (OBC), behind the cockpit. Standard nose only.
3. **Superpods** - Senior Ruby, Standard or none.
4. **Senior Spear** - An attachment on the left Senior Ruby pod.
5. **SPAN dorsal** - The satellite antenna fairing on the spine.
6. **Dorsal sensors 1-3** - Three small fairings behind the canopy.
7. **Belly sensor 4** - A fairing under the fuselage.

Note
Three sensors make pictures. The ASARS-2 radar, the SYERS-2A camera and the OBC are the working sensors, and you carry one at a time. Everything else on this page changes how the aircraft looks and what it weighs, and nothing more: signals intelligence is not simulated.
With the Standard nose and an empty Q-bay there is no imaging sensor at all, so the Mark IV panel is replaced by a blank plate.

NoseASARS-2 RadarSynthetic aperture radar: radar map, search and spot. The long nose with the intake on top. MFD RDR and ASR pages.Open the page →NoseSYERS-2A CameraElectro-optical and infrared camera, five bands. The nose with the window on its side. MFD CAM and SYR pages.Open the page →Q-bay, Standard noseOptical Bar Camera (OBC)Panoramic film camera behind the cockpit. It flies with the Standard nose, which has no sensor. MFD CAM and OBC pages.Open the page →

The Imaging Sensors Compared

	ASARS-2	SYERS-2A	OBC
What it is	Synthetic aperture radar	Electro-optical / infrared camera	Panoramic film camera
Where	Nose	Nose	Q-bay, with the Standard nose
Weight	1,000 lb	650 lb	1,050 lb + 300 lb nose
MFD pages (PME)	RDR, ASR	CAM, SYR	CAM, OBC
Picture	Radar map, search and spot	Five bands, color or black and white	Black-and-white film look
Range or zoom	SRCH 10 - 320 NM, SPOT 0.1 - 40 NM	0.5× - 73×, 90× in SWIR and MWIR	Up to 15×
Power	MODE STBY	MK IV MASTER, then MODE STBY	DRIFTSIGHT, then MK IV MASTER
Warm-up (Short / Realistic)	30 s / 12 min	30 s / 4 min	30 s / 90 s
Operate	MODE 1-5, once airborne	MODE 1-5	MODE OFF for the self-test, then 1-5
Lowest height	5,000 ft above the ground	1,000 ft above the ground	5,000 ft
Attitude limit	20° of bank, 10° of pitch	90° from the wings, 15° of pitch	None
Hand control	Moves the cursor or the patch	Aims it, 85° to the side, 15° fore / aft	Looks left and right, 45°
Darkness	No effect	Picture darkens, street lighting at night	Exposure follows the sun
Sim clouds and weather	No effect	No effect	No effect

All three work with targeting points, and all three build their pictures from online map data - see Mission Equipment (PME) if a picture stays black.

Related pages: Mission Equipment (PME) · Mark IV Camera Panel · Variants · Electronic Flight Bag (EFB)

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Miltech Simulations U-2

ASARS-2 Radar

The imaging radar in the nose: what it is on the real aircraft, what it does in the simulator and where you operate it.



The ASARS-2 nose, the default fit on a fresh install.

On the real aircraft. ASARS-2, the Advanced Synthetic Aperture Radar System, is an imaging radar. It uses the aircraft's own forward motion to act like an antenna far longer than the one it carries, which gives it photo-like detail from very far away.

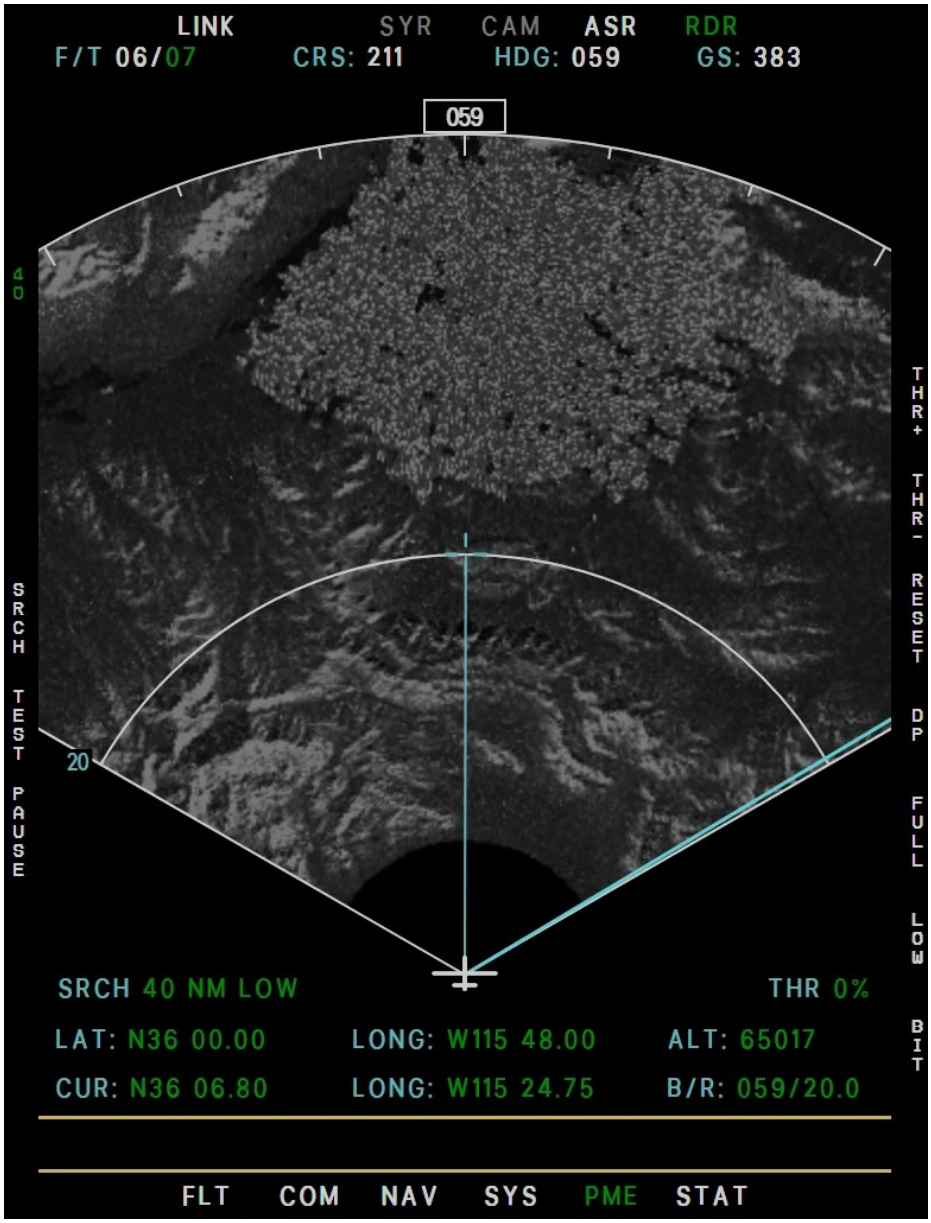
A radar brings its own illumination, so it works day and night and through cloud. It has wide search modes and small high-resolution spot modes, and the real one also finds vehicles moving on the ground.

In the simulator. The RDR page builds its picture from real terrain elevation and land cover. Darkness, cloud and rain make no difference to it. There is no moving-target mode, and aircraft in the air are not shown.

Item	In short
Fit	EFB Aircraft tab, Nose: ASARS-2, 1,000 lb.
Start	MK IV MODE to STBY starts the warm-up. MODE 1-5 is PWR, and it radiates once airborne, so you can set it on the ground. MK IV MASTER only powers its SSA recorder. See Starting and Stopping the Camera.

Item	In short
SRCH	A ±60° fan ahead of the aircraft, out to 320 NM. The finer the resolution, the shorter the reach.
SPOT	A patch from 40 NM down to 0.1 NM across, imaged in 3 to 30 seconds and again about every 15 seconds.
Aiming	The viewsight hand control is the cursor in SRCH and moves the patch in SPOT.
Limits	No map below 5,000 ft above the ground. Past 20° of bank or 10° of pitch the page shows GIMBAL LIMIT and takes no picture; back inside, the last picture is on the scope again.

Example RDR SRCH



SRCH: the wide fan.

Example RDR SPOT



SPOT 2.5 NM: one airport.

Example RDR SPOT close



SPOT 0.5 NM: parked aircraft and their shadows.

How to Operate

1. On the EFB **Aircraft** tab, set **Nose** to ASARS-2.
2. Set MK IV MODE to STBY. The warm-up starts: 30 seconds, or 12 minutes with the EFB option *Sensor warm-up time* on Realistic. MK IV MASTER is not necessary for the radar.
3. On an MFD press B5 PME, then RDR.
4. Set MK IV MODE to 1 - 5 (PWR). You can do this on the ground: the radar radiates once airborne. It makes a map from 5,000 ft above the ground.
5. In L3 SRCH, move the cursor with the viewsight hand control: left and right is the bearing (up to 60°), forward and aft is the range. R6 sets the resolution, R5 the part of the fan.
6. Press L3 for SPOT: a high-resolution patch around the cursor. The page counts down IMAGING (3 to 30 seconds), then takes the patch again about every 15 seconds. The hand control moves the patch.

7. Keep within 20° of bank and 10° of pitch, or the page shows GIMBAL LIMIT.
8. To stop, set MK IV MODE to OFF. The next start warms up again.

Mark IV Panel

The radar needs only MK IV MODE and the hand control. Every other control on the panel is for the cameras. The panel itself: Mark IV Camera Panel.



The Mark IV panel on the right console. The numbers match the table below.

No.	Control	With the ASARS-2
1	**OBLIQUE ANGLE INDICATOR**	Follows the hand control left and right.
2	**VIEWSIGHT HAND CONTROL**	The radar cursor. SRCH: left and right is the bearing, forward and aft the range. SPOT: moves the patch. **Set condition lever** puts the cursor straight ahead at half range.

No.	Control	With the ASARS-2
3	**DRIFTSIGHT**	No function
4	**TRACKER**	No function
5	**MK IV MASTER**	Powers the SSA recorder only. The radar does not need it.
6	**FRAME COUNTER**	No function
7	**OPTIC PWR**	No function
8	**KNOTS**	No function
9	**SHUTTER VELOCITY**	No function
10	**MK IV MODE**	OFF: radar off. STBY: warm-up, then standby. 1 - 5: PWR, radiating once airborne.
11	**A / B / C / D lights**	Light only with MASTER LT TEST.

Every key on the page is under RDR - ASARS-2A Radar.

Related pages: Sensors · Mission Equipment (PME) · Mark IV Camera Panel · Targeting Points

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Miltech Simulations U-2

SYERS-2A Camera

The long-range digital camera in the nose: what it is on the real aircraft, what it does in the simulator and where you operate it.



The SYERS-2A nose. The window turns with the camera as the nose rolls.

On the real aircraft. SYERS-2, the Senior Year Electro-optical Reconnaissance System, is a long-range digital camera. It records several bands of light at once, from visible through near and short-wave infrared to mid-wave infrared, and it can look far out to the side of the aircraft. Like any camera it needs a clear view of the ground, so cloud stops it.

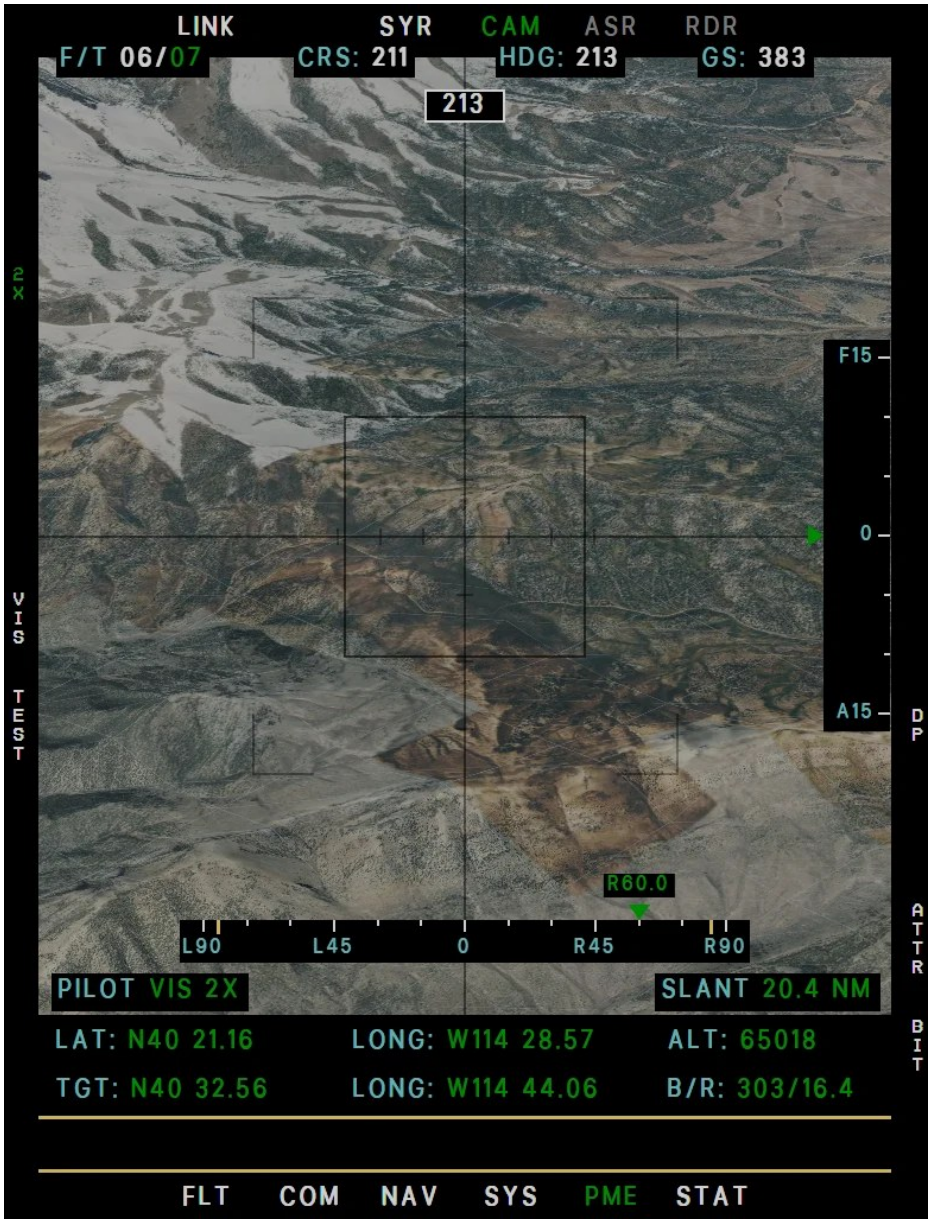
In the simulator. The CAM page is built from online satellite imagery, so it shows the real world under you and not the simulator's scenery or clouds. It darkens at dusk, and at night only real roads show, by their street lighting. Five bands are on L3:

Band	Picture
VIS	Visible light, in color.
NIR	Near infrared, black and white.
SWIR	Short-wave infrared, black and white. Twice the magnification at the same zoom, with a coarser picture.
MWIR	Mid-wave infrared, black and white. Twice the magnification, coarser, as SWIR.

Band	Picture
MSI	Multispectral, in false color.

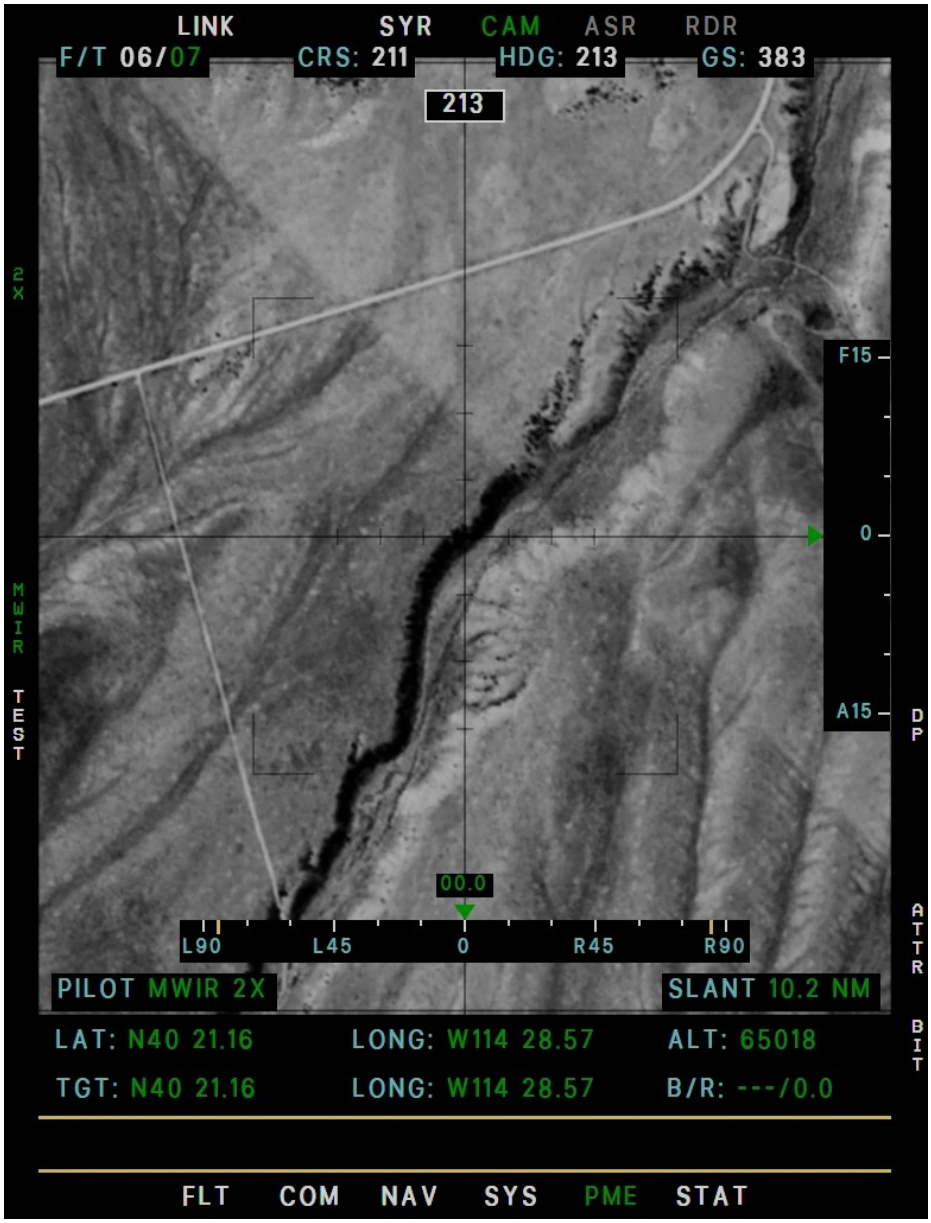
Item	In short
Fit	EFB Aircraft tab, Nose: SYERS-2A, 650 lb.
Start	MK IV MASTER ON, MODE STBY for the boot, then MODE 1-5. See Starting and Stopping the Camera.
Zoom	0.5× to 73×, and 90× in SWIR and MWIR. Near the ground the distance to what you look at caps it.
Aiming	The viewsight hand control turns the camera 85° to either side and 15° fore and aft. Let go and the look keeps its angles as you fly; with L5 LOCK on the CAM page it stays on that spot of ground instead.
Nose	The nose rolls to the line of sight, against your bank, from 5,000 ft up.
Limits	No picture within 1,000 ft of the ground. Past 90° from the wings or 15° of pitch the page shows GIMBAL LIMIT.
Self-test	L4 TEST, about 19 seconds, once the boot is done. It works on the ground.

Example CAM looking to the side



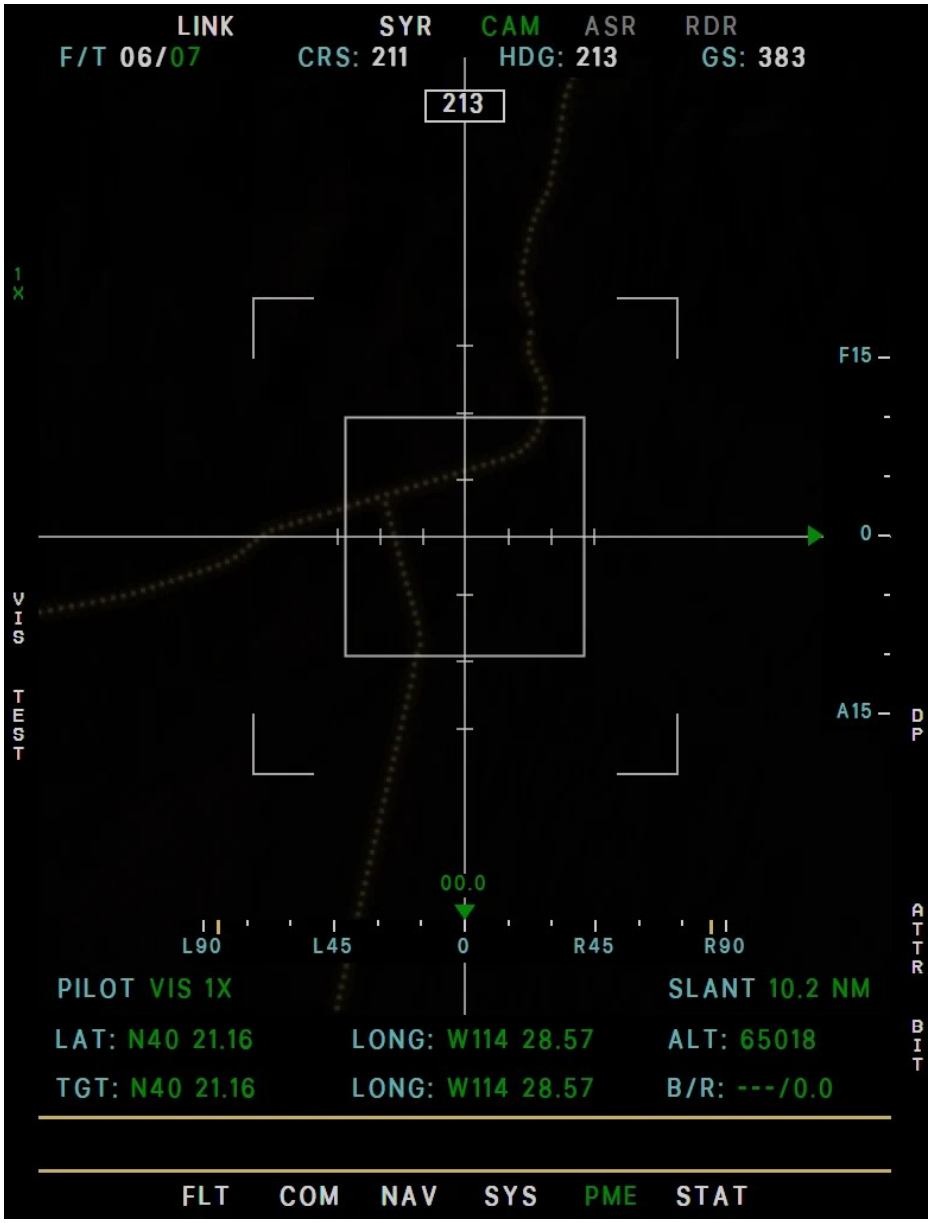
VIS at 2×, aimed 60° to the right.

Example CAM MWIR



MWIR at 2×.

Example CAM at night



At night: street lighting along real roads.

How to Operate

1. On the EFB **Aircraft** tab, set **Nose** to SYERS-2A.
2. Set MK IV MASTER ON. The CAM page reads SYERS-2A OFF MK IV MODE STBY TO START.
3. Set MK IV MODE to STBY. The boot starts: 30 seconds, or 4 minutes on Realistic. C comes on for its second half. Then the page reads SYERS-2A STBY.
4. On an MFD press B5 PME, then CAM. L4 TEST runs the 19-second self-test, also on the ground.
5. Set MK IV MODE to 1 - 5 (all five are the same). The camera opens and looks straight down. There is no picture within 1,000 ft of the ground.
6. Aim with the viewsight hand control: up to 85° to each side, 15° forward and aft. Zoom with the left rocker, select the band with L3. L5 LOCK holds the spot on the ground; R4 DP points the camera at a DP or a TP.

7. MK IV MODE back to STBY closes the camera.
8. To shut down, set MK IV MODE to OFF: C for 5 seconds, then D. The camera stays off until MK IV MASTER goes OFF and ON again.

Mark IV Panel

The SYERS-2A uses MK IV MASTER, MK IV MODE, the hand control and the lights. Every other control is for the OBC or has no function. The panel itself: Mark IV Camera Panel.



The Mark IV panel on the right console. The numbers match the table below.

No.	Control	With the SYERS-2A
1	**OBLIQUE ANGLE INDICATOR**	Closed: follows the hand control left and right (85° travel). Open: shows the camera's look to the side.
2	**VIEWSIGHT HAND CONTROL**	Aims the camera: sideways up to 85°, forward and aft up to 15°. **Set condition lever** points it straight down.

No.	Control	With the SYERS-2A
3	**DRIFTSIGHT**	No function
4	**TRACKER**	No function
5	**MK IV MASTER**	Powers the camera, its nose servo and nose heat. ON before MODE STBY.
6	**FRAME COUNTER**	No function
7	**OPTIC PWR**	No function
8	**KNOTS**	No function
9	**SHUTTER VELOCITY**	No function
10	**MK IV MODE**	STBY: starts the boot, then standby. 1 - 5: camera open. OFF after a start: shutdown.
11	**A / B / C / D lights**	**A**: nose servo fault (none simulated). **C**: second half of the boot, then about 3 minutes after MODE 1 - 5, and 5 s at shutdown. **D**: from 5 s after MODE OFF until 30 s after MASTER OFF. **B**: no function.

Every key on the page is under CAM - SYERS-2A and OBC Camera.

Related pages: Sensors · Mission Equipment (PME) · Mark IV Camera Panel · Targeting Points

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Miltech Simulations U-2

Optical Bar Camera (OBC)

The panoramic film camera in the Q-bay: what it is on the real aircraft, what it does in the simulator and where you operate it.



The Q-bay window with the OBC fitted, seen from below, the left wing root on the right.

Under the fuselage

1. **Q-bay window** - Shows with the OBC fitted. A door takes its place otherwise.
2. **Belly sensor 4** - A separate fit, not part of the camera.

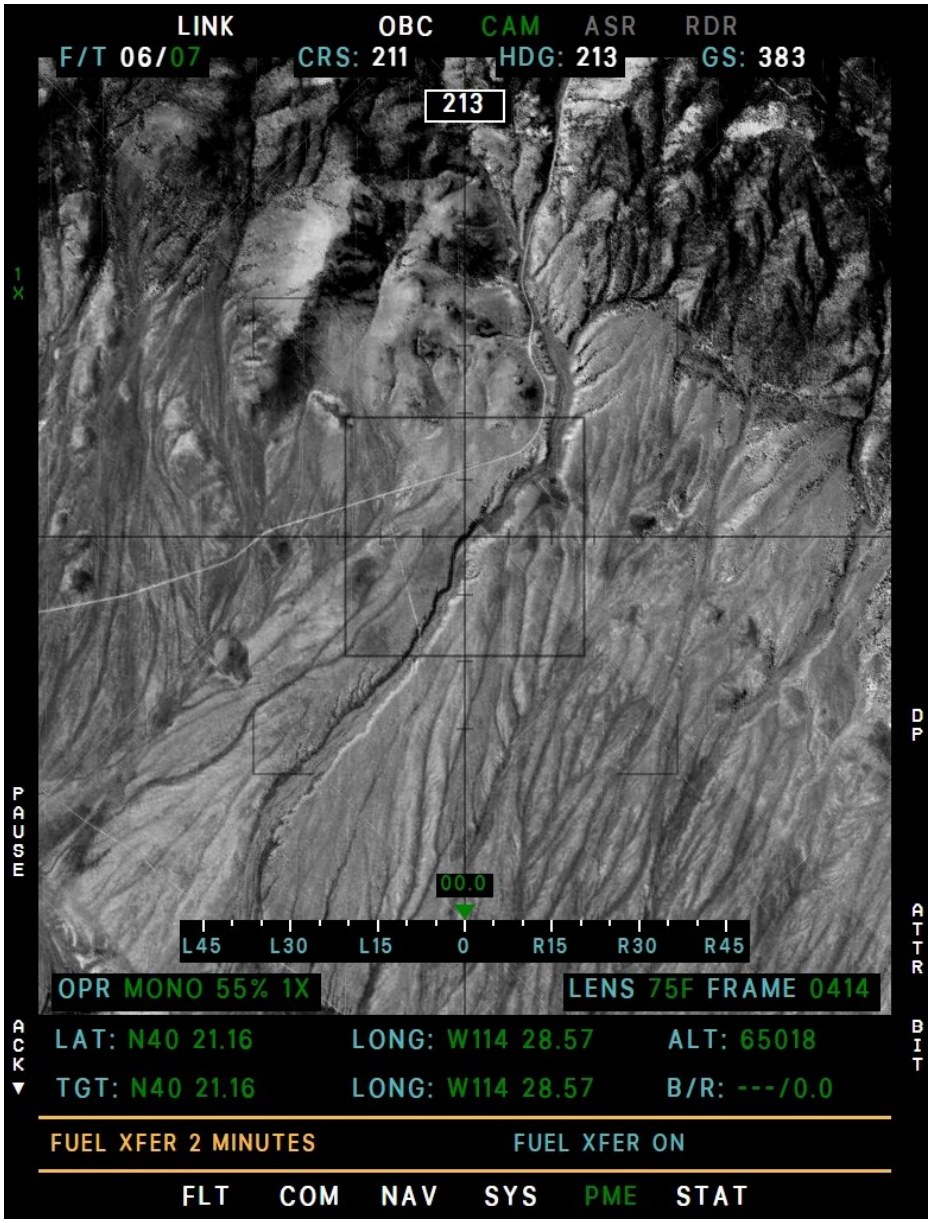
On the real aircraft. The OBC is a panoramic film camera. A 30-inch lens on a rotating optical bar sweeps a strip of ground from horizon to horizon onto a roll of film 10,500 ft long, about 1,600 frames, one every 6.8 seconds or so. Nobody saw a picture until the film had been developed after landing. The U-2 flew its last OBC mission in 2022.

In the simulator. The film is a live feed, so you see what you shoot: a black-and-white picture with grain, built from the same satellite imagery as the SYERS-2A. It runs ten times faster than the real camera, so the 1,600 frames last a flight and not a whole day: 33 minutes on SHUTTER VELOCITY 1, 18 minutes on 2 - 4.

Item	In short
Fit	EFB Aircraft tab, Q-bay: OBC camera, 1,050 lb. It flies with the Standard nose only.

Item	In short
Start	DRIFTSIGHT ON, MK IV MASTER ON for the boot, MODE OFF for the self-test (the C light is the go), then MODE 1-5 at or above 5,000 ft. See Starting and Stopping the Camera.
Exposure	MODE 1-5 is a slit width: 1 for a low sun, 5 for a high one. The wrong one shows in the picture.
Film	SHUTTER VELOCITY sets the frame rate and the coverage named on the page. FRAME counts the frames used, self-test included. At 1,600 the camera stays on its last picture and A lights steady.
Zoom	Up to 15×.
Aiming	The camera cannot move. The hand control looks left and right on the feed, up to 45°, and there is no ground lock or GIMBAL LIMIT.
Lens	Its heaters bring it to 75 °F in about 5 minutes, shown as LENS on the page.
From outside	The bar sits lens up when off and lens down in STBY, and spins while it photographs, one turn per frame.

Example CAM page with the OBC



The CAM page with the OBC at 62,000 ft, on SHUTTER VELOCITY 4: the page reads OBC, and the mode line gives the coverage, lens temperature and frame.

How to Operate

1. On the EFB **Aircraft** tab, set **Nose** to Standard and **Q-bay** to OBC camera.
2. Set DRIFTSIGHT ON. With it OFF the OBC stays in standby.
3. Set MK IV MASTER ON. The boot starts by itself: 30 seconds, or 90 seconds on Realistic, with A flashing.
4. Set MK IV MODE to OFF. After the boot the self-test runs: five frames. C comes on after the fourth frame: that is the go.
5. On an MFD press B5 PME, then CAM (the page reads OBC).
6. Set SHUTTER VELOCITY: 1 gives a frame every 1.2 s (about 33 minutes of film), 2 - 4 a frame every 0.7 s (about 18 minutes).
7. At or above 5,000 ft, set MK IV MODE to the slit for the sun: 1 for a sun about 12° up, 2 for 16°, 3 for 24°, 4 for 35°, 5 for 53° or higher. The OBC photographs. Below 5,000 ft it waits and starts by itself as you climb.

8. The hand control looks left and right on the feed, up to 45°. L5 PAUSE holds the picture; the film keeps running.
9. To stop, set MK IV MODE to STBY. At 1,600 frames the film is out and A comes on steady.

Mark IV Panel

The OBC uses most of the panel. TRACKER, OPTIC PWR and KNOTS have no function. The panel itself: Mark IV Camera Panel.



The Mark IV panel on the right console. The numbers match the table below.

No.	Control	With the OBC
1	**OBLIQUE ANGLE INDICATOR**	Follows the hand control left and right (45° travel).
2	**VIEWSIGHT HAND CONTROL**	Looks left and right on the feed, up to 45°. Forward and aft has no effect: the camera cannot move.

No.	Control	With the OBC
3	**DRIFTSIGHT**	ON / OFF. Must be ON: it powers the MODE and SHUTTER VELOCITY inputs.
4	**TRACKER**	No function
5	**MK IV MASTER**	Powers the camera, its air compressors and lens heaters. ON starts the boot.
6	**FRAME COUNTER**	Counts the frames, self-test included, to 9999. The round button sets it to 0000; the film used is FRAME on the CAM page.
7	**OPTIC PWR**	No function
8	**KNOTS**	No function
9	**SHUTTER VELOCITY**	1: a frame every 1.2 s. 2 - 4: a frame every 0.7 s.
10	**MK IV MODE**	OFF: self-test. STBY: standby. 1 - 5: photographs, each with its own slit width.
11	**A / B / C / D lights**	**A**: flashes during the boot, steady when the film is out. **C**: self-test go; flashes in 1 - 5 without INS data. **B**, **D**: no function.

The page is under CAM - SYERS-2A and OBC Camera.

Related pages: Sensors · Mission Equipment (PME) · Mark IV Camera Panel

Miltech Simulations U-2. SIMULATION USE ONLY. This documentation describes the simulated aircraft as delivered in the add-on and must not be used for real-world aviation.

Miltech Simulations U-2

Superpods and Senior Spear

The long pods on the wings and the Senior Spear fit: what they are on the real aircraft and what they change in the simulator.



Senior Ruby *(Type A).*



With Senior Spear: *the bulge on the left pod.*



Standard *(Type B).*



None: *covers fill the gap in the wing.*

On the real aircraft. The superpods are the long pods on the wings. They carry signals-intelligence equipment, which listens for radio and radar emissions and adds nothing to the pictures.

In the simulator. Signals intelligence is not simulated, so a pod changes the look of the aircraft, its weight and its balance, and nothing else. It does not change the drag. The PME A, PME B and PME C switches have no function.

Fit	EFB Aircraft tab	Weight	Notes
Senior Ruby	Superpods: Type A	2 × 800 lb	The default fit.
Standard	Superpods: Type B	2 × 600 lb	
None	Superpods: None	0 lb	The pods and their decals come off.
Senior Spear	Senior Ruby attachment	+400 lb, left pod	Senior Ruby only. It comes off if you fit the Standard pods or None. The left wing sits heavy: about 40 gal moved from the left to the right inboard tank balances it.

The weights are estimates. Balancing the wings in flight is under CRUISE TRIM AND BALANCE.

Related pages: Sensors · SPAN and Antennas · Variants · Electronic Flight Bag (EFB)

Miltech Simulations U-2. SIMULATION USE ONLY. This documentation describes the simulated aircraft as delivered in the add-on and must not be used for real-world aviation.

Miltech Simulations U-2

SPAN and Antennas

The SPAN fairing on the spine and the other antennas: what they are on the real aircraft and what they change in the simulator.



SPAN fitted: *the large fairing on the spine.*



SPAN off: *the clean spine, the default.*

On the real aircraft. SPAN carries a satellite antenna, so the aircraft can send what it collects to the ground from beyond line of sight.

In the simulator. These items are about the look and the weight. No page or function depends on them: the EFB Datalink tab works with or without the SPAN.



The three dorsal sensors behind the canopy. The numbers match the markers on the EFB drawing.

Dorsal sensors

1. **Forward (1)**
2. **Middle (2)**
3. **Aft (3)**

Item	EFB Aircraft tab	Weight
SPAN dorsal	SPAN switch, or its chip on the drawing	1,100 lb
Dorsal sensors 1-3	Dorsal antennas: Forward, Middle, Aft	300 lb each
Belly sensor 4	Belly sensor switch	300 lb
Belly blade antennas	Belly blade antennas switch	-

The four sensors are fitted on a fresh install, the SPAN is not. The weights are estimates. The belly sensor is in the picture on Optical Bar Camera (OBC).

Related pages: Sensors · Datalink Portal · Variants

Miltech Simulations U-2. SIMULATION USE ONLY. This documentation describes the simulated aircraft as delivered in the add-on and must not be used for real-world aviation.

Miltech Simulations U-2

Mark IV Camera Panel

The Mark IV panel on the right console runs the reconnaissance camera - the SYERS-2A in the nose, or the optical bar camera (OBC) in the Q-bay - and its lever, the viewsight hand control, aims the camera and moves the radar cursor.

The pictures are on the MFD: the camera on the CAM page, the radar on the RDR page - see Mission Equipment (PME). With the ASARS-2 nose the MODE knob is the radar's power control and MK IV MASTER powers its SSA recorder.

With no imaging sensor fitted - the Standard nose and no OBC - the panel and its lever are gone and a blank plate takes their place.



The Mark IV panel on the right console, in the cold-and-dark position: MK IV MASTER, the MODE knob and the A-D lights run the camera, the lever is the viewsight hand control, and the drums are the OBC frame counter.

Mark IV panel

1. **OBLIQUE ANGLE INDICATOR** - Shows how far the camera looks to the side. With the camera closed it follows the hand control left and right (full travel 85° with the SYERS-2A, 45° with the OBC or no camera); with the camera open it shows the camera's look roll.
2. **VIEWSIGHT HAND CONTROL** - The big lever on the panel. It aims the camera and moves the ASARS-2 radar cursor - see Viewsight Hand Control below. Drag it (up / down = forward / aft, sideways = left / right), roll the mouse wheel (forward / aft) or use the key bindings.
3. **DRIFTSIGHT** - ON / OFF. Powers the MODE and SHUTTER VELOCITY inputs for the OBC: with it OFF the OBC holds in standby. No function with the SYERS-2A or the ASARS-2 nose. It is ON after a runway or in-flight start.
4. **TRACKER** - ON / OFF. The spare tracker camera. No function in the simulator.
5. **MK IV MASTER** - Labeled MASTER on the panel. ON / OFF. Powers the camera: the SYERS-2A sensor with its nose servo and nose heat, or the OBC with its air compressors and lens heaters - switching it ON starts the OBC's boot. With the ASARS-2 nose it powers the radar's SSA recorder. It is ON after a runway or in-flight start.
6. **FRAME COUNTER** - Four drums that count the OBC's frames, self-test frames included, up to 9999 and round again. Click the round reset button to their left to set them to 0000. That gives no film back: the film used is FRAME on the CAM page.
7. **VIEWSIGHT OPTICAL POWER** - Labeled OPTIC PWR. 1X / 4X. No function in the simulator; the camera zoom is on the MFD CAM page.
8. **IMAGE MOTION COMPENSATION** - Labeled KNOTS, 300 - 500. No function in the simulator.
9. **SHUTTER VELOCITY** - 1 - 4. With the OBC it sets how fast the film runs: on 1 a frame every 1.2 s (the film lasts about 33 minutes), on 2 - 4 a frame every 0.7 s (about 18 minutes). The CAM page names the coverage - 1 MONO 20%, 2 and 3 STEREO, 4 MONO 55% - but the picture looks the same on all four. No function with the SYERS-2A.
10. **MK IV MODE** - OFF / STBY / 1 - 5. Click or wheel up steps it on, right-click or wheel down steps it back. The tooltip also lists the lights that are on. With the SYERS-2A, STBY starts the boot, 1 - 5 (all five work the same) open the camera, and OFF after a start shuts it down until MK IV MASTER has been switched OFF and ON again.

With the OBC, OFF runs the self-test, STBY is standby and 1 - 5 photograph, each with its own slit width. With the ASARS-2 nose, OFF is off, STBY starts the warm-up and holds the radar in standby, and 1 - 5 is radar PWR.

11. **A / B / C / D lights** - Amber. All four light with MASTER LT TEST. With the SYERS-2A: A nose servo fault (none simulated); C during the second half of the boot, for about 3 minutes after MODE 1 - 5 (about 20 s with the short warm-up) and for the first 5 s of a shutdown; D from 5 s after MODE OFF until 30 s after MASTER OFF.

With the OBC: A flashes during the boot and is steady once the film has run out; C comes on after the fourth self-test frame (go) and stays on in MODE OFF and 1 - 5, flashing in 1 - 5 without INS navigation data; D has no function. B has no function with either camera.

Starting and Stopping the Camera

The camera fitted - the SYERS-2A nose, or the Standard nose with the OBC in the Q-bay - is chosen on the EFB Aircraft tab. The two start differently, and the CAM page shows each step in its status box.

SYERS-2A

1. MK IV MASTER ON. The page reads SYERS-2A OFF MK IV MODE STBY TO START.

2. MODE to STBY: the boot starts - the countdown runs 30 seconds (4 minutes on *Realistic*) and C lights for its second half. Then SYERS-2A STBY.
3. MODE to 1-5 (all five work the same): the feed appears, looking straight down wherever the lever was left. There is no height rule, only the limit of 1,000 ft above the ground. MODE back to STBY closes the camera.
4. To shut down: MODE OFF - C for 5 s, then D. The camera stays off until MK IV MASTER has been switched OFF and ON again; D goes out 30 s after MASTER OFF. MASTER OFF, a change of camera or a loss of power also stop it, and the next start boots again.

OBC

1. DRIFTSIGHT ON. From cold and dark it is OFF, also after the EFB *Set up aircraft* presets, and the page then holds at OBC STBY MK IV DRIFTSIGHT OFF.
2. MK IV MASTER ON: the boot starts by itself, wherever MODE is - 30 seconds (90 on *Realistic*) with A flashing. The page reads OBC WARMING UP ADM BOOT - A LIGHT FLASHING.
3. MODE OFF: once the boot is done the self-test runs, five frames at the film rate (3 to 6 seconds), and the page counts OBC SELF-TEST FRAME 1 OF 5. C comes on after the fourth frame: that is the go, and the page reads OBC SELF-TEST GO. To run it again go OFF - STBY - OFF. The frames come off the film.
4. MODE to 1-5 at or above 5,000 ft: the OBC photographs. Each position is a slit width for the light: 1 suits a sun about 12° up, 2 about 16°, 3 about 24°, 4 about 35° and 5 about 53° or higher. The wrong one shows: too wide a slit washes the picture out, too narrow darkens it.

Below 5,000 ft the page waits at OBC STBY PHOTOGRAPHY ABOVE 5000 FT and opens by itself as you climb through it. Without a passed self-test it reads NO SELF-TEST - MK IV MODE OFF FIRST.

5. To stop: MODE STBY stops the frames. MODE OFF runs the self-test again. MASTER OFF, a change of camera or a loss of power also stop it, and the next start needs the boot and the self-test again.

ASARS-2 radar. MODE OFF is off. STBY starts the warm-up (30 seconds, 12 minutes on *Realistic*) and then holds it in STBY. 1-5 is PWR and it radiates once airborne, so you can set it on the ground. Back to OFF drops it, and the next start warms up again. MK IV MASTER is not needed for the radar itself, only for its SSA recorder.

Note
The boot time follows the EFB option *Sensor warm-up time* (Settings tab): 30 seconds on *Short*; on *Realistic* 4 minutes for the SYERS-2A and 90 seconds for the OBC. A runway or in-flight start comes up with MK IV MASTER and DRIFTSIGHT ON and MODE OFF: the OBC boots and runs its self-test by itself, so you only turn MODE to 1-5. The SYERS-2A still waits for MODE: STBY, or 1-5 straight away, starts its boot.

Viewsight Hand Control

The lever beside the panel is your aiming control. While the camera is open or in TEST it points the camera; with the ASARS-2 nose it is the radar cursor.

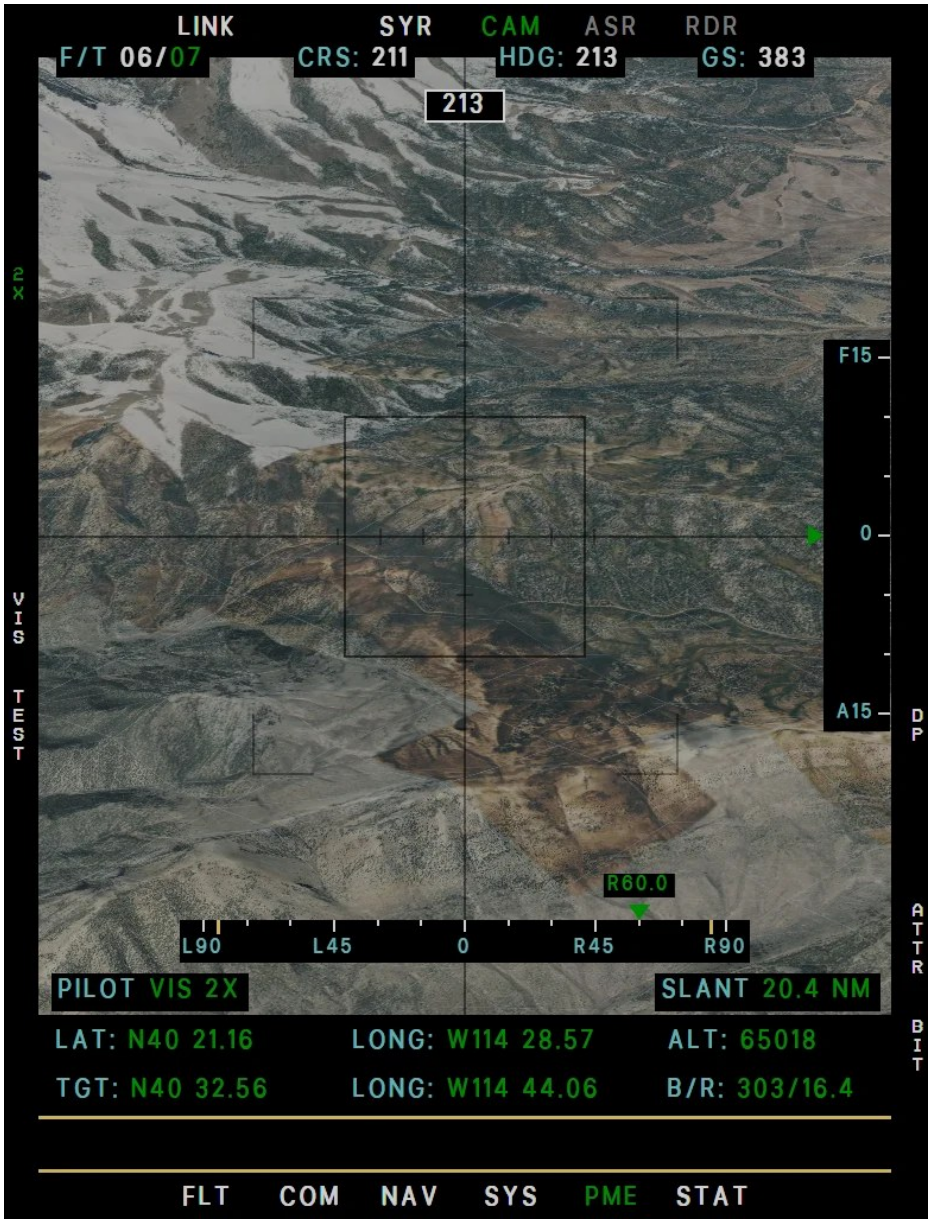
- **Aiming.** Moving the hand control turns the line of sight: sideways up to 85° left or right of straight down, forward / aft up to 15°. The camera opens straight down, wherever the lever was left. It turns at most 60° a second sideways and 30° forward / aft, so a fast move swings it rather than jumping. The OBC cannot move: with it the hand control looks left and right on the feed instead, up to 45°, and forward / aft does nothing.
- **Lock (SYERS-2A).** Unlocked, the default, the camera keeps its angles to the aircraft when you let go, so the picture moves with you. With L5 LOCK on the CAM page (green) it stays on the spot it is looking at: it turns by itself as you fly, turn, bank or climb.

At a stop it cannot follow any further and the spot slides along with you - flying straight, the aft stop is reached within a minute or so, depending on how far out you look. The lock sits on the real terrain under the crosshair, so a spot well above or below the ground under you holds too.

That takes the online elevation data: without it the camera works on the level of the ground under the aircraft, and a far spot on higher or lower ground creeps away. A DP slew locks it by itself. The OBC has no lock: its look stays at the angle you set, except during a DP slew.

- **The lever follows the look.** The hand control shifts the line of sight by how far you move it. After that the lever is kept where the camera looks, with the center of its travel straight down, so it always has the travel left to each stop - and you will see it creep by itself as the lock turns the camera. Read the angles on the roll and tilt scales of the CAM page, or see the crosshair on the MAP.
- **Speed.** With either camera every input is divided by the zoom (and halved again in SWIR and MWIR), so the picture pans at the same pace at any zoom. A centering stick such as a throttle TDC works as a rate control: at 1× full deflection moves the lever 5 % of its travel a second, less near the center, with a small dead zone, and the lever stays where it is when you let go.
- **Straight down.** *Set condition lever* sends the camera straight down (and locks it there with LOCK on). The CAM page R4 DP slew points it at a destination point or TP instead and locks it; moving the hand control ends the slew and the camera stays locked on that ground. The EFB option *Camera straight-down lock* (Settings tab) holds either camera straight down with a flat picture, and the hand control has no effect on it.
- **Nose and stops.** The SYERS-2A nose rolls to the line of sight, against your bank, at about 60° a second - with MK IV MASTER ON, the boot done and at or above 5,000 ft. Below 5,000 ft it centers and stows, though the camera still images. Past the stops - 90° from the wings or 15° in pitch - the CAM picture is blank with GIMBAL LIMIT. The OBC has no gimbal, so no GIMBAL LIMIT either.

Example CAM page, camera 60 degrees right



The SYERS-2A aimed 60° to the right at 62,000 ft, 2×: the ground seen at an angle, far ground at the top fading into the haze. The value over the roll scale reads R60.0, and the TGT row at the bottom is the ground under the crosshair.

ASARS-2 radar cursor. With the ASARS-2 nose the hand control is the radar cursor; the RDR page has no cursor keys. In SRCH the lever position is the cursor: left / right is the bearing, up to 60° either side; forward / aft is the range, from 5 % of the scope range at the aft stop through half range in the centre to full range forward.

Set condition lever puts it straight ahead at half range. In SPOT the hand control moves the patch from where it is, scaled by the patch size so that a move covers the same distance on the scope at every size, and a new picture is taken once you stop moving. Leaving the RDR page and coming back does not move the patch. The lever goes back to the center by itself once past a quarter of its travel, so the patch keeps moving while you hold it, and back in SRCH the lever is put where the patch is.

A DP slew on the RDR page (R4) ends as soon as you move the hand control.

On the MAP. While the camera is open, or in the SYERS-2A TEST, the MAP page shows where it looks: the radar's cyan crosshair on the ground under the CAM crosshair, in a box the size of the CAM picture, turned with the picture.

The box shrinks as you zoom in. Past the gimbal stops it turns dashed and the crosshair goes. The radar cursor is drawn on the MAP as well.

Binding (MSFS Controls)	Hand control
Increase condition lever 1 / **Decrease condition lever 1**	Forward / aft, a step per press
Condition lever 1 axis	Forward / aft as a rate - for a centring stick
Increase condition lever 2 / **Decrease condition lever 2**	Right / left, a step per press
Condition lever 2 axis	Right / left as a rate
Set condition lever	Camera straight down; radar cursor ahead at half range

Related pages: Mission Equipment (PME) · Sensors · Targeting Points

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Miltech Simulations U-2

Targeting Points

A targeting point (TP) is a spot on the ground you mark for the sensors: a building, a parked aircraft, a bridge. The aircraft holds up to 10 of them in one list, shared by all three MFDs. TPs act like destination points - they show on the MAP and on NAV/DPS, you can read their data, point a sensor at them and steer direct to them - but they are not a route: the steering computer never sequences through them.

TPs need an imaging sensor: the ASARS-2 nose, the SYERS-2A nose or the OBC in the Q-bay (EFB Aircraft tab). With the Standard nose and an empty Q-bay the TP and TD legends are gray and cannot be selected, and the MAP draws any TPs in gray. The list stays, so the TPs come back when a sensor is fitted. It lasts for the flight; ZEROIZE erases it.

Filling the List

Way in	Where	What it does
TD file	STAT → LOAD	Replaces the whole list with the points of an INS Planner plan.
Designate	The sensor, and your **Condition lever high idle** binding	Puts the point the sensor is aimed at in the first free slot.
By hand	NAV → DPS, file TP	Type a position into a free slot, or correct a TP.

Loading a TD File

TD (target data) is the STAT → LOAD file that fills the TP list from an INS Planner plan.

1. MFD B6 STAT, T5 LOAD.
2. L6 TD - INSPLANNER, and type the six-digit plan number into the ID box.
3. R6 LOAD. The status reads LOADED, or LOAD FAILED with the reason.

R5 DTAIL opens the file's own page, where L3 FTCH fetches the points so you can look at them before you load. With the TP file shown on NAV/DPS, R2 IMPORT opens that page directly (L2 PLAN selects the ID box) and R7 RTN takes you back to NAV/DPS.

The load replaces all ten slots with the first 10 points of the plan. It takes the plan's target list; a plan without one gives its route markers instead. The INS Planner has no separate target type yet, so in practice any marker plan works.

Each point brings its position, its name (up to 8 characters; without one it is called TP01, TP02 ...) and, if the plan gives it, its size: a diameter, or a length and width with a heading. With no size it gets the default 300 ft.

Designating with a Sensor

Bind **Condition lever high idle** in MSFS Controls (see Keybinds Guide). One press puts a new TP in the first free slot, at the point the sensor is aimed at. It is named after its slot, TP01 to TP10.

Sensor	Where the TP goes	Its size
Camera open (SYERS-2A or OBC, CAM picture up, inside the gimbal stops)	The ground under the crosshair	Read from the object, else 300 ft
Radar operating, SPOT	The center of the patch	Read from the object, else 300 ft
Radar operating, SRCH	The cursor	Always 300 ft - the picture is too coarse to read

The object read. After a camera or SPOT designate the TP appears at once as a 300 ft square. Within a few seconds, if something can be read there, it moves onto the center of the object and takes the object's length, width and heading. The read looks for, in this order:

- A parked aircraft near the point, about 130 × 120 ft along its heading. SPOT only, with the RDR page up on the left MFD, and only live traffic counts.
- The OpenStreetMap building the point lies in: the smallest rectangle around it.
- The object the camera's aerial imagery shows at the point: a shape that stands out from the ground around it, right at the crosshair. A parked C-130, for example, reads as about 115 × 100 ft.

Open ground, ground texture, anything that runs on like a road, anything very small and a point with no connection to the map servers all keep the 300 ft square.

Seeing TPs

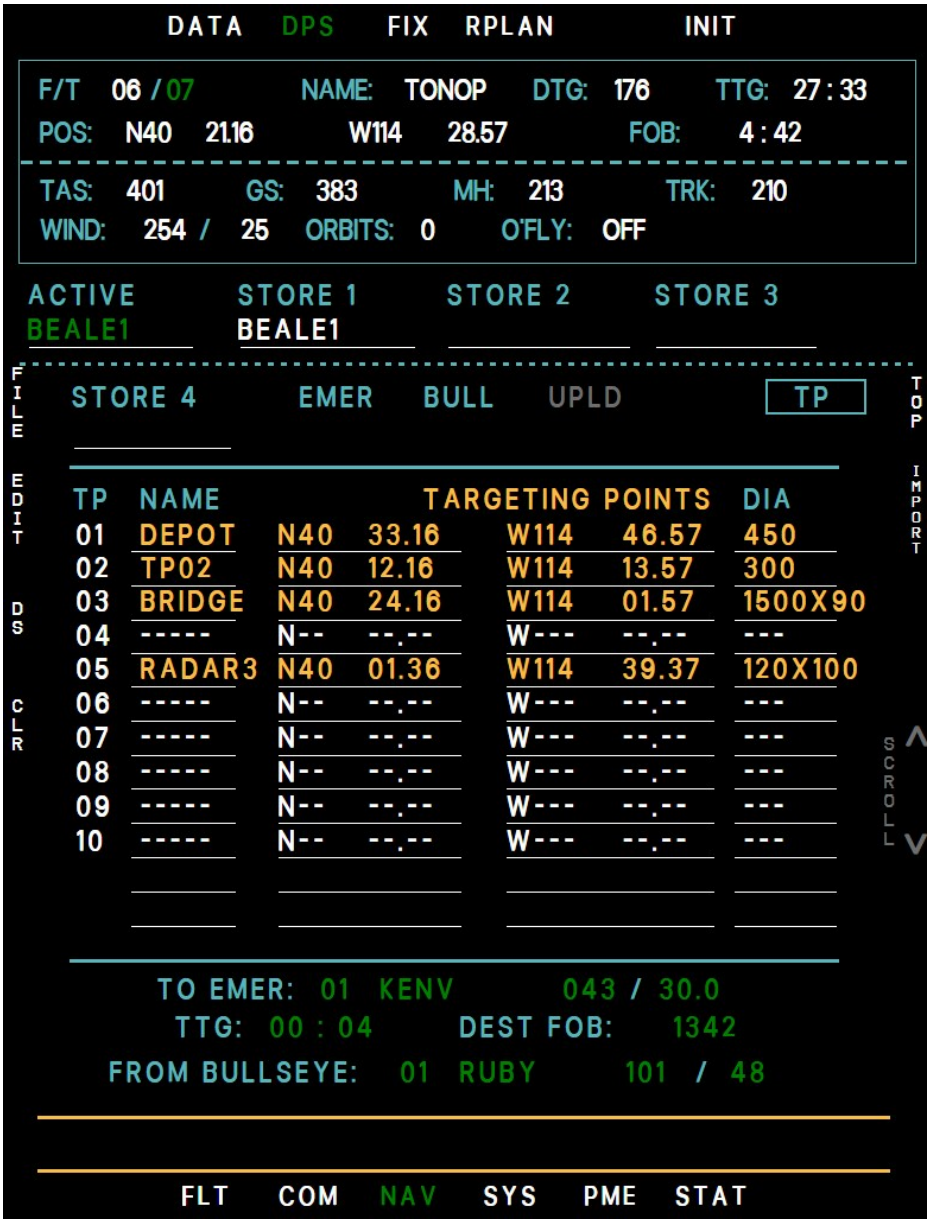
MAP. Every TP is a hollow yellow triangle with a dark casing, whatever the SMBL options. Its number (1 - 10) sits below it on the left; with ICAO on, its name sits on the right. There are no lines between TPs.

On AMP and RCTR, R2 steps through the files to TP. Pick the TP with the right rocker (it turns green) and press R1 ENT: AMP shows its position, bearing / range, time to go and fuel at the point, RCTR centers the map on it.

NAV/DPS. L1 FILE to TP, after BULL and UPLD. The table is headed TARGETING POINTS and always shows all ten slots: number, name, latitude, longitude and size, with dashes in a free slot.

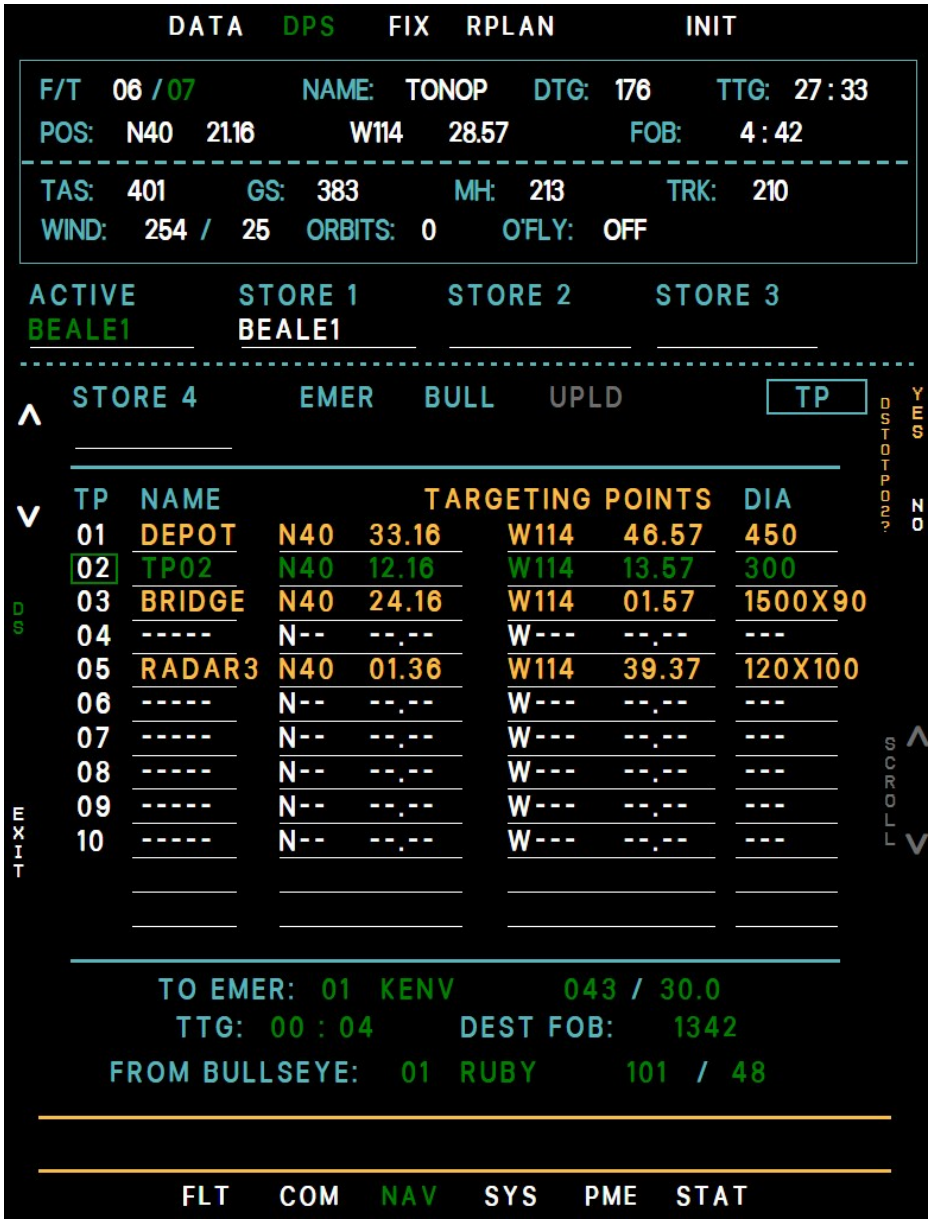
- DIA is the size in feet: one number for a plain TP, length X width for a read object, such as 120X100.
- L2 EDIT: L1/L2 pick the row, L3 steps LAT, LONG, DIA, L5 EXIT. Type with the UFCD pad or use INC/DEC. DIA takes 1 to 99,999 ft by pad and moves 10 ft a step by INC/DEC; a read object's width scales with it. A position typed into a free slot makes a new TP of 300 ft. R1 DEL blanks the row, R2 UNDO restores it.
- L4 CLR: L1/L2 pick a TP, L4 ENT clears it, L5 EXIT. R2 ALL clears the whole list (R1 YES).
- Names come from the TD file. They cannot be typed in the cockpit: the UFCD and BCDU, where DP names are entered, have no TP file.

Example MFD NAV/DPS TP file



NAV/DPS with the TP file: TPs in yellow, free slots as dashes. TP02 has the default size; BRIDGE and RADAR3 show length X width.

Example MFD NAV/DPS direct steer to a TP



A direct steer to a TP being set up: the green box and green row mark the TP, with DS TO TP02? beside YES and NO.

CAM and RDR pictures. Each TP in the picture is a flat yellow box, square to the picture, with a dot on the point and the name beside it. The box is the outline of the target's footprint on the ground at the picture's scale, so it tells you how big the target is:

- **Radar.** The footprint on the scope. In SRCH only TPs inside the fan are drawn; in SPOT those on the patch.
- **SYERS-2A.** The footprint as the camera sees it. Straight down it has its true shape. The further out you look the flatter it gets - about 3.6 : 1 at 40 NM from 65,000 ft - and it grows as you zoom in.
- **OBC.** The same, on the live feed, and on the held picture in PAUSE or at MAX FRAMES.
- A box too small to see is held at 14 pixels on its short side, keeping its shape up to 6 : 1.

Example MFD CAM page with TP boxes



The SYERS-2A at 16×, looking out 60°: TP01 was designated on the parked C-130 at the crosshair and reads as a flat box its size. The other two are loaded TPs.

Example MFD RDR page with TP boxes



RDR SPOT 2.5 NM HIGH: the same kind of box on the radar, TWYB at the default 300 ft and RAMP an 800 X 300 ft target.

Pointing a sensor at a TP. TP is a file in the DP select of both sensor pages:

- **CAM** (camera open): R4 DP, R2 until it reads TP, pick the TP with the right rocker, R1 ENT. The camera slews to it and locks on it. Every TP is offered: a number in amber is out of reach (85° to the side and 15° fore / aft, 45° to the side for the OBC) and ENT does nothing until it comes into reach. R4 again, or moving the hand control, ends the slew.
- **RDR** (SRCH, radar operating): R4 DP, R2 until it reads TP, step through the TPs in the fan with the right rocker (the picked box is heavier), R1 ENT. The cursor follows the TP; L3 SPOT then images it. Moving the hand control ends it.

Direct Steer to a TP

1. NAV → DPS, L1 FILE to TP.
2. L3 DS. A cursor starts on the first TP in use; L1/L2 move it.

3. R1 YES beside DS TO TP02?. R2 NO, L5 EXIT or DS again cancels.

The aircraft flies a normal direct steer straight to the TP, with a magenta line on the map from where it began. On arrival it goes into a continuous right turn at 15° of bank; if it passes more than 1.45 NM from the TP it steers back to it first.

The turn is not tracked, so wind drifts it, and it never goes on to a DP: it stays in that turn until you make another steering selection.

The TP is not in the ACTIVE file, so the steering shows TO DP 00, on the UFCD and BCDU too. Only the top block of NAV/DPS shows the TP's name. The direct steer works from NAV/DPS only, with the INS in NAV.

While the autopilot flies the route in NAV the key reads ANAV and does nothing - disengage NAV first. It is not available while EMER is the active file.

Advisories

Message	Why	What to do
TP LIST FULL	All 10 slots are in use. It stays on until one is free.	Clear a TP on NAV/DPS before the next designate.
TP DESIGNATE FAILED	For 5 seconds after a designate that found no free slot, or no sensor aimed at the ground.	Open the camera (or leave TEST) with the ground in view, or get the radar operating - airborne with MK IV MODE 1-5. If the list is full, clear a TP.

Related pages: Mission Equipment (PME) · Mark IV Camera Panel · Navigation System (INS Steering) · Map, Traffic and Checklists

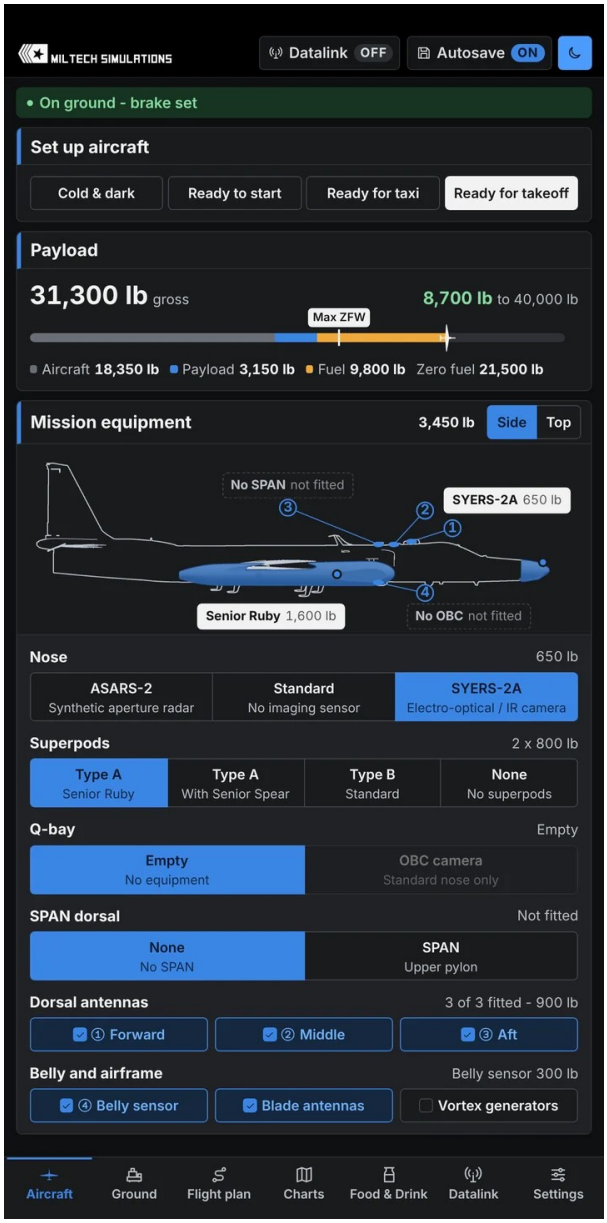
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Miltech Simulations U-2

Electronic Flight Bag (EFB)

The U-2 EFB is an app on the standard MSFS tablet: open the tablet and choose **U-2 EFB**. It is made for the tablet held upright. Seven tabs run along the bottom: Aircraft, Ground, Flight plan, Charts, Food & Drink, Datalink and Settings.

Note
Sim values. Performance values are measured in the sim. They may not accurately represent (nor do they intend to accurately represent) the performance of the real aircraft.



Night mode (the moon in the header): the same app in a dark palette.

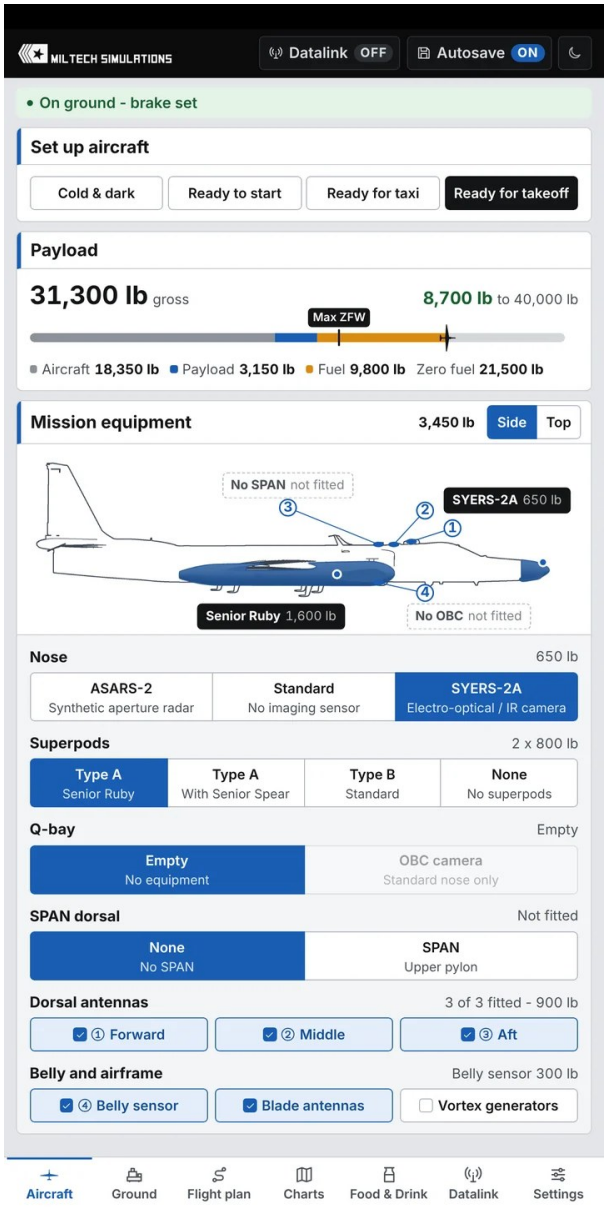
The header holds the **Datalink** chip, **Autosave** and **Night mode**. Under it a status strip shows whether you are on the ground (and whether the brake is set) or in flight, and on the right what matters on the open tab, for example *Equipment can move* on the Ground tab or *No plan sent* on the Flight plan tab. Messages pop up above the tabs and close by themselves; errors stay a little longer, and the × closes one at once.

When the app opens it shows *Restoring cockpit settings* for a moment while your saved configuration is applied.

Header	What it does
Datalink chip	Shows whether the datalink is ON or OFF and opens the Datalink tab. It does not switch the datalink: that is done on the Datalink tab.
Autosave	ON (default): your equipment, the Settings options (the plushie, flag and action camera too) and the food menu carry over to the next flight on this PC. OFF: they reset at the next flight.
Night mode	A dark palette for the whole app, remembered on this PC.

Remembered on this PC whatever Autosave says: night mode, brightness, display size, which Settings sections are folded, your SimBrief Pilot ID, your datalink choice, the chart slots, your custom chart pages and your chalk drawings. Not kept: the CAM road lights (on at every flight start), the EFB tablet and its holder (shown at every flight start), the ground starting air and the vehicle layout.

Aircraft Tab



The Aircraft tab: Set up aircraft, Payload and Mission equipment, with the drawing and the rows under it.

Three cards: **Set up aircraft**, **Payload** and **Mission equipment**. The equipment can be changed on the ground or in flight; only Set up aircraft needs the ground.

Set up aircraft

On the ground and stopped, one press sets the whole cockpit up for you. Anywhere else the line under the buttons says why it cannot run. While a preset runs the line says what it is doing (preparing the aircraft, starting the engine, bringing ground power, clearing the ground equipment) and what it waits for; afterwards it shows the last state applied, or why a preset could not finish.

Preset	What it does
Cold & dark	Stops a running engine at once and switches everything off, external power too. It fits the wheel chocks and the covers.

Preset	What it does
Ready to start	Does the EFA for you up to the ENGINE START checklist: ground power connected with EXTERNAL POWER ON, the avionics up with the INS aligned, the AFCS switches on, pitch trim in AUTO, oxygen ON, the nav lights flashing, the SPOILER switch in ARM and EW CONT in REC. The engine stays off and the canopy stays open; the air-start unit waits on the stand for your Attach. Where no power unit can come (on a runway, or if external power does not come on) it finishes on the battery and the line says so.
Ready for taxi	The engine goes straight to ground idle (no start sequence), with the generators on line, the avionics up with the INS aligned, the boost pumps and sump tanks on, oxygen ON, the canopy closed, the nav lights flashing, the beacon and taxi light on and the Mark IV MASTER on. It first clears the carts and the stairs (as **Disconnect all**) and waits until they have gone.
Ready for takeoff	As Ready for taxi, and also the canopy seal ON, the SPOILER switch in ARM, EW CONT in RPT, the landing light on, the transponder to NORM, the AFCS switches on and the PFD and map pages up. The pitot heat stays off: switch it on just before takeoff if you need it.

The Ready presets take off the covers and the gear pins, but not the wheel chocks, and the pogo pins stay for the runway crew. Your MSFS **Engine auto-start** key runs Ready for taxi and **Engine auto-shutdown** runs Cold & dark (see the Keybinds Guide).

Payload

The gross weight in large figures, and beside it how much more you can load before the 40,000 lb maximum gross weight. The bar builds that weight (aircraft, payload, fuel) with a tick at the maximum zero fuel weight (**Max ZFW**: 20,000 lb for the fuselage plus the superpods and the SPAN). Above it, or above 40,000 lb gross, a red *Over max ZFW* or *Overweight* shows in the card header, and a note under the bar gives the most fuel you can carry.

Mission equipment

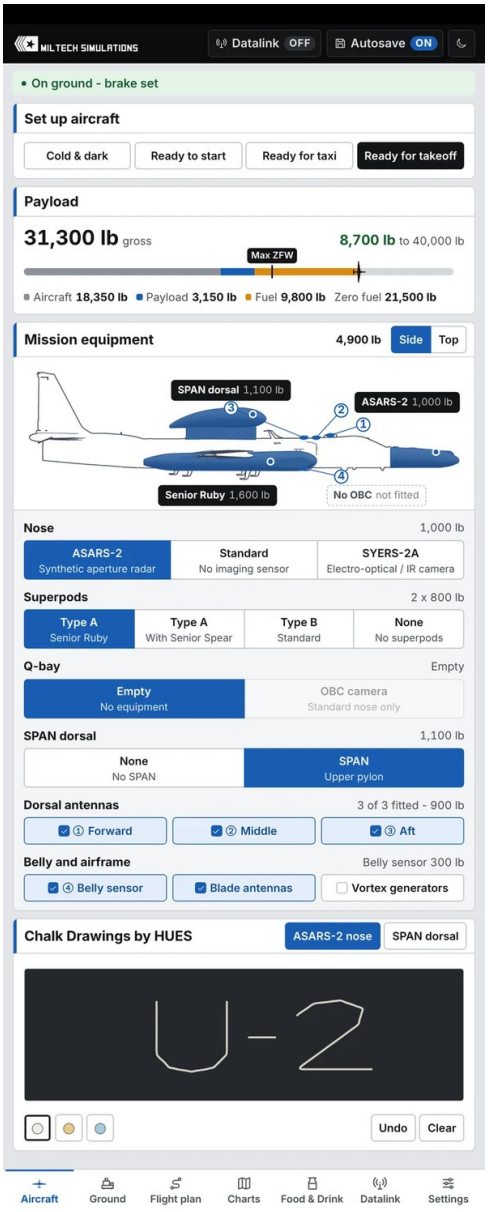
A drawing of your aircraft from the side (the default) or the top. Each fitted item has a chip with its weight: click a chip to step that item to its next fit, or use the rows under the drawing. The numbered markers are the dorsal sensors (1-3) and the belly sensor (4); a box under the pods marks the Q-bay while the OBC is fitted. The card header gives the weight of all the equipment, and the weights go to the aircraft's payload stations at once.

Item	Choices	Weight
Nose	ASARS-2 · Standard · SYERS-2A	1,000 · 300 · 650 lb
Superpods	Type A Senior Ruby · Type A with Senior Spear · Type B Standard · None	2 × 800 (Spear +400 on the left) · 2 × 600 · 0 lb
Q-bay	Empty · OBC camera (standard nose only)	0 · 1,050 lb
SPAN dorsal	None · SPAN (upper pylon)	0 · 1,100 lb
Dorsal antennas	Forward (1) · Middle (2) · Aft (3), tick to fit	300 lb each
Belly and airframe	Belly sensor (4) · Blade antennas · Vortex generators, tick to fit	Belly sensor 300 lb

The nose decides which sensor works: ASARS-2 is the radar (RDR) page, SYERS-2A the camera (CAM) page. The OBC flies with the standard nose only: with another nose it is greyed out, and fitting another nose takes it

out. All sensor weights are estimates. What each item is and does is under Sensors.

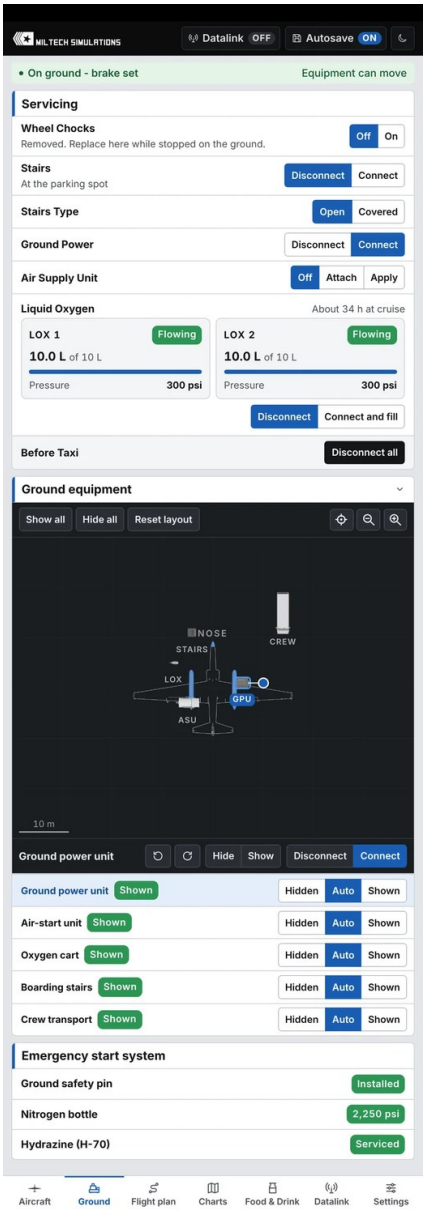
Chalk Drawings by HUES



Chalk Drawings: draw on the ASARS-2 nose or the SPAN dorsal in white, ochre or blue chalk. Click to see the full tab.

With the ASARS-2 nose or the SPAN dorsal fitted, a **Chalk Drawings by HUES** card appears at the bottom of the Aircraft tab. Choose **ASARS-2 nose** or **SPAN dorsal** to open its drawing pad, pick white, ochre or blue chalk and draw with the mouse: the drawing appears on that part of the aircraft. **Undo** takes back the last stroke and **Clear** wipes the pad. Each drawing is kept on this PC.

Ground Tab



The Ground tab: Servicing, the ground equipment map with the ground power unit selected, the vehicle list and the emergency start system. Click to see the full tab.

Service the aircraft and arrange the ground equipment on your stand. It works only while you are parked: on the ground, stopped, off the runway, with the parking brake set or the wheel chocks fitted. The line under the map (and the status strip) says what is missing.

Servicing

The services in the order of a departure. **Connect** or **Attach** brings a hidden vehicle out by itself, sends it to its service point where the cable or hose goes on; **Disconnect** sends it back.

Service	Choices	What it does
Wheel Chocks	Off · On	Stopped on the ground; the walkaround removes them too. The chocks do not follow the parking brake.

Service	Choices	What it does
Stairs, **Stairs Type**	Disconnect · Connect, Open · Covered	Connect brings the boarding stairs to the cockpit; Disconnect takes them back to their spot.
Ground Power	Disconnect · Connect	Brings the GPU to its service point. Once the cable is on, switch EXTERNAL POWER ON in the cockpit. Disconnecting, or the GPU leaving, switches external power off.
Air Supply Unit	Off · Attach · Apply	The starting-air cart. Attach connects the hose; Apply supplies the air, which turns the engine: the only way to start it on the ground (see Engine Start). A press of MIC on the yoke or throttle selects Apply too. The air comes off by itself once the engine runs, and the hose drops if you roll faster than 3 kt.
Liquid Oxygen	Disconnect · Connect and fill	LOX 1 and LOX 2 show the quantity (of 10 L), the pressure and Flowing / Off, with the endurance at cruise in the header. With the engine stopped, Connect and fill brings the oxygen cart and fills both converters to 100 %. The hoses stay on until you press Disconnect.
Before Taxi	Disconnect all	Disconnects every cart and the stairs and sends them back to their spots; the line beside it says what it is waiting for. Ready for taxi and Ready for takeoff do this first by themselves.

Ground equipment

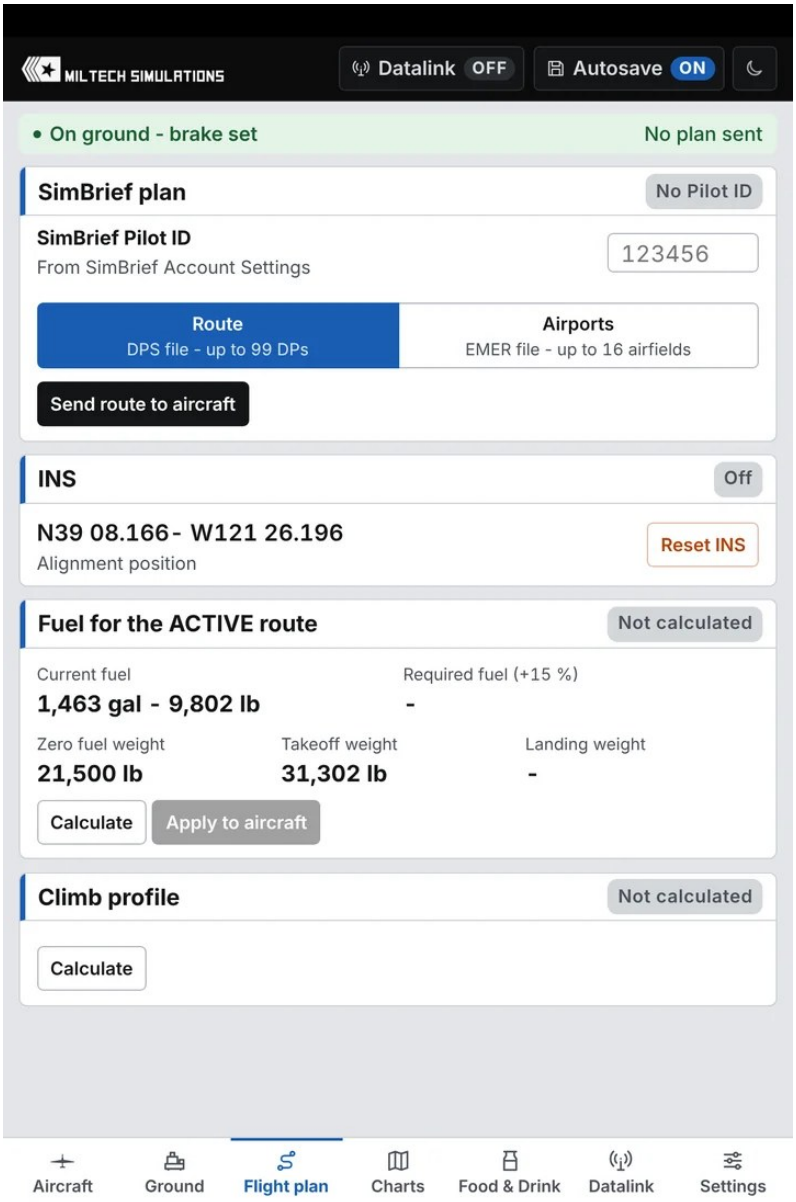
A stand map with your aircraft drawn as fitted, nose up, on a 10 m grid. The magnifiers zoom it (30, 50, 80 or 120 m across), dragging the map pans it, and the target button centres it again. Shown vehicles are solid, hidden ones faint at their planned spots. Click a vehicle (on the map or in the list) to select it, and drag it to a new spot within 40 m of its default position, never into the aircraft's clearance. The bar under the map acts on the selected vehicle: turn it 15° at a time, Hide or Show it, and Connect or Disconnect it.

Each vehicle (ground power unit, air-start unit, oxygen cart, boarding stairs, crew transport) is **Hidden**, **Auto** (follows the normal ground-service sequence) or **Shown**; its tag says what it is doing. **Show all**, **Hide all** and **Reset layout** (default positions, all on Auto) act on every vehicle. A connected cart cannot be moved: disconnect it and wait for it to return.

Emergency start system

Read only: the **ground safety pin** (Installed or Removed; the runway crew pulls it with the pogo pins), the **nitrogen bottle** pressure (2,250 psi when serviced) and the **hydrazine** (Serviced, or Used after an airstart). See Engine Start.

Flight Plan Tab



The Flight plan tab: the SimBrief plan and uplink, the INS, fuel for the ACTIVE route and the climb profile.

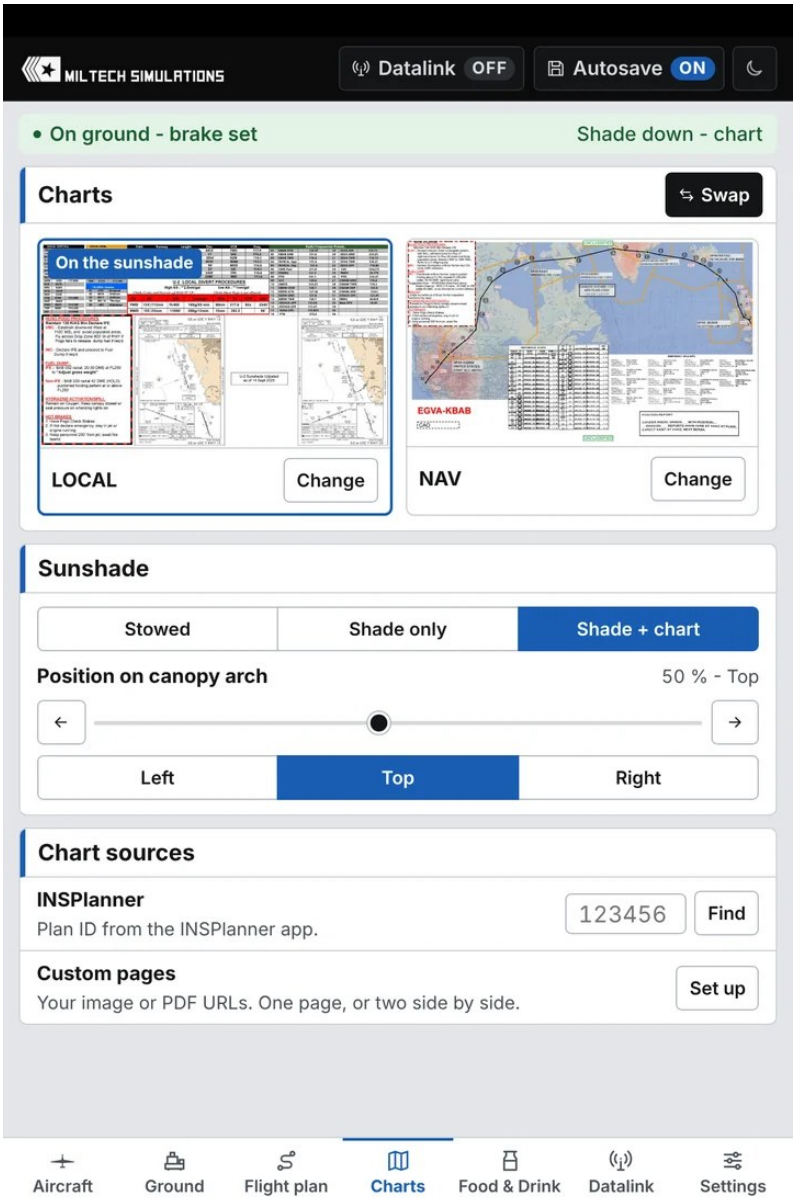
SimBrief plan. Enter your SimBrief Pilot ID once (from your SimBrief account settings); the MFD uses the same ID for MFD STAT → LOAD → SIMBRIEF. Choose **Route** (DPS file: origin, navlog fixes and destination, up to 99 DPs) or **Airports** (EMER file: origin, destination and alternates, up to 16), then **Send route to aircraft**. The EFB plays the ground station: it fetches your latest plan and sends it as an UPLD file, which you accept or reject on the MFD or the BCDU. It needs an internet connection, not the datalink.

INS. Your position in the format the BCDU expects for ALN POS, and the INS state. **Reset INS** asks first, then puts the INS back in standby so you can align again.

Fuel for the ACTIVE route. Current fuel in gallons and pounds. **Calculate** flies the ACTIVE DP file in a quick model (the 160 KIAS climb to M .715, then the cruise climb at M .715, with your zero fuel weight and the pods' drag; standard day, no wind, no descent) and gives the required fuel plus 15 %, the zero fuel, takeoff and landing weights and a fuel bar. **Apply to aircraft** (stopped on the ground) loads it, both sides even. Changing the ACTIVE file or the payload clears the figure.

Climb profile. Calculate draws the climb on the same model: altitude against KIAS, between the stall speed (at the start and end weights) and the limits, MMO .75 and VMO 240 KIAS, with the top of climb, the speed corridor there and the ceilings. With no ACTIVE route it draws the climb at your present weight.

Charts Tab



The Charts tab: the two charts with the one on the sunshade marked, the sunshade and its position, and the chart sources.

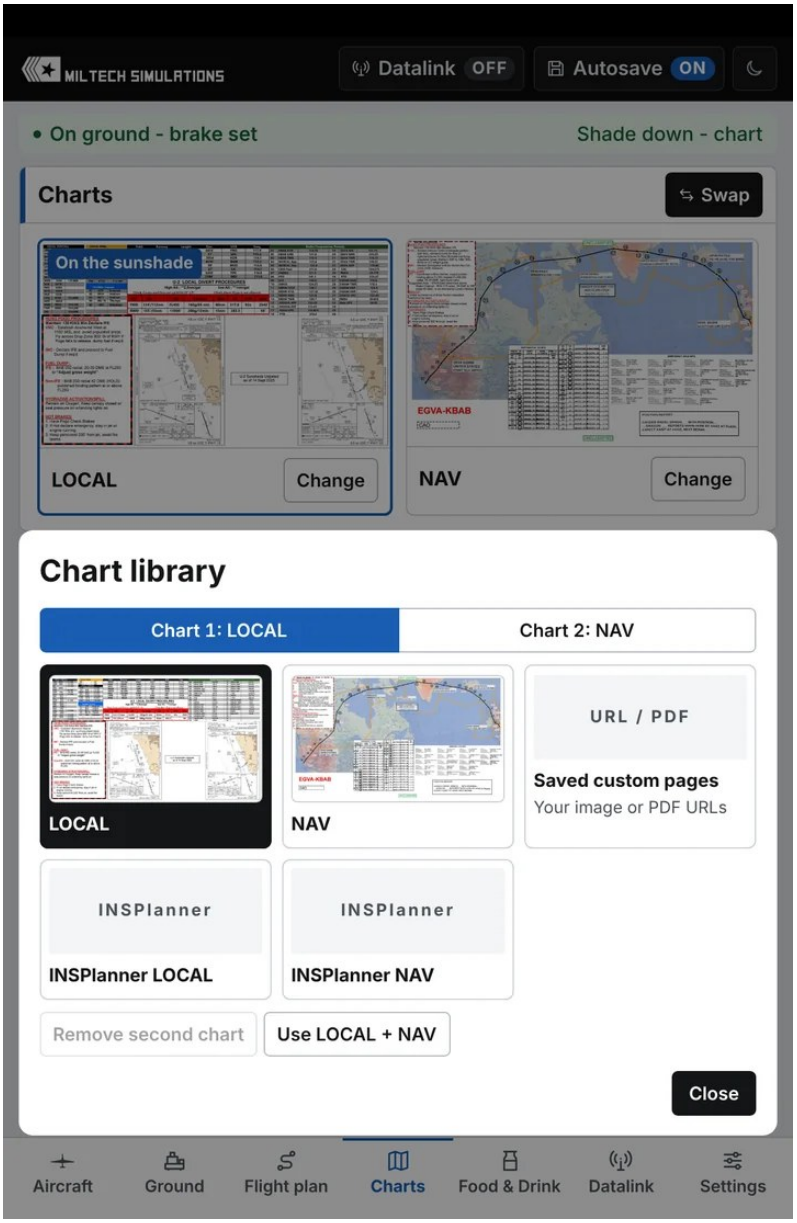
U-2 pilots clip their charts to a sunshade that slides along the canopy arch. Yours works the same way.

Charts. The two tiles are your two charts (LOCAL and NAV to begin with); the one on the shade is marked *On the sunshade*. Click a tile to put its chart on the shade, or **Swap**; in the cockpit the amber pull tab swaps them too. **Change** opens the chart library for that tile.

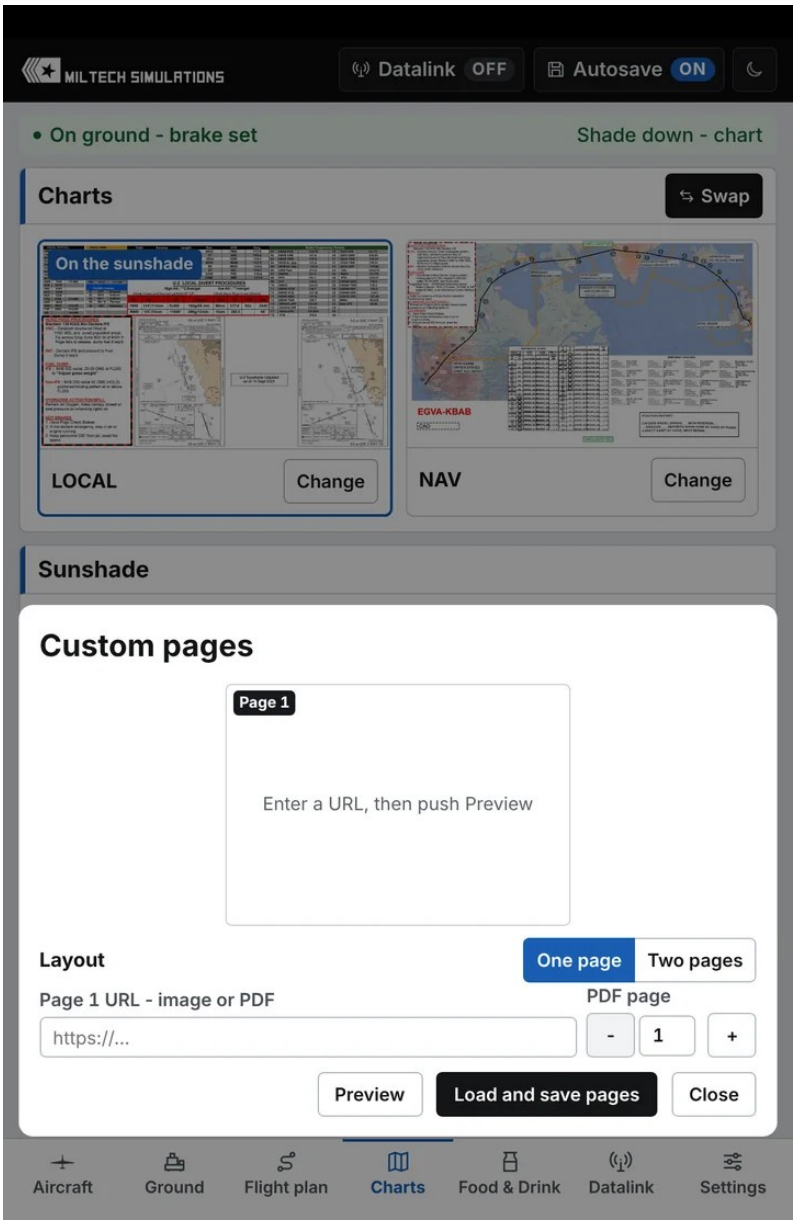
Sunshade. Stowed · Shade only · Shade + chart. **Position on canopy arch**: the slider, the arrows (2 % a click) and Left · Top · Right. In the cockpit you can drag the shade or roll the mouse wheel over it. Every flight starts with the shade down at the top of the arch, showing your last chart.

Chart sources. INSPlanner: generate the charts in INSPlanner and choose Send charts to aircraft, then type the same plan ID here and press **Find**; sheet 1 goes to chart 1 as LOCAL and sheet 2 to chart 2 as NAV. **Custom pages** (Set up): a direct link to an image or PDF, one page or two side by side, the PDF page,

Preview, then **Load and save pages**. Links must be direct http/https addresses to files that are not password-protected.

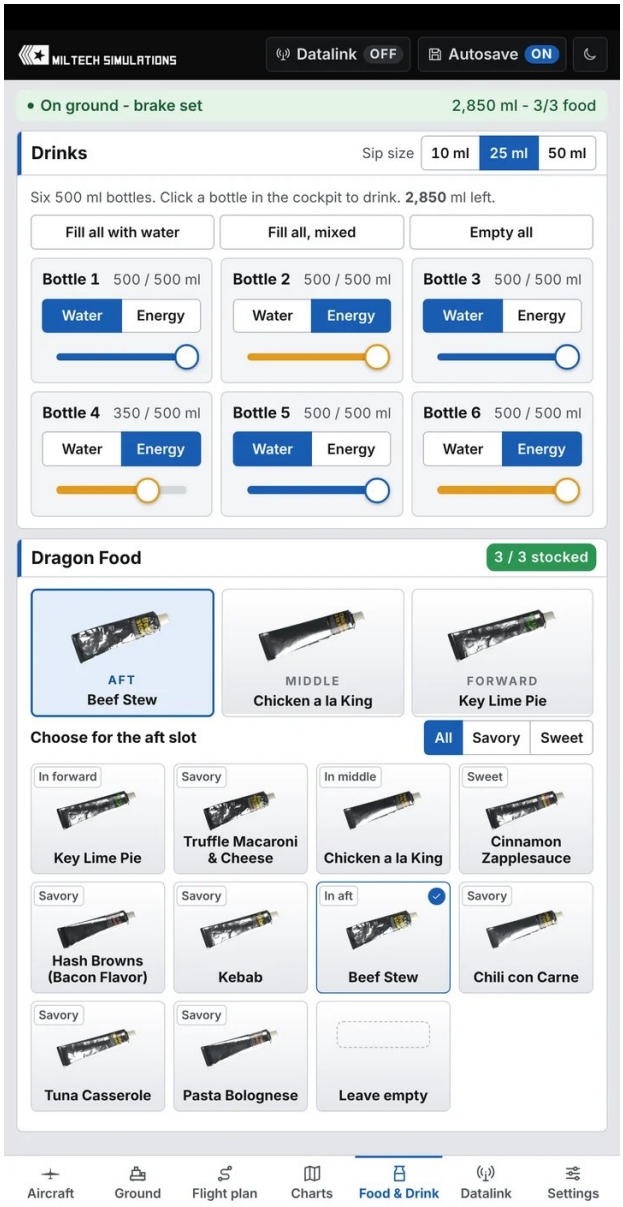


Change: pick the chart for that slot: LOCAL, NAV, your saved custom pages or the INSPlanner sheets.



Custom pages: a direct link to an image or PDF, the layout and the PDF page.

Food & Drink Tab

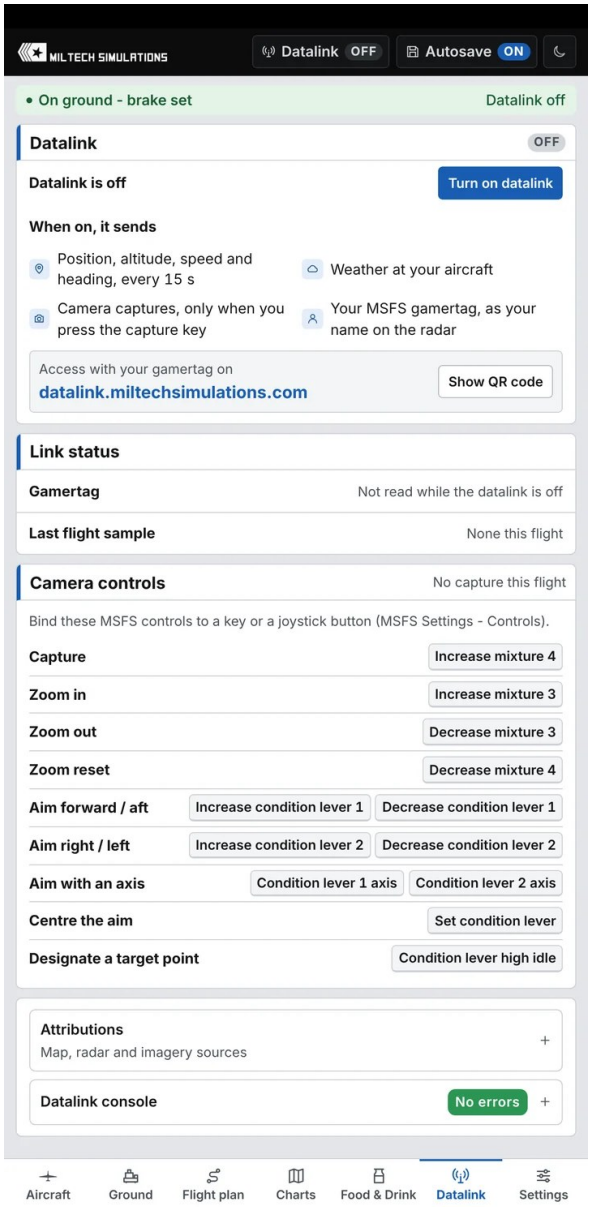


The Food & Drink tab: sip size, fill buttons and the six bottles, and the three Dragon Food slots.

Drinks. Six 500 ml bottles, each Water or Energy. Set a bottle's level with its slider, or use **Fill all with water**, **Fill all, mixed** or **Empty all**; the card shows how much is left in all. The sip size is 10, 25 or 50 ml. Click a bottle in the cockpit to drink.

Dragon Food. Three heater slots (aft, middle, forward) and ten tube flavors. Select a slot, then a tube or **Leave empty**; All · Savory · Sweet filters the list, and the card header counts the stocked slots. In the cockpit, click a stocked tube to take it out and again to stow it; the FOOD HEATER switch warms a tube and shows FOOD READY about ten minutes after START.

Datalink Tab



The Datalink tab: the datalink switch and what it sends, the link status, the camera controls, Attributions and the Datalink console.

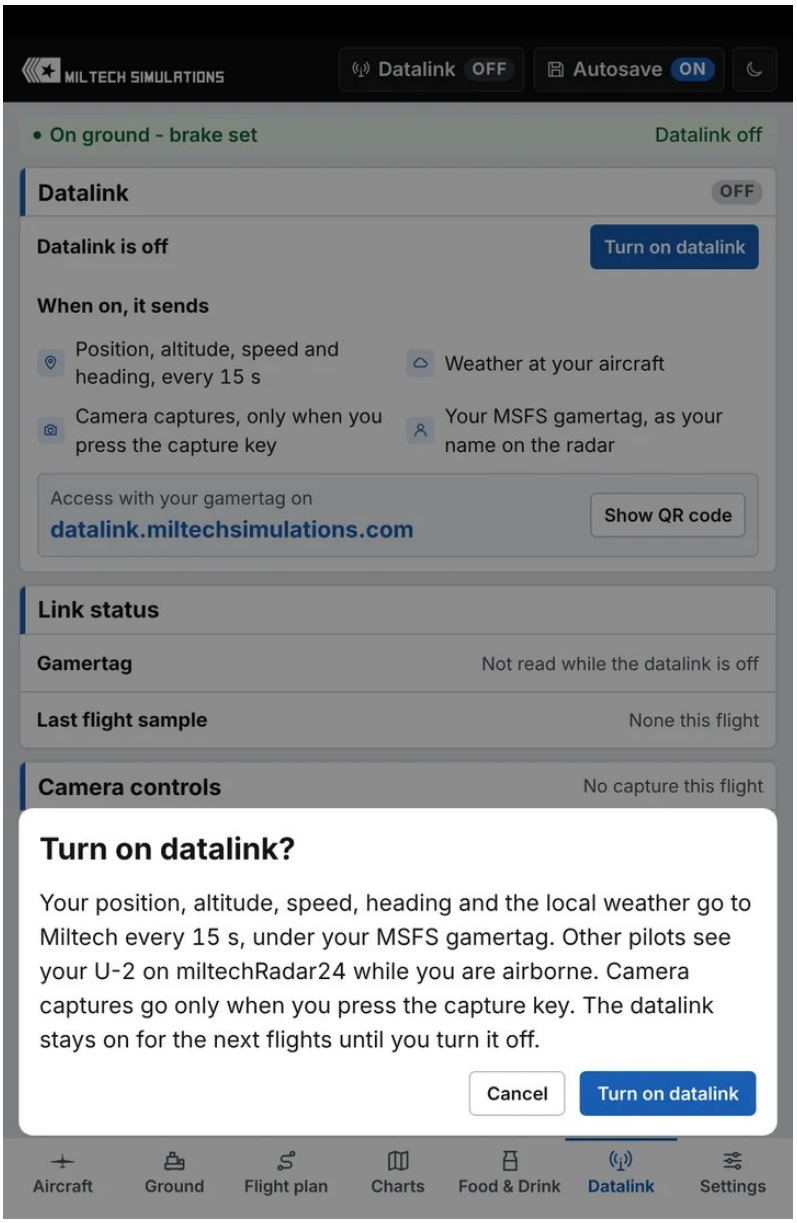
The datalink is off on a first install, and your choice is remembered on this PC. **Turn on datalink** asks first; **Turn off** works at once. While it is on, your position, altitude, speed, heading and the local weather go to Miltech every 15 s under your MSFS gamertag, and other pilots see your U-2 on miltechRadar24 while you are airborne. Camera captures go only when you press the capture key; no images are ever uploaded. Switching off stops the uploads at once, and your radar position goes within 90 s.

datalink.miltechsimulations.com is where you see your shared records: sign in with your gamertag. **Show QR code** puts the address on the tablet for your phone camera. **Link status** gives your gamertag and the time of the last flight sample.

Camera controls lists the MSFS controls the camera pages listen to; they are all in the Keybinds Guide. With the datalink on and a camera page showing above 1,000 ft AGL, Capture saves the camera position and conditions to your gallery; the card header shows how the last capture went.

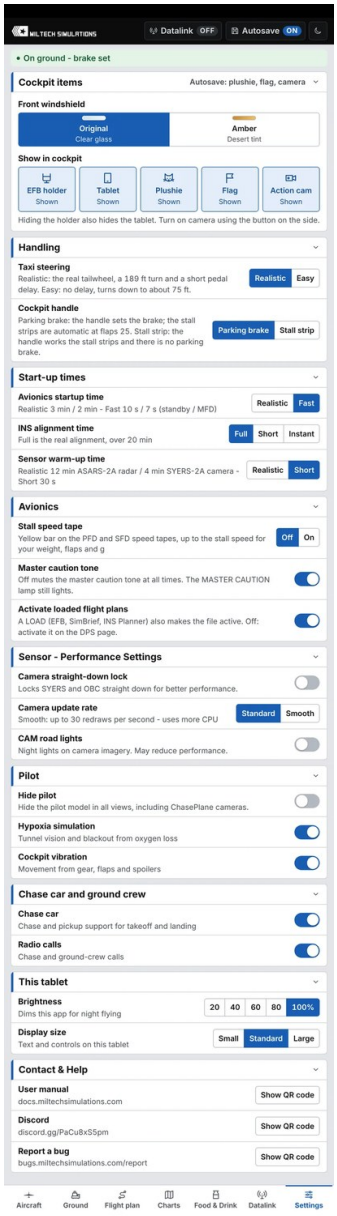
Attributions lists the map, radar and imagery sources. The **Datalink console** shows local error messages from the datalink, the SimBrief uplink and the radar, map and camera pages; it works with the datalink off

and nothing in it is uploaded.



Turning the datalink on asks first: Cancel or Turn on datalink.

Settings Tab



All nine Settings sections, unfolded. Click to see the full tab.

Nine sections; click a heading to fold or unfold it (remembered on this PC). Switches are blue when on.

Option	Choices	What it does
Cockpit items		
Front windshield	Original · Amber	Clear glass or a desert-amber tint.
Show in cockpit	EFB holder · Tablet · Plushie · Flag · Action cam	Click a tile to show or hide the item. Hiding the holder also hides the tablet. The plushie, flag and action camera are kept with Autosave; turn the action camera on with the button on its side.
Handling		

Option	Choices	What it does
Taxi steering	Realistic · Easy	Realistic: the real tailwheel, a 189 ft turn and a short pedal delay. Easy: no delay, and it turns down to about 75 ft.
Cockpit handle	Parking brake · Stall strip	Parking brake: the handle sets the brake, and the stall strips come out by themselves at flaps 25. Stall strip: the handle works the stall strips and there is no parking brake. Change it stopped on the ground.
Start-up times		
Avionics startup time	Realistic · Fast	Realistic 3 min / 2 min, Fast 10 s / 7 s (standby display / MFDs).
INS alignment time	Full · Short · Instant	Full is the real alignment, over 20 minutes. You still start and accept it.
Sensor warm-up time	Realistic · Short	Realistic: 12 min for the ASARS-2 radar, 4 min for the SYERS-2A camera. Short: 30 s.
Avionics		
Stall speed tape	Off · On	A yellow bar on the PFD and SFD speed tapes, up to the stall speed for your weight, flaps and g.
Master caution tone	On · Off	Off mutes the master caution tone at all times; the MASTER CAUTION lamp still lights.
Activate loaded flight plans	On · Off	On: a LOAD (EFB, SimBrief, INS Planner) also makes the file active. Off: activate it on the DPS page.
Sensor - Performance Settings		
Camera straight-down lock	Off · On	Locks the SYERS-2A and OBC straight down, for better performance.
Camera update rate	Standard · Smooth	Smooth: up to 30 redraws a second, for smoother pointing and zoom. Uses more CPU.
CAM road lights	On · Off	Night lights on the camera imagery. On at every flight start; may reduce performance.
Pilot		
Hide pilot	Off · On	Hides the pilot model in all views, ChasePlane cameras included.
Hypoxia simulation	On · Off	Tunnel vision and blackout from oxygen loss: see Cabin, Oxygen and Hypoxia.
Cockpit vibration	On · Off	Movement from the gear, flaps and spoilers.
Chase car and ground crew		

Option	Choices	What it does
Chase car	On · Off	The mobile on takeoff and landing, and the runway crew. Off: nobody pulls the pogo pins on a ground start. See Chase Car and Ground Support Equipment.
Radio calls	On · Off	The chase car and ground crew calls.
This tablet		
Brightness	20 · 40 · 60 · 80 · 100 %	Dims this app for night flying, on top of the simulator's own tablet brightness.
Display size	Small · Standard · Large	Size of the text and controls on this tablet.
Contact & Help		
User manual · Discord · Report a bug	Show QR code	The address of this guide, the Miltech Discord and the bug report page, each with a QR code for your phone camera.

Related pages: Cockpit and Walkaround Interactions · Chase Car and Ground Support Equipment · Keybinds Guide · Sensors · Variants

Miltech Simulations U-2. SIMULATION USE ONLY. This documentation describes the simulated aircraft as delivered in the add-on and must not be used for real-world aviation.

Miltech Simulations U-2

Checklists

The normal checklists for the U-2S, in flight order from a cold and dark cockpit to shutdown. Each line reads **item** ..... **setting**.

Note
Short of time? EFB Aircraft tab, **Set up aircraft** sets the aircraft up as Cold & dark, Ready to start, Ready for taxi or Ready for takeoff. For a first flight, the Quick Start Guide walks through the same start with more explanation.

Checklists by Flight Phase

1 Preflight and Power-Up	2 Ground Checks
Cockpit Preflight Power-Up and Alignment Left Console Instrument Panel Right Console How to fly it: Quick Start Guide	Autopilot Ground Check MFD Pages UFCD Pages How to fly it: Quick Start Guide
3 Engine Start and Taxi	4 Takeoff and Climb
Engine Start After Engine Start Before Taxi Taxi How to fly it: Before You Fly · Taxi	Before Takeoff Takeoff After Takeoff Initial Climb Check 18,000 ft Climb Check 52,000 ft Climb Check How to fly it: Takeoff · Climb
5 Cruise	6 Descent and Approach
Cruise Climb Cruise Trim and Balance Cruise Monitoring How to fly it: High Altitude and the Cruise Climb · High-Altitude Handling	Descent Initial Descent Check 18,000 ft Descent Check Approach to Field Check How to fly it: Descent · Approach
7 Landing	8 After Landing and Shutdown
Before Landing Landing Pattern Landing Landing Rollout How to fly it: The Two-Point Landing · Rollout · Crosswind	After Landing After Parking - Engine Shutdown

Related pages: Flying the U-2S · Quick Start Guide · Emergency Procedures · Map, Traffic and Checklists

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Miltech Simulations U-2

Preflight and Power-Up

From a cold and dark cockpit to a powered aircraft with the INS aligning. Run the three console checklists while the INS aligns.

COCKPIT PREFLIGHT

Cold and dark on a parking spot (canopy open, every switch OFF), before any power is on.

Note
Note: Short of time? EFB Aircraft tab, Set up aircraft, Ready to start does everything up to the ENGINE START checklist for you: ground power, avionics, INS aligned, switches set (parked, up to 3 minutes, engine off, canopy open). Ready for takeoff also starts the engine. → Electronic Flight Bag (EFB)

EFB

1 AVIONICS STARTUP TIME - FAST OR REALISTIC EFB Settings tab. Fast (default): AVP 7 s, SFD 10 s, EW self-test 30 s. Realistic: 2 min, 3 min, 5 min → Electronic Flight Bag (EFB)

2 INS ALIGNMENT TIME - FULL, SHORT OR INSTANT EFB Settings tab. Full 22 min, Short 3 min, Instant 5 s; you still start and accept the alignment → Inertial Navigation System (INS)

3 SERVICING - CHECK Fuel in the MSFS Fuel and Payload window, at least 70 gal in the sump tank (the engine feeds only from it); LOX on the EFB Ground tab: with the engine stopped, Connect and fill brings the oxygen cart and fills both converters, about 3 minutes from empty to full → Fuel System

4 MISSION EQUIPMENT - SET EFB Aircraft tab - nose, Q-bay, superpods, SPAN, external sensors. ASARS-2 nose = RDR page; SYERS-2A nose, or Standard nose with the Q-bay OBC = CAM page

5 CHARTS AND SUNSHADE - SET EFB Charts tab, or drag the sunshade along the canopy arch

COCKPIT

6 PARKING BRAKE - SET In Parking brake handle mode, pull the T-handle at the lower right of the main panel until the tooltip reads SET. In Stall strip handle mode, secure the aircraft with wheel chocks on the EFB Ground tab or in the walkaround.

7 COMM SELECT PANEL - SET Lower left of the main panel: TRANSMITTER SELECT COMM 1 (HF, D/L and SSR transmit nothing), HOT MIC / CALL RCD OFF, COMM CONTROL NORMAL, MASTER VOLUME off the stop → Up-Front Control Display (UFCD)

Caution
Caution: MASTER VOLUME at the bottom stop mutes all headset audio, the warning and caution tones included.

8 UFCD/SFD LIGHTS, INSTRUMENTS LIGHTS, PANEL LIGHTS - SET Three knobs in the centre of the main panel. The panel lights need essential AC (ground power or a generator), the instrument lights emergency AC and the UFCD / SFD lights emergency DC.

9 FUEL BOOST PUMP PRIMARY AND SECONDARY - OFF Fuel panel, right of centre on the main panel → Fuel System

10 INBD AND OUTBD SUMP TANK - OFF

11 INBD AND OUTBD XFER - OFF Cross-transfer switches (their tooltips say XFMR)

12 LEFT AND RIGHT INBD / OUTBD DUMP - CLOSED

13 EW CONT - OFF Top right of the main panel, beside the SFD

14 UFCD, AVP, SFD, BCDU, INS, IFF - OFF Right console power switches (IFF behind them)

15 AFCS POWER - OFF AFCS panel, right console

16 PITOT HEAT - OFF Right console, aft

POWER-UP AND ALIGNMENT

After the cockpit preflight. Start the slow units first, then do the console checks while the INS aligns.

ELECTRICAL

1 BATTERY - EXT PWR Electrical panel, right end of the main panel. EXT PWR / OFF / NORM → Electrical and Avionics Power

2 MAIN DC GENERATOR AND TRANSFORMER RECTIFIER - OFF Their cold-and-dark position; they go to NORM after engine start

3 EXTERNAL POWER - ON One switch for external AC and DC. Connect the cart first: EFB Ground tab, Servicing, Ground power - Connect, and wait for Connected (parked off the runway, parking brake set; Connect brings the ground power unit out if it is hidden). MSFS ground-service power is not used.

Note
Note: With BATTERY in EXT PWR nothing comes on until EXTERNAL POWER is ON; the DC buses then run from the ground cart and the battery rests.

4 WARNING PANEL - CHECK DC GEN and MAIN AC come on with the power; with the engine stopped HYD, OIL, AMAD, SEC and OXY are normal too → Warnings and Alerts

5 MAIN AC GENERATOR - OFF-RESET It cannot connect while external power is on

6 STANDBY GENERATOR AND EMERGENCY INVERTER - OFF Cold-and-dark position; TEST, then NORM after engine start

Note
Note: No ground power: BATTERY NORM instead. Every display, the INS, BCDU and IFF then run on the battery, but AFCS POWER and EW CONT have no AC, the MON DC bus stays dead (MON DC after 15 s, no exterior lights, no SEAT ADJ) and the battery drains.

AVIONICS - RIGHT CONSOLE

7 BCDU - ON 5 s display test, then INITIALIZING 9 ... 1 (about 15 s). While the AVP is off it shows its menu pages (backup control) → Backup Control Display Unit (BCDU)

8 INS - LOAD, THEN ON Three positions ON / OFF / LOAD. LOAD springs back to OFF after loading present position and date - then select ON. MFD NAV > INIT later shows INS MODE STBY → Inertial Navigation System (INS)

9 INS ALIGNMENT - START BCDU NAV-1 > L1 NAV INIT > R5 STBY MODE< (ALN MODE) > ENT, while the AVP is still off. Otherwise start it on the MFD below

Caution
Caution: Do not move the aircraft: above 3 kt the INS alignment starts again (ACFT MOVED), and any

movement restarts the SFD initialization.

10 SFD - ON About 6 s POWER ON BIT, then ATTITUDE INITIALIZING 10 s (Realistic 3 min); speed, altitude and heading show at once → Standby Flight Display (SFD)

11 AVP - ON Up after 7 s (Realistic 2 min). Until then the MFDs show DISPLAY BUS OR AVP FAILURE and the UFCD NO COM → Multi-Function Displays (MFDs)

12 UFCD - ON 9 s self-test, then NO COM until the AVP is up → Up-Front Control Display (UFCD)

13 IFF - ON Comes up in STBY. OFF / ON / HOLD (HOLD springs back to ON); squawk NORM later on the UFCD IFF page

14 AFCS POWER - ON Needs AC (ground power or generator) → AFCS System (Autopilot)

Note
Note: The AUTOPILOT lamp stays on while the PITCH, ROLL and YAW axis switches are OFF (as left by cold and dark); they go ON in the AUTOPILOT GROUND CHECK.

15 MFD OFF / NIGHT / DAY KNOBS - D (OR N) Small knob top right of each bezel, all three. Each MFD runs a 9 s POWER ON BIT (raster, colour bars, grid, characters, BIT list, BIT COMPLETE), then DISPLAY BUS OR AVP FAILURE until the AVP is up → Multi-Function Displays (MFDs)

Note
Note: When the AVP is up the PFD shows RESET BARO and a red ALT box until the altimeter setting is changed - set the baro in MFD PAGES (at 29.92 move it off and back).

16 EW CONT - REC (AS REQUIRED) Needs ESS AC and DC ESS. Startup self-test first: 30 s (Realistic 5 min), tooltip REC - SBIT, EW page EWS STARTUP BIT m:ss. The threat tone also needs MISSION RECORDER (MSN RCD) ON

ALIGNMENT

17 INS ALIGNMENT - MONITOR MFD NAV > INIT (T6): INS MODE, AQ counting down from 300. Not started yet: R1 ALN, R2 YES. ALIGN MISMATCH = entered position more than 1 NM out → Inertial Navigation System (INS)

Note
Note: Full alignment: attitude 30 s after ALN, LIM NAV READY 5 min, FULL NAV READY 22 min (Short: about 40 s / 3 min). Accept with R1 ACPT, R2 YES before taxi (MFD PAGES, NAV); GPS updating then keeps the position.

18 AUDIO CONTROL PANEL - SET Volume panel, left console: COMM 1, COMM 2, TACAN, ILS, AOA and THREAT off the stop (volume = knob x MASTER VOLUME)

Note
Note: At the stop TACAN and ILS switch off (TACAN FAULT advisory) and AOA silences the approach tones (the stall tone stays). HF has no function.

Note
Note: The MFD status and route pages (STAT VERS / LOAD / HIST / FAULT, NAV DPS) are checked in MFD PAGES, once the AVP is up.

LEFT CONSOLE

While the INS aligns, aft to forward.

1 NAV LIGHTS - FLASH FLASH / OFF / STEADY; needs MON DC power

2 ANTI-COLLISION LIGHTS - OFF

3 CONTINUOUS IGNITION - OFF

4 SEAT ADJ - AS REQUIRED Hold left click UP, right click DOWN; moves your eye point. Needs MON DC power

5 LANDING LIGHT - OFF Works only with the gear down

6 FOOD HEATER - OFF OFF / ON / START (START heats a Dragon Food tube in about 5 min)

7 SPOILER SWITCH - ARM OFF / ARM / EMER → Speedbrakes and Lift Spoilers

8 LANDING SPOILERS - LANDING LANDING / LET DN

9 ARC-210 BACKUP RADIO - SET Sim COM 3. Left knob TR+G or TR (OFF = radio dark), right knob MAN or PRST. It takes over COM 1 / COM 2 only with COMM CONTROL BACKUP → Up-Front Control Display (UFCD)

10 COCKPIT FAN - AS REQUIRED HIGH / OFF / LOW (up / center / down)

11 CANOPY SEAL - OFF T-handle, tooltip Unlocked; ON after engine start, OFF before the canopy opens → Cabin, Oxygen and Hypoxia

12 OXYGEN SYSTEM 1 AND 2 - ON The OXY lamp goes out after about 5 s → Cabin, Oxygen and Hypoxia

13 OXYGEN PRESSURE - CHECK 50 TO 100 PSI About 80 psi with the switch ON. Read it on MFD SYS > CAL (T6, ground only) or the EFB Ground tab

14 GUST CONTROL - FAIRED UP takes the flaps 6.25 deg up to the gust position (PFD flap symbol -7) and the flap lever no longer works.

15 ENGINE MODE - PRI

16 EMERGENCY START SYS - OFF, COVER CLOSED EMERGENCY START COVER

17 ENGINE FUEL SHUTOFF - ON, COVER CLOSED ON, not FUEL OFF; FUEL SHUTOFF COVER → Engine Start and Cockpit Controls

18 FLAPS - FAIRED (0 DEG) Lever tooltip TARGET 0 deg; flap indicator on the PFD

19 THROTTLE - OFF Right-click the throttle below 10 % (or Increase Cowl Flap 4) toggles OFF / IDLE → Engine Start and Cockpit Controls

20 THROTTLE FRICTION - AS REQUIRED

21 SPEED BRAKE SWITCH - OFF, SPEED BRAKES IN Spring-loaded to OFF; hold OUT / IN moves the brakes only with hydraulic pressure → Speedbrakes and Lift Spoilers

INSTRUMENT PANEL

While the INS aligns, left to right.

1 LOX QUANTITY - CHECK Two-needle LIQUID OXYGEN gauge (tank 1 / tank 2, 0-10 L) beside the gear handle; also SYS > PERF LOX 1 / LOX 2. Fresh: 8-10 L each → Cabin, Oxygen and Hypoxia

2 GEAR HANDLE AND INDICATORS - DOWN

3 RAM AIR - OFF, RAM AIR COVER CLOSED

4 REFRIG BYPASS - NORMAL Cold and dark leaves it in CLOSE (full cold), or where your last flight in this sim session left it → Cabin, Oxygen and Hypoxia

5 TURBINE BYPASS - NORM OR NORM/9TH Cold and dark leaves it in CLOSE, or where your last flight in this sim session left it

6 CABIN HEAT - HOLD Outer knob HOT / HOLD / COLD; the inner knob selects AUTO and the temperature after engine start

7 SFD NAV BUTTON - PRESS THREE TIMES Front course (red LOC and G/S flags with no ILS tuned), back course (red LOC flag), then normal → Standby Flight Display (SFD)

8 SFD BARO KNOB - CHECK, THEN AS REQUIRED Turn: 0.01 inHg per click and the SFD altitude follows (about 10 ft per click); 1 hPa per click while the PFDs show hPa; push: STD (29.92)

9 MANUAL TRIM POWER - ON Slide switch on the yoke (click the yoke base if the yoke is hidden)

Note
Note: The stabilizer trim also needs DC ESS and hydraulic pressure, so it does not move before engine start.

RIGHT CONSOLE

While the INS aligns, forward to aft.

1 MASTER LIGHT TEST - HOLD, CHECK Every warning panel lamp, FIRE and OVERHEAT lights, MASTER CAUTION, AOA indexer, AFCS mode lights, EW REC / RPT and LANDING GEAR NOT DN, and the red gear handle light; both LOX quantity needles run down towards zero. → Warnings and Alerts

2 AOA SELF-TEST - KEEP MASTER LIGHT TEST HELD OVER 3 S The indexer stays lit and the six AOA tone bands play in turn, 1.5 s each → Angle of Attack (AOA)

Note
Note: Held 7 s or more the test also raises AIL GUST MISMATCH and FLAP GUST MISMATCH; they go when you let go.

3 MASTER CAUTION - RESET Press the MASTER CAUTION lamp

4 FIRE/OHEAT TEST - FIRE TEST, OHEAT TEST, THEN OFF FIRE TEST: FIRE light, FIRE/OVERHEAT and BLEED, FIRE and BLEED AIR LEAK. OHEAT TEST: OVERHEAT light, FIRE/OVERHEAT, OVERHEAT. The switch does not spring back - return it to the centre

5 PITCH TRIM MODE - AUTO Cold and dark leaves it in MANUAL → AFCS System (Autopilot)

6 PITCH RATE, ROLL RATE, MACH ALT, YAW BAL - 5 (MID) AFCS sensitivity knobs, 0-10

7 FACE HEAT - OFF Two positions only, OFF / ON-HIGH

8 WINDSHIELD ANTI-FOG - OFF ON before taxi

9 HATCH HEATER - HTR & BLO, CHECK, THEN OFF HATCH HEATER HOT shows in HTR & BLO unless the OBC is in the Q-bay (only it has a photo hatch to heat); then OFF (centre)

10 PITOT HEAT - CHECK, THEN OFF ON for 15-20 s: SYS > PERF FAT climbs. Left on while standing still, the temperature probe overheats in about a minute (APCU FAULT, FAT dashes) and clears as it cools. ON before takeoff as required.

Related pages: Quick Start Guide · Electrical and Avionics Power · Inertial Navigation System (INS) · Ground Checks

Miltech Simulations U-2. SIMULATION USE ONLY. This documentation describes the simulated aircraft as delivered in the add-on and must not be used for real-world aviation.

Miltech Simulations U-2

Ground Checks

Autopilot, MFD and UFCD set-up before the engine start, once the AVP is up.

AUTOPILOT GROUND CHECK

On the ground before engine start, aircraft stopped, AC power on and the INS at least 30 s into its alignment.

BEFORE YOU START

1 AC POWER - EXTERNAL POWER ON (or engine running) Ground power unit connected on the EFB Ground tab; the AFCS runs on ESS AC - battery alone is not enough → Electrical and Avionics Power

2 INS ATTITUDE - VALID PFD horizon shown (30 s after ALN, or INS in NAV); without it ENGAGE is refused → Inertial Navigation System (INS)

AFCS PANEL (RIGHT CONSOLE)

3 AFCS POWER - ON → AFCS System (Autopilot)

4 AFCS PITCH POWER, AFCS ROLL, AFCS YAW - ON AUTOPILOT lamp goes out - it is lit while AFCS POWER is ON with any axis OFF (a cold start has all three OFF)

5 FLIGHT CONTROLS AND PUSH TO TURN - NEUTRAL / CENTERED PUSH TO TURN tooltip reads CENTERED - HEADING HOLD

6 AFCS ENGAGE - ENGAGED Panel switch; AP box on the PFD. Refused = tooltip OFF (NO AFCS POWER / ALL AXES CUT OFF, or no INS attitude)

Note
Note: On the ground the autopilot moves only the cockpit yoke and the sync bars, never the control surfaces, and it disengages by itself at lift-off (PITCH, ROLL and YAW DISC show).

PITCH

7 MACH - PRESS - MACH lamp ON (green) On the ground the PFD shows .100M

8 PITCH MACH WHEEL - ROTATE BOTH WAYS - control column follows Clockwise = column forward; it may creep a little; the PITCH sync bar beside the SFD moves with it

9 MACH - PRESS - lamp OFF

10 PITCH MACH WHEEL - ROTATE BOTH WAYS - control column follows Basic pitch hold

11 ALT - PRESS - ALT lamp ON (white), PRESS again - lamp OFF

ROLL

12 HEADING MARKER - SYNC TO PRESENT HEADING B1 FLT > T1 PFD > L3 HDG pressed twice quickly → Primary Flight Display (PFD)

13 HDG - PRESS - HDG lamp ON (green)

14 HEADING MARKER - MOVE LEFT AND RIGHT - yoke turns toward the marker L3 HDG, then UFCD knob or rocker; slow, about 20 deg of yoke at 10 deg off; ROLL sync bar follows

15 HDG - PRESS - lamp OFF

16 NAV - PRESS - NAV lamp ON, PRESS again - OFF With the INS in ALIGN or NAV; nothing is steered on the ground

17 PUSH TO TURN - ROTATE RIGHT AND LEFT - yoke follows, then CENTERED 5 deg of bank per click, 40 deg max

Note
Note: The sim has no autopilot clutch or overpower. Do not fight the autopilot with your controller - disconnect it.

TRIM AND DISCONNECT

18 PITCH TRIM MODE - MANUAL - AUTOPILOT MAN TRIM shows Right console; yellow caution with master CAUTION (no AUTOPILOT lamp)

19 AUTOPILOT DISCONNECT (yoke) - PRESS - PITCH DISC, ROLL DISC, YAW DISC show ENGAGE switch drops to OFF; AUTOPILOT MAN TRIM goes out

Note
Note: The DISC advisories stay until the autopilot is engaged again or AFCS POWER is switched OFF and ON.

20 PITCH TRIM MODE - AUTO

21 AFCS SELF TEST - AS DESIRED Autopilot off, aircraft stopped: one press runs one 22 s cycle that sweeps column, yoke and pedals, then stops; press again to stop it early. Failure = APCU FAULT (B6 STAT > T3 FAULT, APCU) → AFCS System (Autopilot)

Note
Note: Pitch trim moves only with hydraulic pressure (engine running), MANUAL TRIM POWER ON (yoke) and DC ESS power: 3.5 deg nose up to 1.5 deg nose down, about 1 deg per 3 s. Trim keys act as the yoke trim switch; with AUTO selected and the pitch axis engaged the autopilot trims and the switch is locked out.

ADF

22 ADF - SET AND CHECK B2 COM > T1 CNI > L2 EDIT to the ADF row: frequency 190-1749.5 kHz, PWR ON. No auto-tune. PFD R4 ADF shows the bearing; ADF SIGNAL = no station received. → Communication Pages (COM)

MFD PAGES

Before engine start, once the AVP is up (DISPLAY BUS OR AVP FAILURE gone). Any MFD; the UFCD knob or PAD can enter values.

FLT (B1 FLT > T1 PFD)

1 BARO - SET R2 BARO, then rocker, UFCD knob or PAD 2992 ENT; R1 = 29.92, R4 = HPA / INHG. The red ALT box and RESET BARO clear only when the setting really changes → Primary Flight Display (PFD)

Note
Note: The SFD has its own baro setting - set it with the SFD knob too. After R4 HPA it shows its own setting in hPa, 1 hPa per click.

2 BARO ALRT - SET Inside BARO press R3 ALRT: transition level FL010-FL240 or OFF (default FL180); crossing it turns the baro digits cyan

3 ALT BUG - AS REQUIRED R1 ALT, set in 100 ft steps, R1 again

4 ALIM - AS REQUIRED L1 A/S > L2 ALIM: low / high limit in kt; L3 switches it ON / OFF. AIRSPEED DEVIATION after 5 s outside, airborne only

5 MLIM - AS REQUIRED L1 A/S > L3 MLIM: low / high Mach; L2 switches it ON / OFF. MACH DEVIATION

6 A/S BUG - AS REQUIRED L1 A/S, 65-300 kt; L1 EXIT

7 HSI - AS REQUIRED Steering source L4 NAV / L5 TAC / L6 ILS / R4 ADF; R3 CRS (not with NAV); L3 HDG marker; R6 HSD map under the HSI

8 MAP - AS REQUIRED B1 FLT > T2 MAP: left rocker = scale 10 / 25 / 100 / 200 / 400 NM (default 100); L1 NORTH; L6 SMBL. All three MFDs share these settings → Map, Traffic and Checklists

SYS (B4 SYS > T1 PERF)

9 FUEL LOAD AND SUMP - CHECK TOTAL = fuel loaded; SUMP about 70 gal (red at 38 or less). LOAD: L4 EDIT four times, set, L5 YES (L6 500 = 500 gal shortcut) → Fuel System

10 FUEL BUGS - SET L4 EDIT = sump bug, L5 sets 35; L4 again = yellow, then red total bug (5 gal steps); L3 EXIT. Bugs start at 0 (off)

11 LOX QUANTITY - CHECK WITH GAUGE LOX 1 / LOX 2 (litres) on PERF against the LIQUID OXYGEN gauge left of the gear handle (needles 1 and 2) → Cabin, Oxygen and Hypoxia

Note
Note: B4 SYS > T6 CAL (ground only) runs a SUMP / LOX calibration; it changes no reading in this build and is not needed.

SYS (B4 SYS > T3 CNSUM)

12 AIRCRAFT CONFIGURATION - SELECT R2 CLN / R3 POD / R4 PEG (default PEG); shapes the plan curve only

13 FUEL LOAD (R1) - SELECT R1 steps R3 ... R12 (245 gal per step, R12 = 2,940 gal)

STAT (B6 STAT)

14 ICAW - CHECK T1 ICAW; INC/DEC turns the pages → Status Pages (STAT)

15 HIST - CLR T2 HIST, L1 CLR, L2 YES. R2 INHB can inhibit up to five nuisance alerts

16 FAULT - CHECK T3 FAULT: unit names green (grey = no power, white = warming up)

17 LOAD - CHECK T5 LOAD: route loaded, e.g. L2 ST2 - SIMBRIEF, R6 LOAD, status LOADED (SimBrief ID on the EFB Flight plan tab)

18 VERS - CHECK T6 VERS: every row shows the same version

NAV (B3 NAV)

19 INS - NAV T6 INIT: at LIM NAV READY or FULL NAV READY press R1 ACPT, R2 YES - N on the PFD. Moving before a READY restarts the alignment (ACFT MOVED) → Inertial Navigation System (INS)

20 DP FILES - LOADED AS REQUIRED T2 DPS: L1 FILE to ACTIVE and check the route; from a store file: L1 FILE to it, R2 LOAD, R1 YES → Navigation Pages (NAV)

21 STEERING MODE - SELECT T1 DATA, L2 EDIT: STR MODE F/T, T/T, T/F, TTD or TFD with the rocker, R1 ENT, L5 EXIT → Navigation System (INS Steering)

COM (B2 COM)

22 COM 1 AND COM 2 PRESETS - CHECK T3 COM1 / T4 COM2: 25 presets each; L1 SEL picks one, L2 EDIT changes one → Communication Pages (COM)

23 TACAN - SET AS REQUIRED T1 CNI, L2 EDIT to the TACAN row (or UFCD HOM LS3). TACAN volume knob off its stop, else TACAN FAULT

24 ILS - SET AS REQUIRED CNI ILS row, or UFCD HOM LS3 four times (localizer 108.10-111.95). ILS volume knob off its stop

25 IFF - STBY, CODES AS REQUIRED CNI L5 EDIT: MSTR STBY, Mode 3 code (IFF switch ON brings it up in STBY); NORM before takeoff

UFCD PAGES

Before engine start, after the UFCD and AVP are up.

1 UFCD - ON - BIT COMPLETE, no NO COM UFCD switch, right console; 9 s self-test; NO COM shows until the AVP is up → Up-Front Control Display (UFCD)

2 COMM CONTROL - NORMAL Audio panel; in BACKUP the backup radio owns the selected COM and UFCD tuning of it is undone

3 HOM PAGE - AS REQUIRED HOM key: LS1 / LS2 = COM1 / COM2 preset (0 = guard 121.500), press again for the frequency; LS3 = TACAN channel, X/Y, mode, ILS; LS4 = steering line. Type, then ENT

4 COM PAGE - COM 1 AND COM 2 - AS REQUIRED COM key, LS1 picks the COM1 / COM2 tab; LS2 CH and frequency (118.000-136.990, 8.33 kHz channels); LS4 GRD ON

5 IFF PAGE - STBY, CODES SET IFF key: MSTR STBY; LS2 Mode 3 code, ENT; C ON. MSTR to NORM before takeoff (LS3, then the knob)

6 TIME PAGE - SET AS NEEDED TIME key: LS1 GMT, type HHMMSS, ENT - this sets the sim clock; LS2 FT / ALERT interval; LS3 UP, LS4 DN timers

Related pages: AFCS System (Autopilot) · Multi-Function Displays (MFDs) · Up-Front Control Display (UFCD) · Engine Start and Taxi

Miltech Simulations U-2. SIMULATION USE ONLY. This documentation describes the simulated aircraft as delivered in the add-on and must not be used for real-world aviation.

Miltech Simulations U-2

Engine Start and Taxi

Ground starting air, generators on line, and out to the runway.

ENGINE START

Parked off the runway with the parking brake set and external power (or battery) on, after the checks above. The air-start unit must be on the stand (EFB Ground tab).

1 CANOPY - CLOSED Click the CANOPY LATCH placard on the right sill (tooltip Closed)

2 MISSION EQUIPMENT - AS REQUIRED MK IV MASTER ON (also the ASARS-2 SSA recorder). SYERS-2A: MK IV MODE STBY starts the boot, 30 s (Realistic 4 min). OBC: DRIFTSIGHT ON, MASTER starts the boot, 30 s (Realistic 90 s), A light flashing; then MODE OFF for the self-test, C light = go. ASARS-2: MK IV MODE STBY starts the radar warm-up (30 s / 12 min) → Mark IV Camera Panel

3 THROTTLE - OFF Throttle below 10 %, right-click it (tooltip THROTTLE IDLE STOP: OFF) or the Increase Cowl Flap 4 key → Engine Start and Cockpit Controls

4 FUEL BOOST PUMP PRIMARY / SECONDARY - PRI ON / SEC ON - FUEL about 19 psi Fuel panel; one pump gives about 15 psi → Fuel System

5 SYS / PERF PAGE - DISPLAY B4 SYS > T1 PERF

6 PARKING BRAKE AND CHOCKS - SET / IN PLACE Secure the aircraft with the parking brake or wheel chocks. In Parking brake mode, pull the T-handle until it reads SET. Chocks are independent of the brake. Use Wheel Chocks Off or Wheel Chocks On on the EFB Ground tab, or click them in the walkaround. In Stall strip mode the T-handle operates the stall strips and the chocks secure the aircraft.

7 GROUND STARTING AIR - APPLY EFB Ground tab, Servicing, Air Supply Unit: Attach, then Apply, or press MIC on the yoke or the throttle grip to have the crew apply it. Needs the parking brake set; Attach brings the air-start unit (ASU) out if it is hidden. The cart drives to its service point and connects the hose; the air comes on once it is connected. N2 rises, ignition is automatic; the starter turns only below 50 % N2. → Electronic Flight Bag (EFB)

8 THROTTLE - IDLE AT 20 % N2 Right-click the throttle again or move it forward. Light-off needs 18 % N2; ground idle is about 60 % N2 / 22 % N1 at sea level.

9 GROUND STARTING AIR - OFF ABOVE 50 % N2 The starter drops out at 50 % N2 by itself and the crew sets the air back to Attached at 52 %; the hose comes off (Off) when neither the brake nor the chocks secure the aircraft, or when you move.

10 ENGINE AND AMAD ALERTS - OFF BY IDLE HYD by about 15 % N2, AMAD / AMAD OIL PRESS LOW at about 38 %, OIL as oil pressure builds, SEC / ENG MODE SECONDARY at 54 %; HYD PRESS LOW and ENG OIL PRESS LOW do not show on a ground start.

Note
Note: The first occurrence of each start alert lights master CAUTION; only a repeat of SEC below 55 % N2 or AMAD below 48 % N2 on the ground is kept off it.

Note
Note: DC GEN, MAIN AC, DC GEN OUT and MAIN AC GEN OUT stay on until the generators are set in AFTER ENGINE START.

Note
Note: There is no START switch. The starter keys (Toggle Starter 1) are the throttle AIRSTART button and do nothing while the emergency start system's ground safety pin is in (on the stand it always is); EMERGENCY START SYS ARM only gives EMER START ARMED there - leave it OFF, cover closed.

Note
Note: Shortcut: the Engine auto-start key, or EFB Aircraft tab > Set up aircraft > Ready for takeoff, powers up and starts the engine for you, without the ground carts.

AFTER ENGINE START

Engine at idle, external power still on. The order keeps the DC buses powered.

1 ENGINE INSTRUMENTS AND ICAW - CHECK SYS > PERF: N2 about 60 %, N1 about 22 %, EGT about 420 C, HYD about 3,000 psi, FUEL about 19 psi; STAT > T1 ICAW. SEAL PRESS OFF clears by itself 20 s after the start.

2 FLIGHT CONTROLS - FREE, FULL TRAVEL Now that hydraulic pressure is up; yoke and pedals follow your controller

3 CANOPY SEAL - ON T-handle on the left console (tooltip Locked); canopy closed. The canopy cannot be opened while it is ON → Engine Start and Cockpit Controls

4 CABIN HEAT - AUTO - SET Knob beside the gear handle: click or wheel, 55-85 F (default 70) → Cabin, Oxygen and Hypoxia

5 MAIN AC GENERATOR - TEST, then NORM Electrical panel (MAIN GEN, AC side). In TEST MAIN AC goes out (generator good, not connected); in NORM it stays lit until external power is off → Electrical and Avionics Power

6 MAIN DC GENERATOR - NORM DC GEN and DC GEN OUT go out - the generator takes the DC buses from external power

7 BATTERY - NORM From EXT PWR (through OFF)

8 EXTERNAL POWER - OFF The main AC generator takes over: MAIN AC and MAIN AC GEN OUT go out; displays ride through the short drop

Caution
Caution: Do not switch EXTERNAL POWER OFF - or release the parking brake, which disconnects the cart - before MAIN DC GENERATOR (or BATTERY) is in NORM. With BATTERY in EXT PWR the DC buses go dead - INS, AVP, UFCD and MFDs lose power and the INS alignment restarts.

9 STANDBY GENERATOR - TEST, then NORM STBY GEN. In TEST: STBY AC GEN ON and the ESS AC lamp (needs 2,500 psi hydraulics)

10 EMERGENCY INVERTER - TEST, then NORM EMER INV. In TEST: EMER INVERTER ON, EMER AC FAIL (with master CAUTION) and the EMER AC lamp

11 TRANSFORMER RECTIFIER - TEST, then NORM XFMR RECT. In TEST: TR ON shows

12 AC AND DC ALERTS - OFF Lamps MAIN AC, ESS AC, EMER AC, DC GEN, MON DC, UTIL BATT LOW out; no generator, TR or inverter rows on ICAW. Reset master CAUTION, L7 ACK. BCCU FAULT on the ground means a battery is low: no takeoff until the batteries are serviced (parked, engine off, BATTERY OFF for a minute)

13 FLIGHT INSTRUMENTS - CHECK PFD and SFD: attitude, heading, both altimeters set (separate baro settings) → Standby Flight Display (SFD)

BEFORE TAXI

Engine running and the AFTER ENGINE START checks done, still stopped with the brakes held.

1 GEAR PINS - REMOVED With the aircraft stopped, remove the main and tail gear pins in the walkaround (one click removes both) or with the EFB Aircraft tab, Set up aircraft. Pogo safety pins stay fitted until the runway crew service. The wheel chocks: Wheel Chocks Off on the EFB Ground tab, or click them in the walkaround. → Electronic Flight Bag (EFB)

Caution
Caution: Fitted pogo pins prevent normal release on the takeoff roll. A stuck pogo can break free after repeated wing rocking in flight. Check that the runway crew has removed the pins before takeoff.

2 MANUAL TRIM POWER - ON Slide on the yoke; OFF stops all stabilizer trim, autopilot trim included

3 PITCH TRIM - CHECK +3.5 AND -1.5, SET +1.0 Yoke PITCH TRIM switch, PFD trim readout; about 1 deg per 3 s; needs hydraulic pressure and MANUAL TRIM POWER → AFCS System (Autopilot)

4 ENG MODE - SEC, CHECK, THEN PRI Engine control panel, left console; in SEC the SEC lamp and ENG MODE SECONDARY come on and N2 follows small throttle movements; both go out in PRI → Engine Start and Cockpit Controls

5 NAV LIGHTS - STEADY Lights panel, left side wall

6 ANTI-COLLISION LIGHTS - ON ANTI-COLL LTS

7 ICAW AND FAULTS - CHECK, CLEAR HIST MFD STAT > ICAW and FAULT; STAT > HIST: L1 CLR, L2 YES → Status Pages (STAT)

8 INS - NAV (N ON THE PFD) Position update only if the GPS has failed (FIX, then NAV/DATA update) → Inertial Navigation System (INS)

9 WINDSHIELD ANTI-FOG - ON Heater panel, right side wall

10 TACAN - AS REQUIRED Channel on the UFCD HOM page (LS3); TACAN knob on the audio volume panel above its stop = ON → Up-Front Control Display (UFCD)

11 MISSION EQUIPMENT - AS REQUIRED MSN RCD ON (no EW threat tone without it), EW CONT; with the ASARS-2 nose MK IV MODE 1-5 preselects radar PWR → Mission Equipment (PME)

12 BRAKES - HOLD, PARKING BRAKE RELEASE Push the PARKING BRAKE handle to release the brake. The wheel chocks don't go with it: take them off first (EFB Ground tab or the walkaround). A ground cart still connected comes off once neither the brake nor the chocks hold the aircraft.

Note
Note: Do not move the aircraft until the INS is in NAV and the SFD attitude is up - moving restarts an unfinished alignment.

TAXI

As soon as the aircraft starts to roll.

1 WHEEL BRAKES - CHECK Either pedal brakes the main wheel; there is no differential braking and no antiskid

2 STEERING - RUDDER PEDALS The tailwheel follows the pedals 0.5 s late, so start turns early. Full pedal holds a 189 ft turn radius up to about 20 kt, fading to about 1.4 deg of wheel by 25 kt

3 FLIGHT INSTRUMENTS - CHECK AND SET PFD attitude and heading, SFD, steering source

Note
Note: At idle the aircraft stays put: about 78 % N2 starts it rolling, then ease the power back to what keeps it rolling.

Note
Note: With the chase car on (EFB Settings tab), the mobile calls "taxi clear" as you start to roll.

Related pages: Engine Start and Cockpit Controls · Chase Car and Ground Support Equipment · Flying the U-2S · Takeoff and Climb

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Miltech Simulations U-2

Takeoff and Climb

From the runway to the top of the 160 KIAS climb.

Note
Sim values. Performance values are measured in the sim. They may not accurately represent (nor do they intend to accurately represent) the performance of the real aircraft.

BEFORE TAKEOFF

Stopped on the runway or at the holding point.

1 GEAR PINS AND POGO FLAGS - VERIFY REMOVED With chase-car support enabled, stop on the runway and wait for the front-gear and both pogo technicians to finish and return to the pickup. Confirm the red pogo flags are gone. The crew also removes the emergency-start safety pin. With chase-car support disabled, runway pin removal is automatic.

2 CANOPY SEAL - ON Canopy closed; the cabin only pressurizes with the seal ON → Cabin, Oxygen and Hypoxia

3 OXYGEN - OXY SYS 1 AND 2 ON Oxygen panel, left console; OXY lamp out

4 INS - NAV (N ON THE PFD)

5 CONTINUOUS IGNITION - ON CONTN IGN, lights panel, left side wall

6 SPOILER SWITCH - EMER Lift spoilers run from the accumulator, refilled by the ISS pump → Speedbrakes and Lift Spoilers

7 LANDING SPOILERS - LANDING

8 FLAPS AND GUST CONTROL - FAIRED PFD flap symbol 0

9 CABIN HEAT - AUTO CONTROL SET Inner knob, 55-85 F (70 default) → Cabin, Oxygen and Hypoxia

10 PITCH TRIM - +1.0 NOSE UP PFD trim readout

11 PITCH TRIM MODE - AUTO Right side wall

12 FUEL TOTAL - CHECK SYS/PERF TOTAL, the fuel counter (also in the window of the standby fuel flow gauge), against the planned load. → Fuel System

13 FUEL SUMP - CHECK ABOUT 70 GAL SYS/PERF SUMP

14 WINDSHIELD ANTI-FOG - VERIFY ON

15 MISSION EQUIPMENT - AS REQUIRED

16 ICAW PAGE - CHECK MFD STAT > ICAW

17 LANDING LIGHT - AS REQUIRED LDG LT; it only lights with the gear down

18 IFF - ON, MSTR NORM, MODE 3 CODE AND C CHECKED IFF switch, right console (comes up in standby); UFCD IFF page → Up-Front Control Display (UFCD)

19 PITOT HEAT - AS REQUIRED ON in cloud or precipitation near or below freezing. Standing still with it on for more than about a minute overheats the temperature probe: APCU FAULT until it cools.

20 ENGINE AND FLIGHT INSTRUMENTS - CHECK

Note
Note: In EMER each lift-spoiler deployment uses one accumulator charge (about three when full); the ISS pump refills one in about 4 s. Below 2,500 psi the SPOILERS lamp and SPOILER PRESS LOW show.

Note
Note: Chase car on: once stopped on the runway, hold still and wait for "runway's clear" and "ground crew clear".

TAKEOFF

Lined up on the runway centreline.

NORMAL TAKEOFF

1 THROTTLE - 85 % N2, BRAKES HELD

2 ENGINE INSTRUMENTS AND LIGHTS - CHECK N2, EGT, FF on SYS/PERF or the standby gauges; no MASTER CAUTION

3 BRAKES - RELEASE

4 THROTTLE - FULL Full throttle travel is available in SEC. Expect up to 10 % less thrust.

5 YOKE - PITCH NEUTRAL

6 DIRECTION - TAILWHEEL STEERING AND RUDDER Steering fades out between about 20 and 25 kt, the rudder takes over

7 WINGS - LEVEL WITH AILERON

8 POGOS - LET THEM FALL They drop by airspeed alone - first at 60-76 KIAS, the second usually a few knots later, 88 KIAS at most → Introduction

9 WINGS - LEVEL AFTER THE POGOS DROP

10 PITCH ATTITUDE - SLIGHT TWO-POINT

11 LIFTOFF - 80-110 KIAS By weight

12 AOA TONES - EXPECT THEM 3 S AFTER LIFTOFF Muted on the ground → Angle of Attack (AOA)

13 CLIMB ATTITUDE - SMOOTH

Note
Note: With the safety pins removed, the pogos release automatically during the takeoff roll. If a pinned pogo remains attached in flight, repeated wing rocking can break it free.

CROSSWIND (AS REQUIRED)

14 CROSSWIND - AS REQUIRED Aileron into the wind and rudder for the centreline, full rudder if needed; stop any yaw at once. Out of rudder: dip the downwind wing slightly. After liftoff hold the ground track with rudder and a slight bank into the wind.

NIGHT (AS REQUIRED)

15 NIGHT - AS REQUIRED Same as by day. NAV LIGHTS, ANTI-COLL LTS and LDG LT on; PANEL, INSTRUMENTS and UFCD/SFD light knobs set. Hold the centreline on the runway lights, then fly the PFD attitude into the climb.

AFTER TAKEOFF

Airborne and climbing.

CLIMB-OUT

1 CLIMB SPEED - 160 KIAS Optional PFD L1 A/S bug → Primary Flight Display (PFD)

2 PITCH - SMOOTHLY TO THE CLIMB ATTITUDE

3 THROTTLE - FULL

4 AIRSPEED - BELOW 180 KIAS AIRSPEED lamp and AIRSPEED HIGH from 180 KIAS (230 with gust UP); red line and AIRCRAFT OVERSPEED at 181 (241 gust UP, below 43,000 ft) → Standby Flight Display (SFD)

5 G LOAD - NO PUSHOVER BELOW 1 G Unloaded, the AMAD oil pump uncovers (AMAD, AMAD OIL PRESS LOW)

6 POWER REDUCTION - LOWER THE NOSE GENTLY TO HOLD SPEED

Note
Note: Full power low down can drain the sump faster than it refills. FUEL SUMP LOW or CHECK SUMP QTY in the climb: lower the nose a little, or INBD SUMP TANK ON until the sump is back near 70 gal (FUEL XFER ON, and XFER PRESS LOW while the sump is below 69 gal). → Fuel System

TURBULENT AIR (AS REQUIRED)

7 GUST CONTROL - UP Flaps 6.25 deg up (PFD flap symbol -7) and ailerons 7.5 deg up by themselves in 3-4 s, the nose comes up, flap lever out of use; red line 241 KIAS below 43,000 ft. → Engine Start and Cockpit Controls

8 CLIMB SPEED - HOLD

9 HEAVY TURBULENCE - 120-130 KIAS

10 GUST CONTROL - FAIRED IN SMOOTH AIR

11 AIRSPEED FOR FAIRED - 150 KIAS OR LESS FAIRED above 180 KIAS brings AIRSPEED HIGH and the red line

12 PITCH - EXPECT A TRIM CHANGE WHEN SWITCHING

13 FLAPS - VERIFY 0 ON THE PFD FAIRED takes them back to 0 by itself; if not, GUST CONTROL back to UP

INITIAL CLIMB CHECK

Gear up and settled in the 160 KIAS climb.

1 GEAR - UP, INDICATORS CHECK MAIN and TAIL gear indicators up, gear handle light out

2 ENGINE AND FLIGHT INSTRUMENTS - CHECK No alerts on the MFD alert line

3 LANDING LIGHT - OFF Already dark once the gear left the down position

4 GUST CONTROL - AS REQUIRED

5 MISSION EQUIPMENT - AS REQUIRED MK IV MODE 1-5. SYERS-2A: opens at once, C light about 20 s (Realistic 3 min). OBC: after a good self-test, it photographs from 5,000 ft. ASARS-2: goes to OPER once airborne → Mark IV Camera Panel

18,000 FT CLIMB CHECK

Climbing through 18,000 ft.

1 SPOILER SWITCH - ARM Main hydraulics; the ISS pump stops

2 LANDING SPOILERS - LANDING

3 OXYGEN - CHECK QUANTITY AND PRESSURE LOX quantity gauge (LITERS, beside the gear handle) or SYS/PERF LOX 1 / LOX 2; pressure about 80 psi on the EFB Ground tab; no NO. 1 / NO. 2 OXY → Cabin, Oxygen and Hypoxia

4 CABIN ALTITUDE - ABOUT 7,500 FT SYS/PERF ALTITUDE CABIN 7.5

5 ALTIMETERS - 29.92 ON PFD AND SFD PFD R2 BARO, then R1; SFD: push its baro knob (STD) → Primary Flight Display (PFD)

6 FUEL - CHECK SYS/PERF TOTAL and SUMP

7 MISSION EQUIPMENT - AS REQUIRED

Note
Note: The stall strips are automatic (out from 24 deg flap, in below 20 deg), or on the handle with the EFB option Cockpit handle on Stall strip. STALL STRIP OUT above 18,000 ft with the gear up means they are still out.

52,000 FT CLIMB CHECK

Reaching about 52,000 ft, where the 160 KIAS climb meets Mach .715.

1 CLIMB MACH - .715 PFD Mach readout; hold it with AFCS MACH (CRUISE CLIMB); red line Mach .75

2 NAV AND ANTI-COLLISION LIGHTS - OFF

3 OXYGEN - CHECK QUANTITY AND PRESSURE

4 CABIN ALTITUDE - ABOUT 25,000 FT SYS/PERF ALTITUDE CABIN about 25

5 SUMP BUG - 65 GAL SYS/PERF L4 EDIT, L6 (65), L3 EXIT; CHECK SUMP QTY then means the inboard tanks are empty → Fuel System

Caution
Caution: On SYS/PERF, L6 pressed outside EDIT opens the LOAD 500 prompt - answer NO (L6).

6 FUEL - CHECK

7 PITOT HEAT - OFF

8 GUST CONTROL - FAIRED

9 MISSION EQUIPMENT - AS REQUIRED

Related pages: Flying the U-2S · U2 101 - The Basics · Cruise

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Miltech Simulations U-2

Cruise

The cruise climb on the autopilot, keeping the wings balanced, and the long watch.

Note
Sim values. Performance values are measured in the sim. They may not accurately represent (nor do they intend to accurately represent) the performance of the real aircraft.

CRUISE CLIMB

From about 60,000-65,000 ft until level-off.

AUTOPILOT

1 CRUISE CLIMB - BEGIN AT 60,000-65,000 FT

2 THROTTLE - VERNIER TO EGT 650-725 C At full throttle the engine control holds the EGT at 840 C in PRI, nothing holds it in SEC; the AFCS never moves the throttle.

3 ENGINE AND FLIGHT INSTRUMENTS - MONITOR SYS/PERF; EGT HIGH from 842 C

4 OXYGEN - MONITOR

5 AFCS - ENGAGE AFCS POWER on, PITCH / ROLL / YAW on, AFCS ENGAGE; AP box on the PFD → AFCS System (Autopilot)

6 MACH HOLD - .715 AFCS MACH button at .715; PITCH MACH wheel 0.001 per click

7 MACH/ALT KNOB - 5, LOWER IF IT OSCILLATES Right side wall; 5 is the norm, above it the autopilot is sharper, below it softer; 7-10 invites a slow oscillation, towards 3 in turbulence

8 PITCH RATE KNOB - 5, HIGHER IF IT OSCILLATES Towards 7; 1-3 invites a slow oscillation

9 AOA TONES - MONITOR Any tone means AOA .70 or more, gear up or down; stall tone above .98. High up the gauge reads low, but the tones still come before the stall: any tone up there is a stall warning. → Angle of Attack (AOA)

10 FLIGHT PATH - MONITOR PFD Mach, altitude trend and AP box

PITCH AND AILERON TRIM

11 PITCH TRIM MODE - AUTO The AFCS trims; the yoke trim switch is out while the pitch axis is engaged (MANUAL gives AUTOPILOT MAN TRIM)

12 YOKE - HANDS OFF WITH THE AUTOPILOT ENGAGED Disconnect first (yoke AP disconnect) to fly by hand

13 STABILIZER TRIM - MONITOR PFD trim readout and PITCH sync bar beside the SFD. The autopilot may run the trim past the stops; after a disconnect it runs back at 1 deg per 3 s

Note
Note: Trim running on its own: MANUAL TRIM POWER (yoke) OFF stops the stabilizer, autopilot trim included.

14 AILERON TRIM - SMALL INPUTS ONLY ABOVE 150 KIAS Switch on the throttle quadrant; needs MANUAL TRIM POWER

15 AILERON TRIM - NOT IN CRUISE Correct a heavy wing with fuel (CRUISE TRIM AND BALANCE)

CRUISE TRIM AND BALANCE

In cruise with the autopilot engaged, whenever a wing is heavy or the aircraft slips.

LATERAL FUEL BALANCE

1 FUEL BALANCE - CHECK No per-tank gauge in the cockpit - the ROLL sync bar (beside the SFD) and the yoke show the aileron the autopilot is holding; per-tank fuel in the MSFS fuel menu

2 SIDESLIP - CENTRED FIRST PFD sideslip trapezoid under the bank pointer

3 CROSS-TRANSFER - AS REQUIRED INBD XFER / OUTBD XFER (fuel panel) towards the light wing, 7 gal/min; OFF when balanced → Fuel System

4 ROLL SYNC BAR - MONITOR Back to centre as the wings balance

Note
Note: FUEL XFER ON shows while a transfer runs and FUEL XFER 2 MINUTES reminds you every 2 minutes. XFER PRESS LOW = source tank empty: switch off. Cross-transfer does not run while the SUMP TANK switch of the same pair is ON.

Note
Note: A fuel load is evened out across each wing pair once it has settled, and the engine feed draws both sides equally in balanced flight. In a sideslip the wing on the ball's side feeds less and slowly gets heavy, so centre the sideslip before you transfer; otherwise an imbalance comes from dumping or cross-transfer.

DIRECTIONAL TRIM

5 SIDESLIP - CHECK PFD sideslip trapezoid (the sim's yaw string)

6 YAW BAL KNOB - CENTRE THE SIDESLIP Right side wall, 5 = neutral, up to 2 deg rudder trim; works only with the AFCS engaged and YAW on

Note
Note: There is no rudder tab and no other rudder trim: with the autopilot off the rudder trim is held at zero.

LATERAL MISTRIM

7 AFCS ROLL - OFF IF THE AIRCRAFT BANKS UNCOMMANDED Pitch hold stays; AUTOPILOT lamp on

8 LATERAL TRIM - CHECK Aileron needed to hold the wings level

9 FUEL - BALANCE, THEN AFCS ROLL ON Cross-transfer as above; OFF and ON again also resets a tripped axis (a trip leaves the switch ON)

CRUISE MONITORING

Throughout the cruise.

CONSUMPTION

1 FUEL - CHECK SYS/PERF TOTAL, FF, FOB (h:mm), RNG - read them in stable cruise → System Pages (SYS)

2 OXYGEN - CHECK SYS/PERF LOX 1 / LOX 2, roughly 0.5 L an hour in all; HIGH OXY CONSUM RATE above 2 L an hour

3 CONSUMPTION TREND - CHECK SYS/CNSUM Fuel, LOX and oil plotted against time beside the PLAN curve (load R3-R12, CLN / POD / PEG) - no hand plot needed

4 CABIN ALTITUDE - CHECK SYS/PERF; CABIN ALTITUDE HIGH if above schedule

CREW COMFORT

5 FACE HEAT - AS REQUIRED Knob OFF / HIGH only; it runs the sim windshield de-ice (no faceplate in the sim)

6 CABIN TEMPERATURE - 65-70 F CABIN HEAT AUTO CONTROL knob; SYS/PERF TEMPERATURE CABIN

EW (AS REQUIRED)

7 EW CONT - REC OR RPT Beside the SFD; startup BIT 30 s after OFF (5 min with EFB Avionics startup time Realistic)

8 THREAT LAMPS AND EW PAGE - MONITOR REC green = threat tracked, RPT red flashing = jamming; MFD FLT > EW

9 THREAT KNOB - SET New-threat tone volume, times MASTER VOL (audio volume panel); the tone needs MSN RCD ON

Note
Note: Threats are sim traffic within 5 NM and 1,000 ft of you, moving faster than 20 kt.

LEVEL-OFF CRUISE (AS REQUIRED)

10 ALTITUDE - LEVEL OFF, AFCS ALT ALT holds the altitude at the press and replaces MACH; PITCH MACH wheel 100 ft per click

11 THROTTLE - REDUCE FOR CRUISE SPEED The AFCS only pitches; if speed decays ALT gives up height

12 CRUISE ALTITUDE - AS PLANNED (ABOUT 45,000 FT)

Note
Note: Between 43,000 and 49,500 ft the IAS red line is 181 KIAS whatever the gust control; Mach red line .75.

Related pages: High Altitude and the Cruise Climb · AFCS System (Autopilot) · Fuel System · Descent and Approach

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Miltech Simulations U-2

Descent and Approach

From the cruise altitude to the traffic pattern.

Note
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DESCENT

Planning the descent from the cruise altitude.

1 DESCENT START - AS LATE AS THE PLAN ALLOWS Fuel burn is simulated and an idle descent uses little; plan the descent to use tailwinds

2 DESCENT MACH - 0.715 DOWN TO 53,000 FT

3 DESCENT SPEED - 160 KIAS BELOW 53,000 FT

4 SMOOTH AIR - 170 TO 180 KIAS Only with GUST CONTROL UP, and out of the PFD red bar

5 ROUGH AIR - 160 KIAS MAX; 120 TO 130 KIAS IN HEAVY TURBULENCE

Note
Note: Limits in the sim: the PFD / SFD red bar is at 181 KIAS from 43,000 to 49,499 ft whatever the gust switch; below 43,000 ft it is 181 KIAS FAIRED / 241 KIAS UP. The Mach bar is 0.751, or 0.651 from 30,500 to 42,999 ft.
AIRSPEED HIGH comes on above 180 KIAS FAIRED / 230 KIAS UP, MACH RATE when Mach 0.75 is less than 5 s away.

INITIAL DESCENT CHECK

Before you leave the cruise altitude.

BEFORE DESCENT

1 MISSION EQUIPMENT - AS REQUIRED MK IV MODE STBY when done: the camera closes, the ASARS-2 radar goes to STBY. Below 5,000 ft the SYERS-2A nose centers by itself and the OBC stops photographing → Mission Equipment (PME)

2 FOOD TUBE - STOWED Click a tube that is in use to put it back

3 TURBINE BYPASS - NORM OR NORM/9TH Beside the gear handle → Cabin, Oxygen and Hypoxia

4 CABIN HEAT (INNER KNOB) - AUTO, 65 OR 70 °F Click or wheel, 5 °F steps; cabin temperature on SYS > PERF

5 COCKPIT FAN - LOW OR HIGH Clears canopy fog faster

6 NAV LIGHTS - STEADY

7 ANTI-COLLISION LIGHTS - ON

8 WINDSHIELD ANTI-FOG - ON Right side wall; the windshield fogs in the descent without it

9 PITOT HEAT - ON

DESCENT CONFIGURATION

10 LANDING GEAR HANDLE - DOWN FORE and AFT gear indicators show down

11 THROTTLE - IDLE

12 SPEED BRAKE - OUT Throttle switch, hold OUT (left click) - spring-loaded to OFF, about 5 s for full travel, needs hydraulic pressure → Speedbrakes and Lift Spoilers

13 SPOILER SWITCH - ARM

14 LANDING SPOILERS - LET DN The lift spoilers rise and stay up; above 105 KIAS the airflow pushes them partly down

15 GUST CONTROL - UP Before 180 KIAS. Flaps 6.25° up (PFD flap symbol -7) and ailerons 7.5° up by themselves in 3-4 s, and the nose comes up; the flap lever is out of use. → Engine Start and Cockpit Controls

16 AFCS - AS REQUIRED Basic pitch hold or MACH → AFCS System (Autopilot)

Note
Note: From gear down until the flaps reach 24° the cyan STALL STRIP IN advisory shows. The stall strips are automatic, or on the handle with the EFB option Cockpit handle on Stall strip.

18,000 FT DESCENT CHECK

Passing 18,000 ft.

1 LANDING LIGHT - ON It only lights with the gear down

2 ALTIMETERS (PFD AND SFD) - SET LOCAL PFD R2 BARO and the UFCD knob; the SFD has its own baro knob - set both → Standby Flight Display (SFD)

3 FUEL BALANCE - CHECK The full check is in APPROACH TO FIELD CHECK

4 AOA VOLUME - SET Left-console volume panel; at the stop only the stall tone remains → Angle of Attack (AOA)

5 CABIN ALTITUDE - MONITOR SYS > PERF; CABIN ALTITUDE HIGH when it is above the schedule

Caution
Caution: There is no faceplate in the sim. Keep OXYGEN SYSTEM 1 and 2 ON until the engine is shut down: off, they give the red NO. 1 / NO. 2 OXY warnings, and above 8,000 ft cabin altitude the hypoxia simulation starts.

APPROACH TO FIELD CHECK

Before you enter the traffic pattern.

APPROACH SET-UP

1 MISSION EQUIPMENT - AS REQUIRED

2 LANDING SPOILERS - LANDING The lift spoilers retract; SPOILER SWITCH stays in ARM

3 GUST CONTROL - FAIRED 150 KIAS max. AIRSPEED HIGH now comes at 180 KIAS

4 FLAP POSITION - CHECK 0° PFD flap symbol. If the flaps do not stop at faired, GUST CONTROL back to UP

THRESHOLD SPEED

5 GROSS WEIGHT - CHECK EFB Aircraft tab, Zero fuel and Gross; fuel total on SYS > PERF

6 T-SPEED - COMPUTE 70 KIAS + 1 KT PER 100 GAL OF FUEL + 1 KT PER 650 LB OF ZERO FUEL WEIGHT ABOVE 18,700 LB

Note
Note: With flaps 35 the AOA reads about .80 at T-speed and the stall tone comes about 7 kt below it; with less flap, fly the AOA instead.

Note
Note: Touchdown weight above 24,300 lb: use the heavy-weight technique (see LANDING).

FUEL BALANCE CHECK

Note
Note: The cockpit has no per-tank fuel gauges; the yoke shows the heavy wing. In turbulence or IMC do the check higher up, and fly no steep or uncoordinated turns while you do it.

7 LANDING GEAR HANDLE - DOWN

8 SPEED BRAKE - IN Hold IN (right click)

9 FLAPS - UP (0°)

10 GUST CONTROL - FAIRED

11 AOA - BELOW .90 No touchdown tone (fast 700 Hz beeps); 1.00 is the stall

12 WINGS LEVEL, AUTOPILOT OFF - NOTE THE YOKE AND AILERON TRIM POSITION The deflection needed to hold the wings level points to the heavy wing

13 INBD XFER / OUTBD XFER - TO THE LIGHT WING, OFF WHEN BALANCED A click cycles OFF / TO RIGHT / TO LEFT; 7 gal/min → Fuel System

Note
Note: A cross-transfer does nothing while the SUMP TANK switch of the same pair (INBD / OUTBD SUMP TANK) is ON. FUEL XFER 2 MINUTES reminds you every two minutes; XFER PRESS LOW means nothing is flowing.

Related pages: Flying the U-2S · Speedbrakes and Lift Spoilers · Cabin, Oxygen and Hypoxia · Landing

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Miltech Simulations U-2

Landing

The pattern, the touchdown and the rollout.

Note
Sim values. Performance values are measured in the sim. They may not accurately represent (nor do they intend to accurately represent) the performance of the real aircraft.

BEFORE LANDING

On downwind, before the turn to final.

1 LANDING GEAR HANDLE - DOWN FORE / AFT indicators down. With the handle UP and 20° flap or more you get LANDING GEAR NOT DN and the GEAR lamp

2 SPEED BRAKE - OUT

3 TURBINE BYPASS - NORM/9TH Below 25,000 ft the cooling turbine cuts in and out at 70 % N2 - expect the airflow to change

4 FLAPS - 20° TO 35° Below 130 KIAS (FLAPS DOWN warning above it); 5° per click. They pitch the nose down: trim nose up.

5 THRESHOLD SPEED - AS COMPUTED

Note
Note: The stall strips come out by themselves at 24° flap or more (EFB option Cockpit handle on Stall strip: pull the handle). At 20° they stay in and the STALL STRIP IN advisory stays.

Note
Note: 30° of bank at most in the pattern - the AOA rises with the bank. Avoid moderate turbulence. Buffet from gear, flaps and spoilers, and near the stall, is simulated (EFB Settings tab, Cockpit vibration).

AT THE THRESHOLD

6 THROTTLE - IDLE

7 LIFT SPOILERS - UP AT TOUCHDOWN SPOILER button on the yoke or throttle (hold, or click to latch), or your Toggle water rudder binding. Needs SPOILER SWITCH ARM and LANDING SPOILERS LANDING; nothing deploys by itself

LANDING PATTERN

Technique for the standard 360° overhead pattern. The heights and speeds are targets, not limits.

INITIAL APPROACH

1 PATTERN - 360° OVERHEAD Enter as traffic and wind require

2 INITIAL APPROACH - 130 KIAS, 1,500 FT AGL

TURN TO DOWNWIND

3 TURN - NEAR THE RUNWAY END, DESCENDING, 20° TO 30° BANK Hold the speed with the throttle

4 FLAPS - 20° TO 35° (35° RECOMMENDED) Full flaps give the shortest float and roll

5 AIRSPEED - 90 KIAS OR T + 10

6 AOA - ABOUT .64 AT T + 10 Indexer yellow and green, green alone from .65

DOWNWIND

7 ALTITUDE - ABOUT 1,000 FT AGL

8 POWER - SET FOR A SLIGHT DESCENT, SAME SPEED

9 BEFORE LANDING CHECKLIST - COMPLETE

TURN TO FINAL

10 TURN - AT ABOUT 700 FT AGL, 20° TO 30° BANK, COORDINATED

11 AIRSPEED - 90 KIAS OR T + 10

12 90° POINT - ABOUT 500 FT AGL

FINAL APPROACH

13 ROLL OUT - ABOUT 250 FT AGL, ON SPEED

14 THRESHOLD - T-SPEED (ABOUT .80 AOA), 10 FT AGL MAX Indexer green and red; the approach beeps turn into the steady 500 Hz flare tone

Note
Note: Keep a smooth, stable glide to touchdown. With the chase car on (EFB Settings tab), the mobile calls your height above the runway in the flare.

LANDING

Special cases. Normal landings follow LANDING PATTERN.

1 NIGHT LANDING - SAME AS BY DAY Trim for pitch

2 CROSSWIND LANDING - BANK INTO THE WIND, DOWNWIND RUDDER Lift spoilers as needed

3 HEAVY WEIGHT (ABOVE 24,300 LB) - LOW SINK RATE, NO FULL-STALL TOUCHDOWN Fly it onto the runway

4 NO-FLAP LANDING - IDEAL CONDITIONS ONLY, 24,300 LB MAX Fly about .80 AOA at the threshold with the flaps up

5 MINIMUM GROUND RUN - FLAPS 35, SPEED BRAKE OUT Plan the threshold 500 ft before the runway; lift spoilers at touchdown

6 TOUCH-AND-GO (24,300 LB MAX) - SLOW TO 50 KIAS, FLAPS AND LIFT SPOILERS IN, GO Normal touchdown first. The pogos are not refitted - they only come back when you stop

LANDING ROLLOUT

From touchdown to the stop.

1 ROLLOUT - WINGS LEVEL, TAILWHEEL ON THE RUNWAY Hold the wings with the yoke: left neutral, a wing goes down in a few seconds. A wing-tip skid touches as you slow

2 BRAKES - AS REQUIRED Either pedal brakes the main wheel, no antiskid; the tailwheel steers only at low speed (full below about 20 kt)

3 SPEED BRAKE - IN Once directional control is good

4 FLAPS - UP

5 LIFT SPOILERS - DOWN SPOILER button again if you latched them

6 AIRCRAFT - STOP, HOLD THE BRAKES With chase-car support enabled, stop (3 kt or less) on the runway or wherever you have rolled to and hold the brakes. The pogo truck's crew fits both pogos, raised wing first, levels the aircraft, then the other side; there is no time limit, so wait for the crew-clear call before taxiing. If you move off, the crew stops. With support disabled, the pogos are restored automatically on touchdown.

7 TAXI SPEED - BEFORE YOU TURN OFF THE RUNWAY With the pogos off, yoke into the turn to keep the wing up

Related pages: Flying the U-2S · Angle of Attack (AOA) · Speedbrakes and Lift Spoilers · Chase Car and Ground Support Equipment · After Landing and Shutdown

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Miltech Simulations U-2

After Landing and Shutdown

From the runway exit to a cold cockpit.

AFTER LANDING

Pogos fitted, clear of the runway.

1 LANDING LIGHT - AS REQUIRED

2 CONTINUOUS IGNITION - OFF

3 TACAN VOLUME - OFF (FULLY ANTICLOCKWISE) Left-console volume panel; the TACAN FAULT advisory follows

4 ILS VOLUME - OFF (FULLY ANTICLOCKWISE)

5 IFF - HOLD, THEN OFF Right console. HOLD springs back to ON after 1 s; OFF within 15 s keeps the codes, OFF without HOLD zeroizes Mode 4

6 PITOT HEAT - OFF

7 FACE HEAT - OFF Right console knob

8 MISSION EQUIPMENT - AS REQUIRED

9 ADF - PWR OFF MFD COM > CNI, L2 EDIT to the ADF PWR field → Communication Pages (COM)

10 PITCH TRIM - 0° Yoke PITCH TRIM switch, PFD trim readout 0; moves only with hydraulic pressure

11 MANUAL TRIM POWER - OFF Yoke slide switch; also stops the aileron trim

12 SPOILER SWITCH - OFF

13 LANDING SPOILERS - LANDING

Note
Note: The stall strips go in by themselves below 20° flap (EFB option Cockpit handle on Stall strip: push the handle).

AFTER PARKING - ENGINE SHUTDOWN

On the parking spot, engine at idle.

BEFORE SHUTDOWN

1 PARKING BRAKE - SET In Parking brake handle mode, pull the T-handle to SET. In Stall strip handle mode, fit wheel chocks using the EFB Ground tab or the walkaround.

2 FLAPS - AS DESIRED They freeze where they are once hydraulic pressure is gone

3 SPEED BRAKE - AS DESIRED They stay where they are after shutdown

4 MISSION EQUIPMENT - OFF MK IV MODE OFF, then MK IV MASTER OFF - with the SYERS-2A once the D light is on (it goes out 30 s later); MSN RCD, RECORDER, PME A / B / C and CHBDL OFF

5 EW CONT - OFF

6 ZEROIZE - AS REQUIRED Hold 3 s with the AVP up. Erases the DP files, fixes, COM presets, IFF codes and squawk and resets the INS; DATA ZEROIZED shows for 5 s

7 AFCS POWER - OFF

8 AFCS PITCH / ROLL / YAW - OFF

9 INS, BCDU, SFD, UFCD - OFF Right console

10 WINDSHIELD ANTI-FOG - OFF

11 TRANSFORMER RECTIFIER - OFF Electrical panel

12 EMERGENCY INVERTER - OFF

13 STANDBY GENERATOR - OFF

14 MFD OFF / NIGHT / DAY KNOBS (ALL THREE) - OFF

15 AVP - OFF

ENGINE SHUTDOWN

16 THROTTLE - OFF Right-click the throttle below 10 % (THROTTLE IDLE STOP), or Increase Cowl Flap 4

Note
Note: The sim has no engine cool-down; the real aircraft wants about 5 minutes at or near idle first. Hydraulic pressure is gone within seconds.

AFTER SHUTDOWN

17 NAV LIGHTS - OFF

18 ANTI-COLLISION LIGHTS - OFF

19 LANDING LIGHT - OFF

20 HOT MIC / CALL RCD - OFF Audio panel

21 COMM CONTROL - NORMAL

22 ARC-210 BACKUP RADIO - OFF Left rotary

23 OXYGEN SYSTEM 1 AND 2 - OFF NO. 1 / NO. 2 OXY show while there is power - normal

24 CANOPY SEAL - OFF Left console T-handle

25 CABIN HEAT (OUTER KNOB) - HOLD A click on the inner knob selects AUTO again

26 FUEL BOOST PUMP PRIMARY AND SECONDARY - OFF

27 INBD / OUTBD SUMP TANK, INBD / OUTBD XFER - OFF

28 PITOT HEAT, COCKPIT FAN, HATCH HEATER, FOOD HEATER - OFF

29 IFF - OFF

30 MAIN AC GENERATOR - OFF-RESET

31 MAIN DC GENERATOR - OFF

32 EXTERNAL POWER - OFF If connected

33 BATTERY - OFF With the engine off the small utility battery carries the cockpit alone: the emergency battery is not used on the ground. UTIL BATT LOW comes after about 4 minutes and the cockpit goes dark after about 8 to 10. Parked with BATTERY OFF for a minute, both batteries are serviced

34 CANOPY LATCH - OPEN Click the placard on the right sill; on the ground with the CANOPY SEAL OFF

Note
Note: EFB Aircraft tab > Set up aircraft > Cold & dark (or your Engine auto-shutdown binding) does this whole shutdown for you while you stand still on the ground.

Note
Note: To get out, click the cockpit sill (parked, CANOPY SEAL OFF) for the walkaround. Engine covers and gear pins are walkaround objects. Pogo safety pins are removed by the runway crew. Wheel chocks are walkaround objects too, and the EFB Ground tab removes or replaces them.
Ground power and LOX servicing are on the EFB Ground tab and need their cart on the stand - set a cart to Shown if it is not there.

Related pages: Landing · Chase Car and Ground Support Equipment · Electronic Flight Bag (EFB)

Miltech Simulations U-2. SIMULATION USE ONLY. This documentation describes the simulated aircraft as delivered in the add-on and must not be used for real-world aviation.

Miltech Simulations U-2

Emergency Procedures

Two emergency checklists for our rendition of the U-2S: oxygen failure or hypoxia, and a takeoff with the pogos still attached. Each checklist starts with what you see.

Warning
Simulation use only. These procedures are written from the behaviour of the simulation. They are not the real aircraft's emergency procedures and must not be used on a real aircraft.

OXYGEN FAILURE OR HYPOXIA

OXY with NO. 1 OXY or NO. 2 OXY (warnings: converter off, below 50 psi or 1 liter), LOW OXY QTY (both together below 2 L), HIGH OXY CONSUM RATE. Without usable oxygen and with the cabin above 8,000 ft the view narrows and dims.

1 OXYGEN SYSTEM 1 AND 2 - ON Oxygen panel, left console; OXY goes out after about 5 s → Cabin, Oxygen and Hypoxia

2 LOX QUANTITY AND PRESSURE - CHECK LIQUID OXYGEN gauge and SYS > PERF LOX 1 / LOX 2; about 80 psi with a system ON

3 CANOPY SEAL - ON With the seal OFF the cabin is at aircraft altitude

NO USABLE OXYGEN

4 DESCENT - IMMEDIATELY Descend at once, as fast as is safe, until the cabin is below 8,000 ft

5 CABIN ALTITUDE - BELOW 8,000 FT SYS > PERF ALTITUDE CABIN. Pressurized (seal ON), the cabin stays at or below 8,000 ft up to about 19,000 ft aircraft altitude; unpressurized, descend below 8,000 ft

Note
Note: Symptoms clear 45 s after oxygen is back, or 90 s after descending without it. Time to blackout without oxygen: about 4 min at a 25,000 ft cabin, 90 s at 30,000 ft, 10 to 20 s at 40,000 ft and above → Cabin, Oxygen and Hypoxia

Note
Note: The hypoxia simulation can be switched off on the EFB Settings tab → Electronic Flight Bag (EFB)

TAKEOFF WITH POGOS STILL ATTACHED

Both pogos still on after liftoff: the runway crew did not pull the pogo safety pins (you rolled early, or the chase car is off). With the pins in, neither pogo falls on the takeoff roll, and they stay on in normal flight.

1 CLIMB - SAFE ALTITUDE, WINGS LEVEL Fly the aircraft first: the pogos do not change how it handles

2 WINGS - ROCK HARD, LEFT AND RIGHT Four to seven hard roll reversals break a pinned pogo off → Introduction

3 POGOS - CHECK GONE Repeat step 2 until both have fallen

Note
Note: To avoid it, hold still on the runway with the chase car on (EFB Settings tab) until you hear "ground crew clear" → Chase Car and Ground Support Equipment

Related pages: Checklists · Warnings and Alerts · Cabin, Oxygen and Hypoxia

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Miltech Simulations U-2

Chase Car and Ground Support Equipment

A U-2 does not fly alone. A chase car (the "mobile") follows you on takeoff and landing, a runway crew pulls the pogo pins, a pogo crew fits the pogos after landing, and carts on your stand give ground power, starting air and oxygen.

Note
Keep the chase car on. EFB Settings tab, section *Chase car and ground crew*: *Chase car* turns the vehicles and crews on or off; *Radio calls* turns only the calls on or off. Both are on by default. The vehicles for each variant are listed under Variants.

Who Comes Out

Why a mobile: the U-2 pilot sits low in a long nose, in a pressure suit and helmet, and cannot see the runway well in the last few feet. At a real U-2 base another U-2 pilot in a fast car follows every takeoff and landing and talks the pilot onto the ground. Yours drives by itself.

Vehicle or crew	When	What it does
Chase car (the mobile)	Takeoff and landing	Waits behind you on the stand, follows you to the runway, checks the runway, chases the takeoff and the landing and gives the radio calls
Runway crew pickup	Before takeoff	Brings two technicians, one to each pogo, to pull the pogo pins. After takeoff it collects the pogos from the runway
Pogo pickup	After landing	Brings the crew that fits the pogos again
Stand equipment	Parked	Ground power, starting air, oxygen, stairs and the crew van: see Ground Equipment on Your Stand below

Departure

1On the standOn the stand, work the carts from the EFB Ground tab.

2Engine runningStill stopped, with the engine running, the mobile calls "mobile's up". When all the carts and the stairs are disconnected it calls "mobile taxis clear".

3TaxiRelease the parking brake: the chase car backs out and follows you to the runway.

4On the runwayLine up on the centreline and stop. Hold still for at least 1 minute. The runway crew pickup brings two technicians, one to each pogo. They pull the pogo pins (and the emergency-start safety pin). Wait for "ground crew clear".If you move earlyThe technicians leave. The pins they have not pulled stay in, and those pogos do not fall on the takeoff roll.

5TakeoffThe chase car follows you down the runway. The pogos fall on the takeoff roll, and after you are airborne the pickup collects them from the runway.

Landing

1ApproachDescend below 3,000 ft above the ground towards a runway: the chase car and the pogo pickup come out. With the gear down, the flaps out and below 1,500 ft, the mobile calls "mobile's up".

2FlareThe mobile calls your height from 10 ft down to 1 ft. If you are more than 1.5 m (5 ft) off the centreline above 5 kt it calls "left rudder" or "right rudder". Trust the calls: the height is hard to judge from the cockpit.

3RolloutA touchdown call, then "stop on the runway" and "slow down" as the speed decreases. Keep the wings level with the aileron until you stop.

4Pogos back onStop (3 kt or less), on the runway or wherever you have rolled to, and hold the brakes. The pogo pickup brings the crew. They fit the pogo under the raised wing, level the aircraft and fit the other one. The mobile calls "pogos on", then "mobile taxis clear".If you taxi offThe crew stops, and starts again when you next stop.

5Back on the standTaxi in and shut down. With the engine stopped and the aircraft secured, the chase car parks on your stand.

With the Chase Car Off

- No vehicles, no crews and no calls.
- The pogo pins come out by themselves as soon as you are on a runway.
- After landing the pogos are back on at touchdown.
- The stand equipment on the EFB Ground tab still works.

Ground Equipment on Your Stand

The carts and vehicles are worked from the EFB Ground tab, only while you are parked: on the ground, stopped, off the runway and with the parking brake set.

Equipment	EFB name	What it does
A/M32A-86 ground power unit	GPU	External power. Connect, then EXTERNAL POWER ON in the cockpit
Air-start unit	ASU	Starting air for the engine: the only way to start it on the ground
Oxygen servicing cart	LOX	Fills both liquid-oxygen converters, engine stopped
Boarding stairs, open or covered	STAIRS	Access to the cockpit; *Position at cockpit* puts them there
Crew transport van	CREW	The crew van on the stand

- **Hidden / Auto / Shown** for each vehicle. On a parking start the GPU, the air-start unit and the oxygen cart come out by themselves. *Connect* or *Attach* also brings out a hidden cart.
- **Servicing:** a connected cart first drives to its service point and connects its cable or hose; the line under the service shows the progress. **Disconnect all** clears the carts and the stairs before you taxi.
- **Moving a vehicle:** drag it on the stand map, or move and rotate it in steps. Each one can go up to 40 m from its default spot, and never into the aircraft's clearance.

- **What breaks a connection:** releasing the parking brake, hiding the cart, or (for the starting air) rolling faster than 3 kt. *Route blocked* means a vehicle is in the way: disconnect, clear the path and try again.
- The EFB **Set up aircraft** presets need no carts: *Ready for taxi* and *Ready for takeoff* put the engine straight at ground idle.

Every Ground tab control is under Electronic Flight Bag (EFB), Ground tab.

If Something Does Not Come

Problem	Check
No runway crew	Is the chase car on? Are you on the runway itself, and still for at least 1 minute? They leave when you move and come back when you stop again.
No calls	*Radio calls* on the EFB Settings tab.
A cart does not connect	You must be parked off the runway with the parking brake set (chocks fitted with the EFB option *Cockpit handle* on *Stall strip*).
Pogos stayed on after takeoff	The pins were still in: see Takeoff with Pogos Still Attached.

Related pages: Flying the U-2S · Electronic Flight Bag (EFB) · Landing Gear, Brakes and Ground Handling · Introduction

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Miltech Simulations U-2

INSPlanner

INSPlanner is the Miltech Simulations online planner for routes made of coordinates. Make a route, zones, scan boxes and charts on a map, on any device, then send them to the aircraft with a 6-digit ID. Open it at insplanner.miltechsimulations.com.

Note
No account is necessary. The aircraft reads the plan from the internet with the ID only. An ID is good for the flight you load it in: the U-2 does not keep it for the next flight.

What the U-2 Takes from INSPlanner

Item	INSPlanner tab	Where it goes in the U-2	U-2 limit
Route	Flight Plan	MFD STAT → LOAD, file ST3 - INSPLANNER or ST4 - INSPLANNER 2, then a DP file	99 DPs
Emergency airports	Zones	File EMER-BULL-ROZ → EMER file	16
Bullseyes	Zones	File EMER-BULL-ROZ → BULL file	10
Restricted operating zones (ROZ)	Zones	File EMER-BULL-ROZ → circles on the MFD map	24
TP scan boxes	Zones	File TD - INSPLANNER → targeting points	10
Charts (LOCAL and NAV)	Charts Export	EFB **Charts** tab → the cockpit sunshade	2 sheets

Names go into the U-2 in capitals, up to 8 characters. The U-2 does not use the waypoint turn settings.

Make a Route

1. Open the **Flight Plan** tab. Type a name in *Flight Plan Name*.
2. Add the waypoints in the order you fly them: click the map, use **Search** (an ICAO or IATA code, an airport, a navaid or a place, then *Add as Waypoint*), or **Add by coordinate** for exact decimal degrees.
3. Correct the route in the waypoint table: ▲ / ▼ move a waypoint up or down, ✥ moves it on the map, × deletes it. **Delete All** clears the plan.
4. Click **Send to Aircraft** (at least 2 waypoints). INSPlanner shows a 6-digit ID.

File menu: *Retrieve from Cloud* opens a plan again from its ID; *Save as CSV* and *Load from CSV* keep a plan as a file.

Load the Route

1. On an MFD press B6 STAT, T5 LOAD.
2. Select ST3 - INSPLANNER (or ST4 - INSPLANNER 2 for a second plan) and press R5 DTAIL.
3. Press L2 PLAN and type the 6 digits on the UFCD keypad.
4. Press L3 FTCH. The points show in the list with their positions.

5. Press R6 LOAD. The status reads LOADED.

With the EFB option *Activate loaded flight plans* on (the default) the route becomes the ACTIVE file at once. If it is off, select the store file on NAV → DPS and press LOAD. See LOAD and DPS.

Zones and TP Boxes

1. Open the **Zones** tab. Type a name in *Zone Plan*.
2. Select a tool: **Airport** (emergency airport), **Bullseye**, **ROZ** or **TP box**. Click the map, or use *Place by airport or coordinates*.
3. A ROZ starts with a 10 NM radius; set the radius and the colour in its line under *Plan items*. For a TP box, hold and drag on the map over the area you want to scan.
4. Click **Send to aircraft** and write down the 6-digit ID.
5. On the MFD LOAD page, load EMER-BULL-ROZ and TD - INSPLANNER with that ID, the same way as the route.

- ROZ colours show as green, magenta or cyan on the MFD map. The U-2 takes a radius up to 255 NM.
- TD - INSPLANNER is gray when no imaging sensor is installed. The TP boxes become targeting points: see Loading a TD File.

Charts on the Sunshade

1. Make the route (and the zones, if you want them on the chart) first.
2. Open the **Charts Export** tab. Fill in the title, the classification banner and the destination points header (track ID, aircraft, date, time). Add procedures and mission remarks if you want them.
3. Under *Detail views*, draw up to six ops areas with **Draw ops area**, or **Add current view**.
4. Click **Generate PNG**, then **Send charts to aircraft**. Write down the 6-digit ID.
5. In the U-2 EFB, **Charts** tab, type the ID and press **Find**. Sheet 1 goes to chart 1 as LOCAL and sheet 2 to chart 2 as NAV.

Sheet	What it shows
LOCAL	The departure and arrival airports and up to six ops areas
NAV	The whole route with its numbered waypoints, the zones, the destination points table, the emergency airfield information and the mission remarks

The charts ID also holds the route: you can load it on ST3 - INSPLANNER too. See EFB, Charts Tab.

If It Does Not Load

Status on the LOAD page	Do this
NO PLAN NUMBER	Press PLAN and type all 6 digits.
ID NOT FOUND or **NO ROUTE DATA**	Check the ID. Send the plan again from the correct tab: a Zones ID does not hold a route.

Status on the LOAD page	Do this
NETWORK / CORS - RETRY LOAD or **TIMEOUT 15 S - RETRY LOAD**	Check the internet connection and press LOAD again.

Related pages: Status Pages (STAT) · Navigation Pages (NAV) · Electronic Flight Bag (EFB) · Targeting Points · Quick Answers

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Miltech Simulations U-2

Datalink Portal (Coming Soon)

Coming Soon

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