Miltech Simulations MV-22B Tiltrotor

Quick Start Guide

Before you launch a flight, you must understand and follow the following steps:

1. **Get yourself familiarized with the** Important Need-to-Knows
2. **Your MSFS Assist Realism Settings must be set to True to Life, and crash detection must be off.** This is a strict requirement for this aircraft to function properly.
3. **You must map two controller buttons/keyboard keys to “Increase Cowl Flap 4” and “Decrease Cowl Flap 4”.** These two keys will control the angle of nacelles.

> Note
> If you prefer following a video tutorial, follow this: https://www.youtube.com/watch?v=1yAO-eDkGvo&t=72s

4. MSFS Sets the starting flight mode based on the type of starting location for the flight. Parking - Cold and Dark, Runway - Ready to Fly, etc. For this guide, we will be starting from a Parking location (Cold and Dark).
5. All flight plans are to be created using the built-in MSFS Flight Map before starting the flight. CDU Input is not available. Create your flight plan through the MSFS Flight Map now.
6. Fuel and payloads are to be changed through the built-in MSFS Menu. Range and Endurance are calculated automatically based on these numbers. To perform a VTOL Takeoff, Takeoff Weight must not be greater than 52.000lbs at sea level. Load your fuel and decide if you will be performing a VTOL or STOL takeoff and landing now.
7. By default, the aircraft always starts in “Hard” Flight Mode. Under this mode, the aircraft is prone to Vertex Ring State and Engine Limitations that the pilot must take care of for a successful flight. Flight mode can be switched to “Easy” through the CDU to deactivate VRS and Limitations. Decide if you want to fly the aircraft in “Hard” Mode, or switch to “Easy” now.

Normal Procedures

Welcome to the cockpit of the Osprey MV-22! If you’re not used to Helicopters, it may feel like you’re seated on the copilot seat. In helicopters (and tiltrotors) the captain sits on the right seat, unlike aircraft.

Take a few minutes to familiarize yourself with the cockpit. There are two screens in front of the pilot and copilot, which are your Multi-Function Displays (MFD). In between both seats, you’ll find the Central Display Unit (CDU), with the two input keyboards. And above you, you’ll find the Overhead Panel.

The aircraft is Cold and Dark. It’s time to start the checklists now.

I. Pre – Start

1.	Landing Gear – Down	Center Console
2.	Flaps – AUTO	Center Console
3.	Displays – OFF	Main Panel
4.	Fire Suppression T Handle – Both NORM	Overhead
5.	Rotor Brake – OFF	Overhead
6.	Engine Control Levers (Silver, large levers) - Both OFF	Overhead
7.	APU – STOP	Overhead
8.	Primary Cockpit Lights – OFF	Overhead
9.	Emergency Egress – OFF	Overhead
10.	Secondary Cockpit Lighting – OFF	Overhead
11.	Cargo Hook Hoist Mode – OFF	Overhead
12.	Fuel Dump – OFF	Overhead
13.	Emergency Oxygen – OFF	Overhead
14.	Blade Unfold and Wing Unstow Procedure – As Required	Main Panel (MFD)

Note
The Osprey can fold and stow its wings for Hangar/Carrier storage. This is known as “Blade Fold/Unfold and Wing Stow” (BFWS) and can be accessed through the Multi-Function Display. For more information on BFWS: Blade Fold/Unfold and Wing Stow (BFWS) Procedures

II. Power Startup

1.	Battery – ON	Overhead
2.	APU - RUN/ENG check APU display is RUN	Overhead
3.	Turn ON ALL PFD/MFD/CDU Displays (Rotary Switch OFF/DAY/NIGHT)	Main Panel
4.	Exterior Lights as required	Center Console (CDU)

Note
Exterior lights are operated through the CDU. Find and click on the “LTS” button on the keyboard of the CDU. To operate the lights, Master CTRL must be on (white with *). Turn on/off the exterior lights by pushing the buttons on the CDU.

III. Engine Startup

1. Start Engines:

a.	Set CDU on EICAS display (Click “EICAS” Button)	Center Console (CDU)
b.	Parking brake – ON	Center Console
c.	Rotor Brake – OFF	Overhead
d.	Rotor Lock – OFF (MFD/SYST/BFWS)	Main Panel (MFD)
e.	Fuel Quantity – CHECK	Main Panel (MFD)
f.	Nacelles – 90 Degrees	Main Panel (MFD)

Note
Nacelles are operated with “Increase Cowl Flap 4” and “Decrease Cowl Flap 4”. Y**ou must map two buttons of your controller, or keys on your keyboard to these commands.** Hold the mapped keys to increase of decrease nacelle angle. **Note that an alert on the CDU, indicating to map these two buttons, will show up until the nacelles are moved up and down, and the aircraft registers that both**

commands are correctly mapped.

g. Check aircraft is clear from obstacles	
h. Move ENG2 Control Lever to START position.	Overhead
i. Proprotor – Observe ROTATE	
j. EICAS-NG – gaining % RPM after 30 sec	Center Console (CDU)
k. ENG2 - Wait for Np stabilize at 70-72 %	Center Console (CDU)
l. Switch respective Engine Control Lever – FLY	Overhead
m. ENG1 - Lever to START position	Overhead
n. ENG1 – Wait for Np stabilize at 70-72%	Center Console (CDU)
o. Switch respective Engine Control Lever – FLY	Overhead

IV. Taxi

1. Disengage APU – STOP Position	Overhead
2. Engine Control Levers – Check both FLY	Overhead
3. Parking Brake – OFF	Center Console
4. Nacelles and Throttle as Required (minimum 60 Deg)	
5. Speed under 20 Knots	

V. Before Takeoff

1. Flaps – AUTO	Center Console
2. Fuel Quantity – CHECK	Main Panel (MFD)
3. Doors and Ramp – CLOSED	Overhead
4. Decide if takeoff will be VTOL or STOL	
I. VTOL – Maximum Takeoff Weight: 52.000 lbs	
II. STOL – Maximum Takeoff Weight 60.000 lbs	
5. Contact tower for Takeoff Clearance. Radios are inputted in CDU	Center Console (CDU)

VI. Takeoff

VTOL

1. Check take-off Area- CLEAR from obstacles
2. Nacelles 87 – 92 Degrees
3. Check windspeed and direction – headwind / into the wind
4. Increase Thrust slowly and Take off VTOL – observe NG indication to avoid engine stress.
5. Establish hover at 20ft AGL

STOL

1. Taxi to runway (Take-off position) and check area is CLEAR from obstacles
2. Nacelles: as required, depending on available runway. Normally: 60 to 75 degrees
3. Take off STOL – observe NG indication to avoid engine stress.

Warning
If maximum throttle is applied for a period longer than 45 seconds, the aircraft engines may fail due to overstress. Reduce throttle after takeoff to maintain engines on the “green area”. Engine Stress damage can be deactivated through the CDU (ACFT INIT/Flight Reality to EASY)

VII. Airborne and Conversion

1. Observe aircraft attitude – LEVEL
2. Observe engine RPM% - GREEN — Center Console (CDU)
3. Landing Gear – UP — Center Console
4. Gain speed and gradually rotate nacelles forward – observe conversion corridor indication in the PFD (Conversion)
5. Gain altitude as required
6. Above 130 knots nacelles can rotate to 0 degrees (APLN)
7. Set and activate Autopilot after CPLD turns green to ARM

> Caution
> Gradually rotate nacelles as speed is gained until Nacelles are at 0 deg. The conversion process must be flown manually (Autopilot is not recommended). Follow the conversion corridor ("Green arc") from the nacelle angle indicator on the top left corner of the primary flight display.

VIII. Climb

1. Navigation Course – SET
2. Default Climb Rate – 1000 Feet/min

IX. Cruise

1. Ideal Cruise Altitude - 17,000ft
2. Ideal Cruising Indicated Airspeed – 180 KIAS

The Osprey is now cruising and enroute to its deployment mission. Continue monitoring the engines to avoid a flameout due to engine stress and start briefing for the descent.

X. Descent

1. Default Descent Rate – 1000 Feet/min. Always descend in "APLN" mode (nacelles 0 deg)
2. Keep Indicated Airspeed under 200 KIAS

XI. Conversion

1. Scrub Airspeed to begin Conversion
   a. Max Speed for Conversion: 200 KCAS
   b. Ideal Conversion: 150-170 KCAS at 5000ft (Radio Altimeter)
2. Limit Nacelles to <75 Degrees until 40 KCAS is reached (follow Conversion Corridor)
3. At Nacelle Angle >75 Degrees, beware of rate of descent is NO MORE than 1500ft/min. Otherwise, the risk of Vortex Ring State is high.

> Warning
> Vortex Ring State (VRS) is a type of aerodynamic stall that occurs in helicopters and tiltrotors as a result of a high descent rate and low airspeed. You must be careful when descending with Nacelles at an angle higher than 75 degrees and airspeed below 40 KCAS, as the risk of VRS is very high.
> The aircraft will alert of a high Sink Rate, as well as the Vertical Speed Indicator illuminates red if the aircraft is in danger due to VRS. An ideal VTOL descent speed is 1000ft/min.

If VRS occurs, move nacelles down and gain airspeed to retain lift, if altitude permits
VRS can be deactivated through the CDU (ACFT INIT/Flight Reality to EASY)
NOTE: From 180 KCAS to 0 KCAS/Hover, conversion requires around 1800 meters in length. Distance requires varies depending on windspeed and thrust.

XII. Landing

VTOL

1. Observe Landing Spot is CLEAR
2. Observe wind speed and direction – head INTO the wind and avoid crosswind conditions
3. Adjust speed and Nacelle Angle
    a. Limit Nacelle Angle >75 Degrees for speeds under 40 KCAS
    b. At Nacelle Angle >75 Degrees, beware of rate of descent is no more than 1500ft/min
4. Landing Gear – EXTENDED Center Console
5. Flaps – AUTO Center Console
6. At 300ft AGL, level fuselage altitude and start turning Final
7. Under 200ft AGL, descent rate must be no more than 400ft/min
8. Move nacelles to 90deg (±5 Deg) and establish a stable a 30-40ft hover over the landing area
9. Reduce throttle slowly to lower the aircraft
10. Cut the throttle and apply breaks upon touchdown to avoid aircraft movement on the ground

STOL

1. Approach the runway as a conventional aircraft – Speed and nacelle angles as required (follow conversion corridor)
2. Observe landing path
3. Landing Gear – EXTENDED Center Console
4. Flaps – AUTO or MANUAL as Required Center Console
5. On Final Approach
    a. Nacelles at 60 Degrees
    b. Maintain speed between 50-80 Knots, as required according to weight
    c. Vertical Speed as Required
6. Land with Main Landing Gear first
7. Cut throttle, apply braking as Required
8. Increase Nacelle Angle as Required

XIII. Taxi

1. Nacelles and Throttle as Required (minimum 60 Deg)
2. Speed under 20 Knots
3. APU – As Required, RUN/ENG — Overhead

XIV. Engine Shutoff

1. Throttle Control Lever – Closed/IDLE
2. Nacelles – 90 Degree
3. Parking Brake – SET — Center Console
4. ENG1 and ENG2 Engine Control Levers – OFF — Overhead
5. Blade Fold and Wing Stow Procedure – As Required, see BFWS Procedure Checklist

XV. Cockpit Switchoff

1. External Lights – OFF — Center Console (CDU)
2. MFDs / CDU / EICAS – OFF — Main Panel (MFD)
3. RFIS / Standby Instruments – Min Brightness — Main Panel (MFD)
4. Cockpit Lighting – OFF — Overhead
5. APU – STOP — Overhead
6. BATTERY – OFF — Overhead

Congratulations! You have finished your first flight with the Osprey.