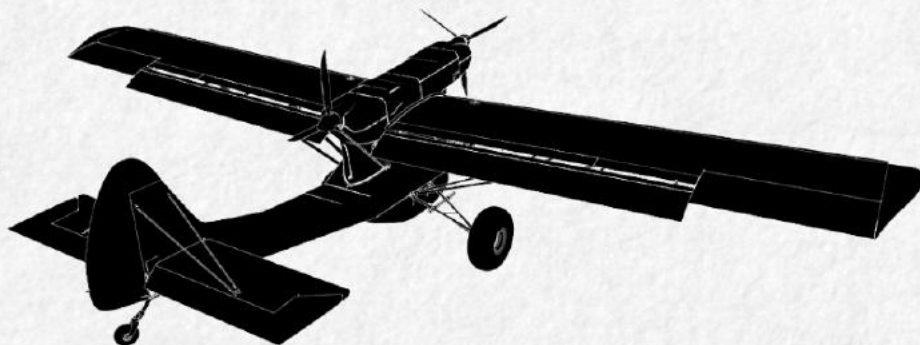




GOT FRIENDS FLIGHT MANUAL

EXPERIMENTAL TWIN CUB DOUBLEENDER

THIS PUBLICATION IS MADE FOR MICROSOFT FLIGHT
SIMULATOR AND SHOULD NOT BE USED AS A REAL
WORLD SUBSTITUTE



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SIMULATOR MARKETPLACE GUIDLINES.**

CHAPTER #1: INTRODUCTION

Introduction: First conceptualized by Alec D. Wild, the Twin Cub, better known in the bush community as “DoubleEnder” is seen to some as “the most innovative prototype bush plane of the modern era” *. With a focus on safety, redundancy, reliability and stability, this one-off home built aircraft remains one of the most exciting back country experiences any pilot could have an opportunity of flying.

Background on Development: The real world DoubleEnder was a home built in a joint effort by Alec D. Wild, Eric Lewis (LewAero Works), Engineered by Douglas Keller, and later iterated/modified by Peter Anderson. This unique aircraft started development in the mid 2000s as a Piper PA-18 and then made its public reveal in various Super Cub Forums. The aircraft gets its name from its unique “pusher-puller” set of in-line Rotax 9 series engines. It can often be seen equipped with a custom built belly pod that doubles as an auxiliary fuel tank. A notable feature of the aircraft’s design included a large bubble canopy, offering the pilot a stunning view from the cockpit. Other design elements included a fully actuating horizontal stabilizer for trim, 35” bush tires equipped for off-airport operations, and automatic leading edge slats on the primary wing surface in addition to large spoilerons that greatly assist roll rate during flight. The DoubleEnder also featured a fully free-castering tailwheel that allowed for precise ground maneuvering in very tight spaces; perfect for sandbars in the backcountry.

Based on our research, the DoubleEnder saw roughly 4 distinct phases of life before its last officially recorded flight in May 2015 in Aurora, Oregon. The status of the project at the current time, July 2023, is unknown. It remains a one off aircraft and never met any commercial production. Newer home built aircraft created by the same team, such as the “Ascender”, have also been in production with a handful of public photos surfacing online. Today, there is only a handful of publicly remaining information online of the DoubleEnder and information is declining as the years continue to pass. They showcase the aircraft’s stunning visibility and unique in-line engine sounds in detail. With such scarce information remaining, we took the opportunity to recreate this aircraft and cement its history in Microsoft Flight Simulator as one of the most unique bush planes to ever be flown.

** For More Background Information, Backcountry Pilot made an incredible video on the DoubleEnder that can be viewed on YouTube at this link: <https://www.youtube.com/watch?v=IHR6bpupwJk&t>*

Got Friends Recreation: Our digital recreation of such an iconic aircraft seemed fitting for our team as our current portfolio consists heavily of some of the more eccentric airframe designs. Our past projects take a heavy emphasis on STOL/Bush aircraft and our goal with the DoubleEnder was to produce the most accurate digital recreation of this bird with all the current information publicly available. This project is considered a “flagship” release with heavy emphasis on systems depth, dynamic and reactive wear/tear that shows visually on the model in addition to affecting aircraft systems and handling. Packed into this package is a lot of the existing technology developed during the Wilga in addition to all new technology never seen before in any Got Friends product.

NOTICE

The DoubleEnder works around specific sim limitations using our custom coding. Specific elements of the simulation including (but not limited to): Dihedral effect, engine failures, electrical system manipulation, and visibility syncing of accessories over the network are written using our own custom workarounds. Although rigorously tested in detail by our Beta team, there may be rare circumstances that you notice minor artifacts for some of these elements. We have however verified the stability of these workarounds and have concluded they were fit for release. See the FAQ section for more detail.

CHAPTER #2: SPECIFICATIONS

Characteristics:

Crew:	2 x Persons (170 lbs / 77 kg Maximum) each
Capacity:	Two Passengers or Pilot + Cargo
Cabin Width:	2.3 ft / 0.7 m
Length:	21.3 ft / 6.5 m
Height:	11.8 ft / 3.6 m
Gross Weight:	2500 lbs / 1135 kg
Empty Weight:	1500 lbs / 680 kg
Primary Fuel Capacity:	2 x 24 gallons / 91 liters per wing
Auxiliary Fuel Capacity:	1 x 55 gallons / 208 liters single belly pod

Powerplant:

Type:	Rotax 9 Series
Model:	2 x Rotax 916iS
Propeller Specs:	2 x Airmaster AP332CTF (3-Blade Carbon Fiber)
Engine Configuration:	2 x Horizontally Opposed Piston Engines 160hp (117kW) Each
RPM Range:	0 - 5800 RPM, Cruise at 5500
Control Unit:	Airmaster AC-200F with Feather Support AC-200R with Beta Support
Engine Monitoring Unit:	2 x Customized MVP-50P Engine Monitors

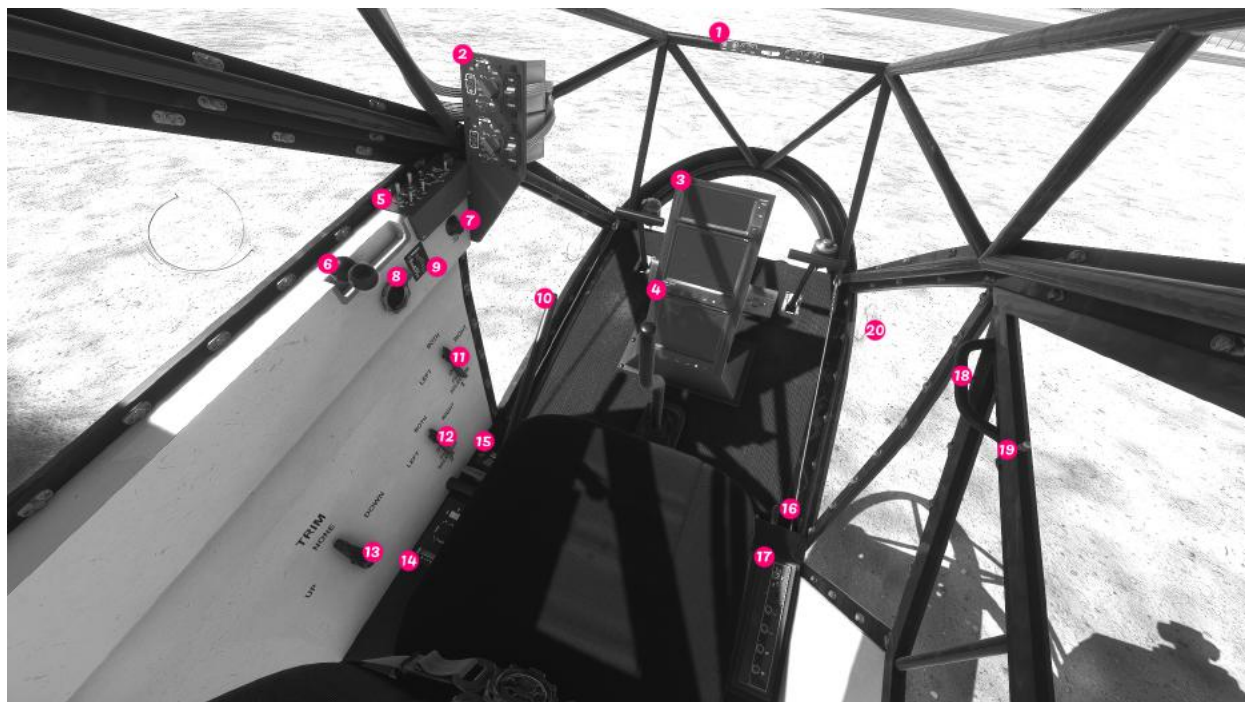
Performance:

Never Exceed (VNE):	139 kts / 257 kph
Cruise Speed (VC):	96 kts / 178 kph
Takeoff Speed (VS):	39 kts / 72 kph
Best Climb (VY):	60 kts / 111 kph
Stall Speed (VSO)	31 kts / 57 kph
Range:	361 nm / 667 km
Endurance:	4 hours on Primary Tanks, 7 hours with Auxiliary Fuel Pod
Service Ceiling:	13,255 ft / 4,040 m

CHAPTER #3: VIRTUAL COCKPIT

Cockpit Interactivity Quick Guide:

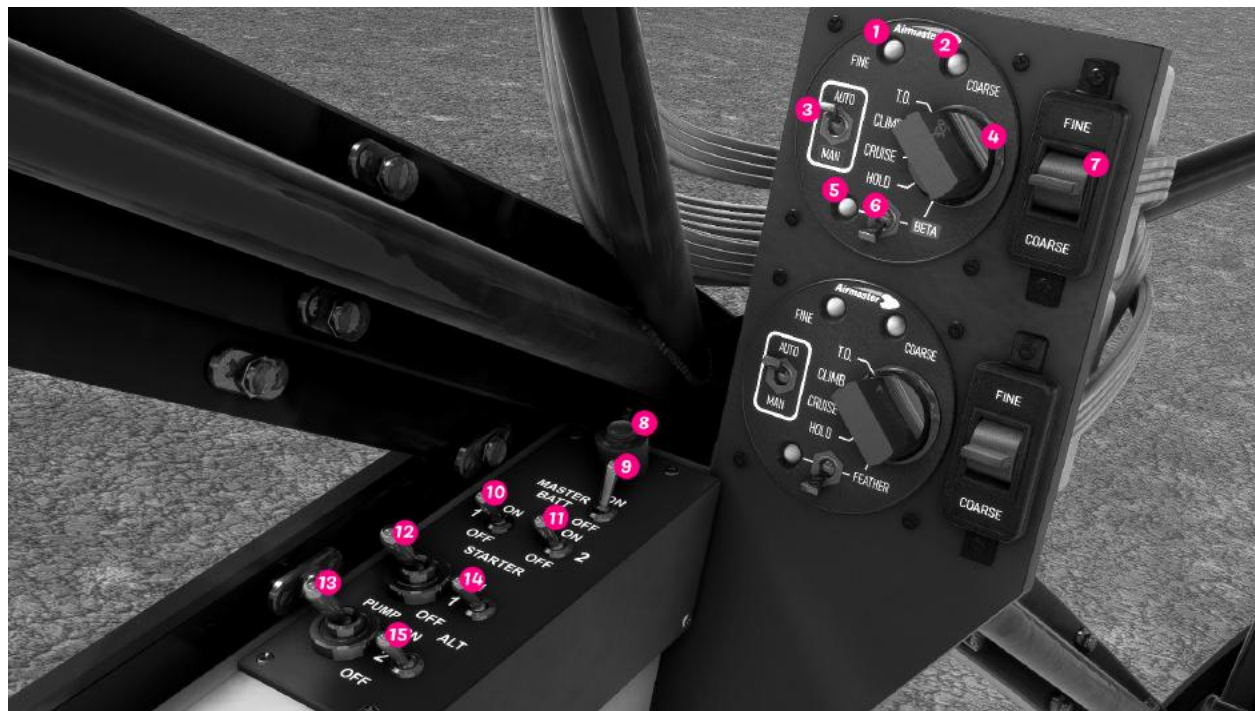
1. Annunciator Warning Light Panel
2. Airmaster Engine Control Units
3. GTN-650 Navigation / Comms Display (Swappable with PMS and TDS Compatibility)
 - a. **Note:** If TDS Replacement Package is installed the MVP-50P settings and the SD Card will still display PMS50. Rest Assured TDS is running with full compatibility.
4. MVP-50P Engine Monitoring Units
5. Main Switch Panel
6. Throttle Levers (Left = Front, Right = Rear)
7. Windshield De-Ice Knob
8. Vibration Effects / Damper Knob
9. Critical V-Speeds Placard
10. Flaps Handle
11. Front Engine Fuel Selector
12. Rear Engine Fuel Selector
13. Manual Trim Adjustment lever (Forward = Nose Down, Back = Nose Up)
14. Type 400A Integrated Flight Director (Recognition Light = On/Off)
15. Auxiliary Belly Fuel Pod Control Panel with Emergency Dump Lever
16. Parking Brake Lever
17. Bendix King KT76A Mode C Transponder
18. Door Handle
19. Window Slider (Safety Pin)
20. Hot Weather Air Vents



CHAPTER #3: VIRTUAL COCKPIT

Airmaster Control Unit & Engine Panel:

1. Hold Mode Prop Fine Annunciator Light
2. Hold Mode Coarse Annunciator Light
3. Airmaster Auto/Manual Mode Switch *
4. Manual Flight Mode Selection Knob
5. Feather/Beta Annunciator Light
6. Feather/Beta Arming Switch *
7. Hold Mode Switch (Fine or Coarse) *



AIRMASTER CONTROL NOTES

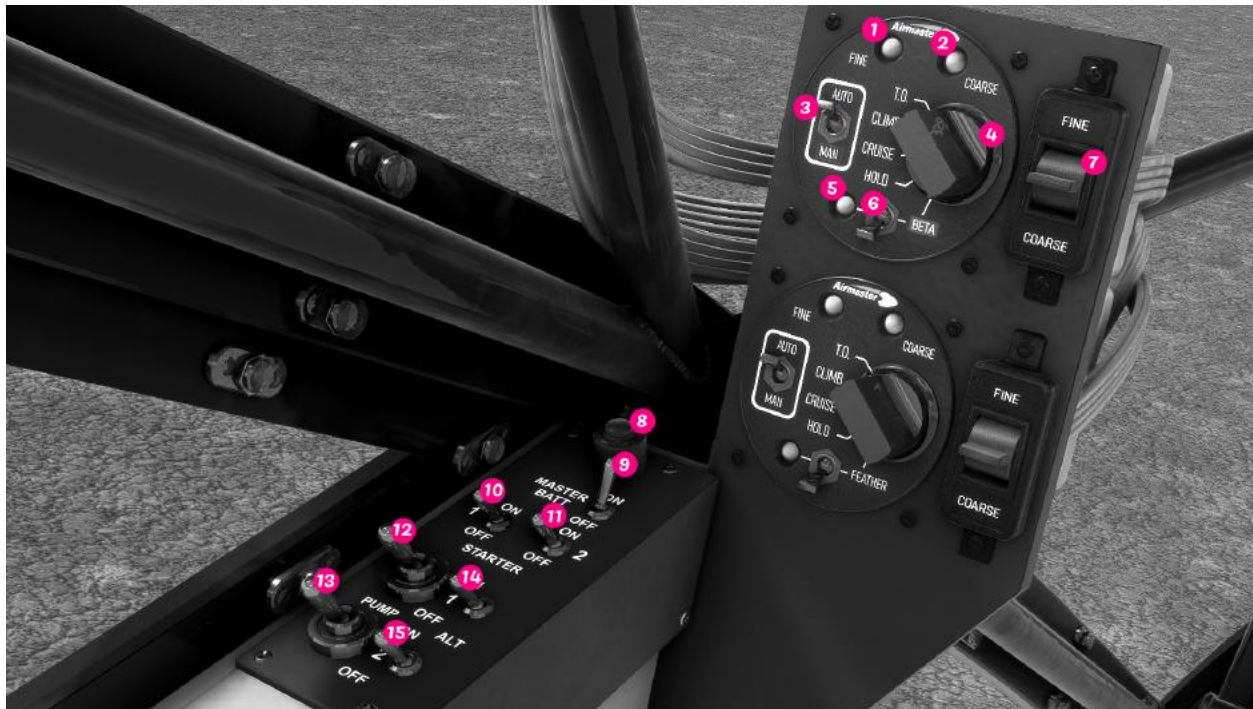
The Airmaster unit by default is set to function in "Automatic" mode and will attempt to manage your propeller beta based on automated calculations and engine performance specifications. This is to say that when the Airmaster Auto/Manual Mode Switch is set to "Auto", the Manual Flight Mode Selection Knob will not be operational. Please ensure you set this switch to manual before manually manipulating the Manual Flight Mode Selection Knob. We recommend that you stay in "Auto" Mode until you are ready to progress flight training and experiment with these advanced features throughout your flights. The Coarse/Fine Knob is only used in the HOLD Mode position indicated on your Manual Flight Mode Selection Knob. Your Airmaster Unit must be in Manual Mode.

As for Feather/Beta, it's worth noting that the DoubleEnder only supports Beta in the forward propeller while the rear propeller only has a feather mode. However, if you wish to feather your forward engine, place your top AC-200R into "Hold" Mode and adjust your propeller to the most Coarse setting available using the Hold Mode Switch. You will know if you are in the finest or coarsest setting because your indicator lights will go from "Blinking" to "Steady". Be aware that going to the finest setting or Beta mode in flight can cause overspeeding and damage to your engine in realism mode. To activate Beta or Feathering, first ensure your Airmaster Auto/Manual Mode Switch is in the "Manual" position. Then turn your Manual Flight Mode Selection Knob to Beta or Feather. Finally, ensure your Feather/Beta Activation Switch is armed on. In order to receive backwards momentum, ensure your rear propeller is feathered.

CHAPTER #3: VIRTUAL COCKPIT

Airmaster Control Unit & Engine Panel:

8. Master Battery Annunciator Light and Voltage Test
9. Master Battery Switch
10. Front Engine Starter Switch
11. Rear Engine Starter Switch
12. Front Engine Fuel Pump Switch
13. Rear Engine Fuel Pump Switch
14. Front Engine Alternator Switch
15. Rear Engine Alternator Switch



NOTE:

Hardware switches from your hardware can override these in-sim clickable switches. So if you're unable to turn something off from this panel via clicking, please double check none of your hardware switches are still in their 'on' position first. This is a common recurring issue with many Honeycomb users. All of these switches are available to be keybound in MSFS using the default hotkey assignments.

CHAPTER #3: VIRTUAL COCKPIT

Right Wall Detailed View:

1. Avionics Master Switch
2. Pitot Heat Switch
3. Master Failure Light
4. Master Circuit Breaker
5. Landing Light Switch (Suspension or Belly Pod)
6. Nav Light Switch (Wings + Tail)
7. Strobe Light Switch (Wings)
8. Front Engine Magneto #1 Switch
9. Front Engine Magneto #2 Switch
10. Rear Engine Magneto #1 Switch
11. Rear Engine Magneto #2 Switch
12. Front Engine Alternator Circuit Breaker
13. Front Engine Starter Circuit Breaker
14. Front Engine Fuel Pump Circuit Breaker
15. Front Engine Airmaster AC-200R Circuit Breaker
16. Front Engine MVP-50P Circuit Breaker
17. Transponder Circuit Breaker
18. Rear Engine Alternator Circuit Breaker
19. Rear Engine Starter Circuit Breaker
20. Rear Engine Fuel Pump Circuit Breaker
21. Rear Engine Airmaster AC-200F Circuit Breaker
22. Rear Engine MVP-50P Circuit Breaker
23. Avionics Master Circuit Breaker
24. Type 400A Integrated Flight Director Circuit Breaker
25. Lights Electrical Circuit Breaker (All Lights)
26. Flight Hour Tracker
27. Emergency Locator Transmitter Switch



CHAPTER #3: VIRTUAL COCKPIT

Left Wall Detailed View:

28. Rear Seat Cabin Light (Adjustable Angle via Main Unit and Brightness via Front Spinner)
29. Critical Weight Limitations Placard
30. Headphones (Click to Enable Headphone Simulation)
31. TRS Plugs (Click to Disable Headphone Simulation)
32. Front Seat Cabin Light (Adjustable Angle via Main Unit and Brightness via Front Spinner)



Annunciator Light Panel:

1. Front Engine Alternator Failure Annunciator Light
2. Rear Engine Alternator Failure Annunciator Light
3. Front Engine Oil Pressure Warning Light
4. Rear Engine Oil Pressure Warning Light
5. Slip / Turn Coordinator
6. Critical AOA, Pre-Stall Annunciator Light
7. Indicated Icing Annunciator Light
8. Left Wing Fuel Critical Annunciator Light
9. Right Wing Fuel Critical Annunciator Light



NOTE:

These Warning Lights indicate failures at a glance but don't indicate how close you are to failure. Please refer to the MVP-50P's respective Workshop Page to help diagnose impending failures. In the event you do have a failure that you are unable to diagnose via the MVP-50P system, please check the circuit breaker right wall from the images above to see what happened (Realism must be enabled).

CHAPTER #4: MVP-50P SYSTEMS

MVP-50P MAIN PAGE

The MVP-50P is controlled using the large knob on the left and pushing it in to make selections/changes. This knob doubles as a page flipper and cursor. Right clicking on the large knob is used for various selection modes. During use of the MVP-50P, pressing the "HOME" button will allow the user to return to this main engine data screen. Alternatively, pressing the "EXIT" button will go back one-step in any cursor selection. Refer to the FAQ at the end if you have questions.

This page of the MVP 50P system displays core engine parameters such as Manifold pressure, current Revolutions Per Minute, Outside Air Temp, Time (Local & Zulu), Cylinder Head EGT/CHT, Flaps Position, Trim position, Propeller Angle, Autopilot/Flight Director Annunciator, Fuel Flow, Fuel Pressure, Oil Pressure, Oil Temperature, Remaining Left and Right Fuel, Remaining Auxiliary Fuel, and current power draw in terms of Volts and Amps.

Pressing the "SCRN" button will cycle the right Engine Data Screen section to a Digital Gauge Screen (Airspeed, Altitude, HDG and V-Speed), or a Competition Page (Wind Direction and Ground Roll Distance) for those wanting to keep track of take-off/landing metrics. To calibrate the Altimeter, right click and use the large knob for barometer settings. To reset ground roll distances, right click the large knob.



CHAPTER #4: MVP-50P SYSTEMS

MVP-50P CONFIGURATION PAGE

This page of the MVP-50P system allows the pilot to configure display settings in the DoubleEnder. Few important items to note:

- Display brightness is tied to all MVP-50P units as well as the GTN-650 and Interior Decals/Warning Lights.
- Display unit changes are shared across both MVP-50P Avionics but do not affect PMS50 GTN-650, Asobo GTN-650 or TDS GTNXi display units. Those avionics must have their units changed via their own system settings.



CHAPTER #4: MVP-50P SYSTEMS

MVP-50P AIRCRAFT CONFIGURATION PAGE

This page of the MVP-50P system allows the pilot to configure core aircraft settings:

- Option for the Belly Pod (Extra Cargo and Auxiliary Fuel Tank)
- Options to remove the Rear Seat and utilize this space for Cargo instead
- Options to Swap GTN650 Simulation from Asobo to PMS or TDS (PC ONLY | TDS Requires Additional Package)
- Options to toggle Realism Wear and Tear, Engine Stress/Damages and Electrical Failures (**Off by Default**)
- Options to toggle Ground Handling between Simplified and Authentic (**Simplified by Default**)
 - ❖ Simplified adds 12% Rudder Linkage and Removes Weathervaning, P-Factor, and Ground Looping
 - ❖ Authentic is recommended if you want to replicate "real-world physics". Recommend using Rudder Pedals
- Options to enable aircraft Tie Downs
- Options to enable aircraft Pitot Cover
- Options to deploy Campsite (Must have Rear Seat Removed and at least 40 lbs in Cargo Weight)
 - ❖ *Visible Campsite Accessories are fully dependent on Cargo Weight up to 170 lbs Max*
- Options to enable/disable or force enable Dirt Simulation on the tires and airframe
 - ❖ **If not set to "Dynamic", Dirt/Mud will stay on the fuselage at the selected dirt setting with no changes**
- Options to visually toggle Propeller Spinners
- Options to visually toggle Tail Registration Numbers
- Options to toggle Pilot and Co-Pilot Visibility (Co-Pilot requires Rear Seat and at least 1 lb in Weight)
- Options to change Vibration Effects intensity on various cockpit items such as stick and throttle
- Options to toggle on/off all visual effects to increase FPS performance (Also disables multiplayer visual effects)



CHAPTER #4: MVP-50P SYSTEMS

MVP-50P AIRCRAFT V-SPEEDS PAGE

This page of the MVP-50P system allows the pilot to quickly reference critical V-Speeds for the DoubleEndr. The data inputted on this page is dynamic to your current weight and balance and can be used as a reference in flight or in the event of an engine failure. Please note, that these speeds will change depending on your overall unit selection setting in the MVP-50 Configuration Page.

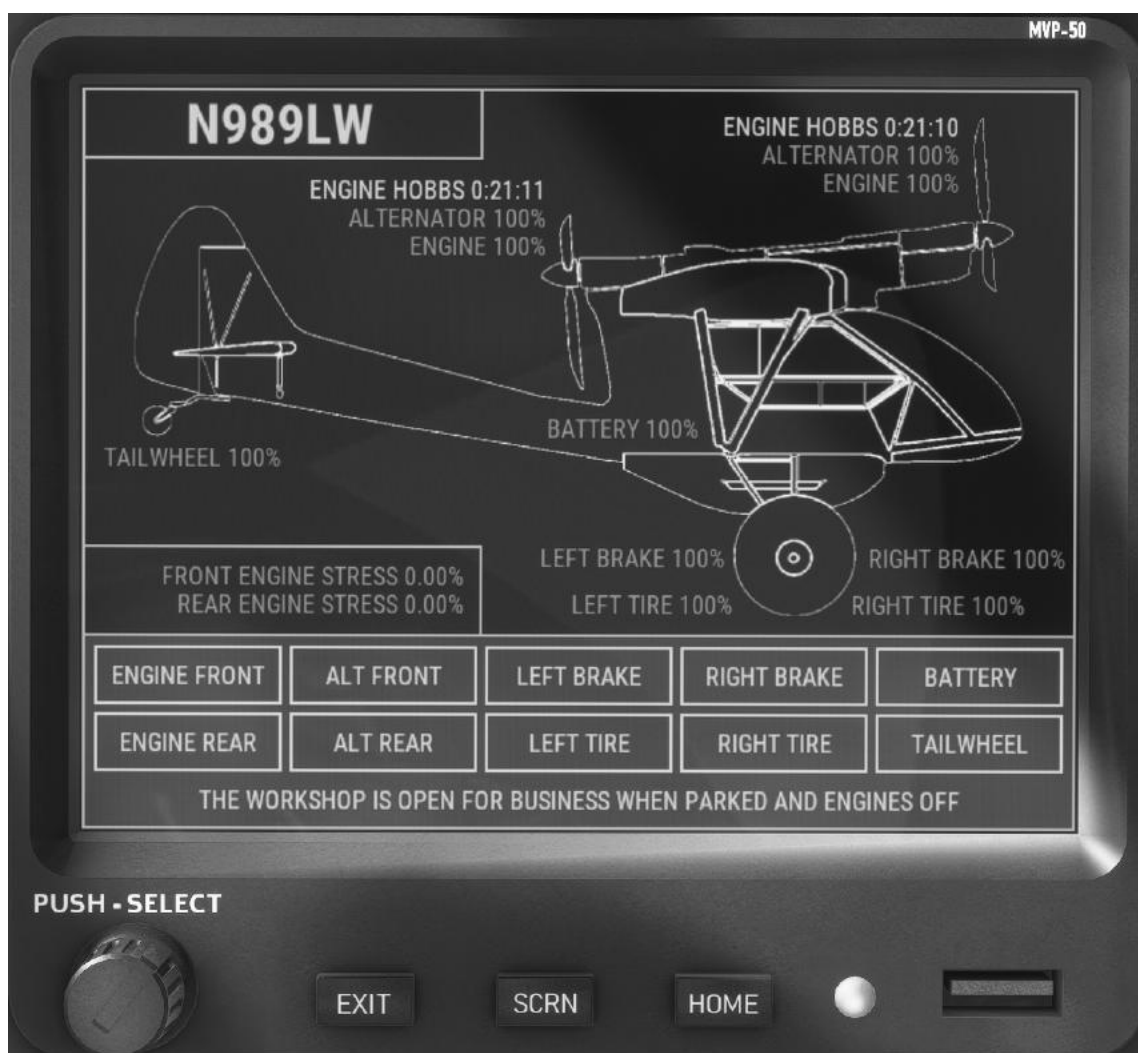


CHAPTER #4: MVP-50P SYSTEMS

MVP-50P WORKSHOP PAGE

This page of the MVP-50P system can only be interacted with when the aircraft is parked and both engines are turned off. The page allows the pilot to see aircraft component health at a glance and give them an opportunity to replace individual components (Engines, Alternators, Brakes, Tires, Batteries). This page also shows the pilot current engine hours and active stresses on the engine in the event of extended high RPM, high oil pressures, and temperatures.

It's worth noting that Engine Stresses will decrease over time if corrected quickly enough, but extended mistreatment of either engine directly contributes to the engines overall health. As time passes, components become prone to frequent failures. Once health for any component reaches 30% or less, failures are more likely to happen in flight. Keep on your toes with how you treat the DoubleEnder and ensure you replace components as they wear so as to not risk in flight failures. Alternatively, if you are interested in experiencing a failure on the DoubleEnder during a single flight, utilize the Wear and Tear Aging Override Page mentioned in the next section. This will override all gathered wear and tear throughout your flights, so keep that in mind if you don't want to lose your wear and tear record from past flights. For users not wanting to deal with failures, they can disable Realism via the Aircraft Configuration MVP-50P screen.



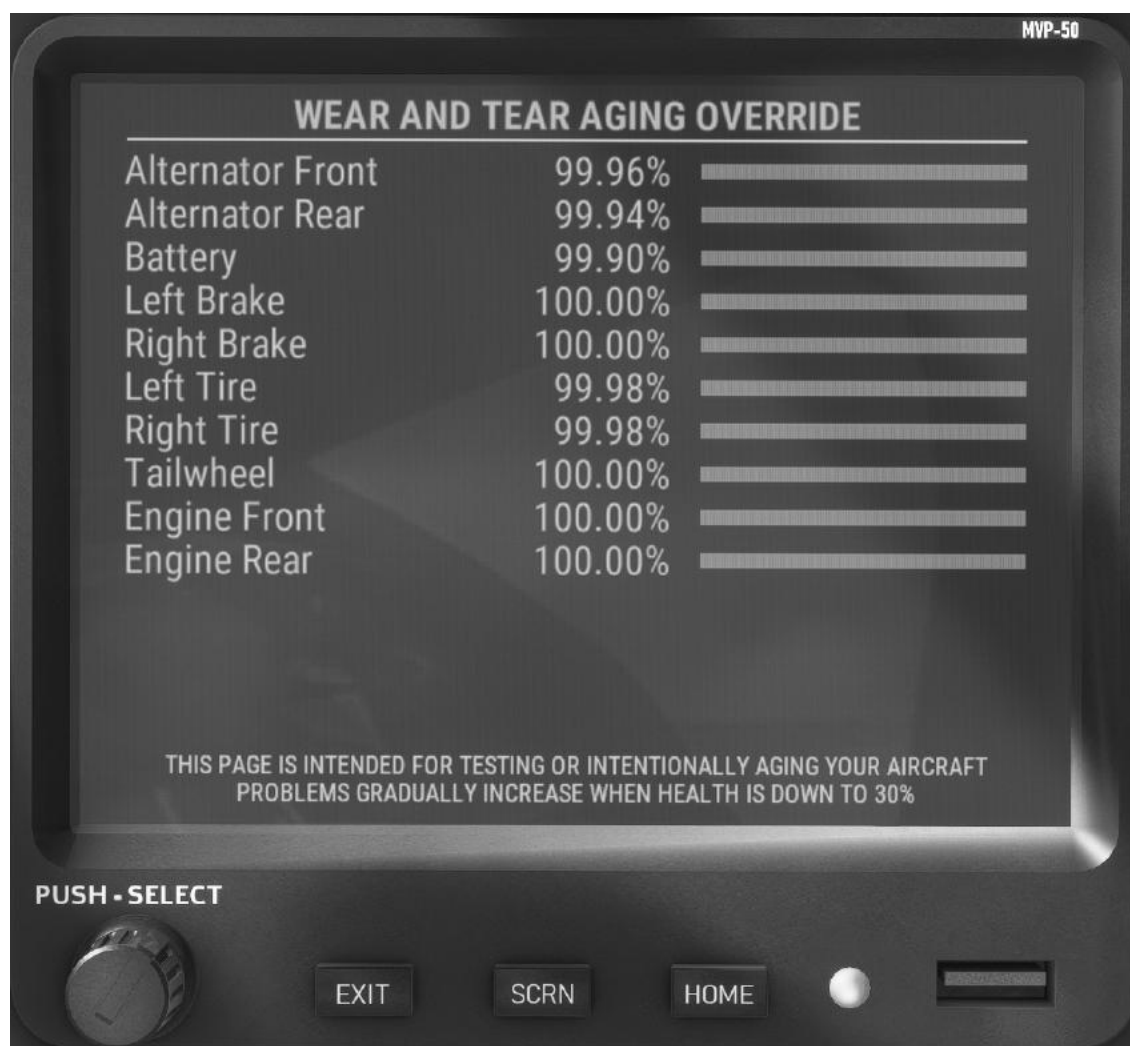
CHAPTER #4: MVP-50P SYSTEMS

MVP-50P WEAR AND TEAR AGING OVERRIDE PAGE

This page of the MVP-50P system allows the pilot to manually edit wear/tear failure values for testing purposes. These items depict direct values of wear over time as a percentage as well as a visual bar that decreases and changes color over time.

To edit these values, the user can click in the left cursor knob to select a setting, and rotate the knob to increase or decrease the respective value.

Failures are designed to occur more frequently once a component health reaches 30% or lower. This is a fantastic way to fast track the aircraft's components aging to test some of the most exciting features of the DoubleEnder.

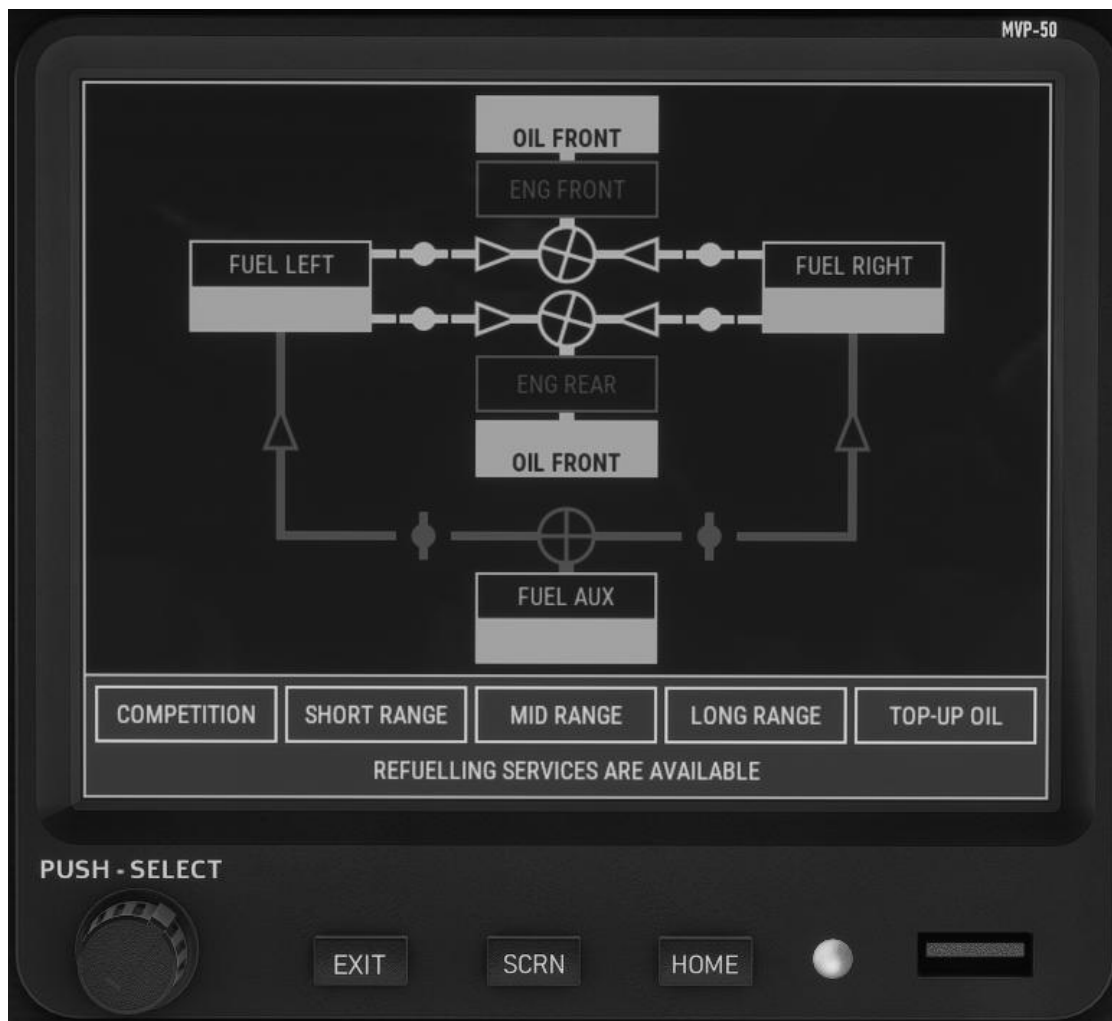


CHAPTER #4: MVP-50P SYSTEMS

MVP-50P OIL AND FUEL SYSTEMS PAGE

This page of the MVP-50P system allows the pilot to manually visualize their current fuel flow system, oil levels and access refueling services when the engines are off and the aircraft is parked.

To access the refueling services, you can simply click on the left cursor knob to access the selections panel, rotate the knob to go to your desired selection and click the knob again to utilize fueling services and oil services.



CHAPTER #5: FEATURES

DISCLAIMER

The Got Friends DoubleEnder has an extensive feature set. A handful of these features rely on experimental custom coding that was verified as stable for release. It's worth noting however that these aren't officially supported sim solutions but instead our own custom code working around the limitations of Microsoft Flight Simulator. In some rare circumstances, you may experience minor visual bugs. For example, pressing "L" to toggle all lights may flicker the belly pod visibility momentarily.

- Highly detailed 3D model with 4K HD Textures
- Soft Body Animations of Cables, Wires, Landing Gear, Headphones, and Brake Fluid
- 16 Real World Liveries, Prototype Liveries, and Community Streamer Liveries
- Custom Rotax 916iS Series Wwise Sound Pack Fully Developed In-House
- Highly Detailed Native Flight Model with CFD and New Propeller Physics
- Custom Water Skimming Simulation with Semi-Buoyant Tires
- Authentic and Simplified Free-Castoring Tail Wheel and Custom Injected Ground Handling Physics
- 128 Layers of Dynamic Dirt/Mud that are dynamic to Surface Types and Water
- Dynamic & Reactive Tire Wear (3 Stages)
- Dynamic & Reactive Wear and Tear Simulation on Engines and Electrical System
- Fully Working Circuit Breaker Simulation with Popping Breakers based on Wear and Tear
- Options to fly with a Co-pilot or Interactive Visible Cargo
- Deployable Interactive Cargo (Campsite, Pod Cargo, and Fuel Jerry Cans for Additional Fueling)
- Aircraft Stow/Secure options for Tie-Downs and Pitot Cover
- Custom MVP-50P Avionics System with Customizable Screens and Repair Workshop
- Detailed Airmaster AC-200F and AC-200R Propeller Systems
- Leading Edge Slats, Sliding Flaps up to 60 Degrees, and Locking Spoilerons
- Persistence on Aircraft Wear and Tear, Visibility Options, MVP-50P Configuration, and Exits
- Persistence of Fuel Levels (Flight-to-Flight)
- Optional Belly Pod with Auxiliary Fuel Tank and Cargo Options for Cross-Country Flights
- Synced Multiplayer Visible Options and Visual Effects (Limitations Apply)
- Emergency Fuel Dumping System, Tank Feeding System and Visual Effects
- PMS-50 GTN-650 Support and optional TDS GTN-650XI Replacement Package Support
- Type 400A Integrated Flight Director with Software and Hardware Auto-Pilot Compatibility



CHAPTER #6: CHECKLIST

DISCLAIMER

This Checklist is designed for the end-user to help them get familiar with the standard operating procedures of the DoubleEnder. These are not meant to be used as a real world substitute. Please refer to proper flight instruction from a CFI. Got Friends are not liable for misuse of this checklist. **A simplified version of this checklist is also available using MSFS' In-Game Checklist System.** Please consider turning on the Assisted Checklist option in MSFS' Accessibility Options for a more in-depth walk-through.

Pre-Flight Checks:

- Verify Weight and Balance and Cargo Weights using the Top Panel in MSFS.
- Doors: Verify Door is closed.
- Elevator Trim: Verify Elevator Trim movement and set trim to the neutral position for take-off.
- Control Surfaces: Verify Rudder, Elevator, Ailerons, and Spoilerons Movement.
- Flap Handle: Verify Flaps and Slats cycle from position one to position five and set Flap Handle to desired position for take-off.
- Breakers: Verify all Breakers are set.
- Battery: Turn on Master Battery Switch.
- Avionics: Turn on Avionics Switch.
- MVP-50P Digital Gauge Screen: Cycle SCRNBUTTON to display Heading, Airspeed, Altitude, and Vertical Speed.
- MVP-50P Altimeter Calibration: Right click MVP-50P Knob and adjust Barometer Settings. Right click again to apply calibration.
- MVP-50P Configuration Page: Use MVP-50P Knob and cycle to the MVP-50 Configuration Page and set desired settings.
- Aircraft Configuration Page: Use MVP-50P Knob and cycle to the Aircraft Configuration Page and set desired settings.
- Aircraft V-Speeds Page: Use MVP-50P Knob and cycle to the Aircraft V-Speeds Page to take note of desired speed thresholds displayed for your current weight and balance ratio.
- Workshop Page: Use MVP-50P Knob and cycle to the Workshop Page. Fix any issues in the workshop before the engine starts.
- Engine Data Page: Use MVP-50P Knob and cycle to the Engine Data Page to monitor engine starts. Alternatively, press HOME
- MVP-50 Engine Data Screen: Cycle SCRNBUTTON to Display Fuel, Oil, and Electrical Data. Verify Fuel Levels are correct.
- GTN-650 (Top Display): Verify power and tune local frequency.
- Transponder: Verify power and place into Standby.

Before Starting Rear Engine:

- Nav Lights: Turn on Navigation Lights Switch.
- Airmaster AC-200F (Bottom Unit): Ensure Mode Switch is set to Auto.
- Fuel Selector (Rear Engine): Select Left, Right or Both.
- Fuel Pump (Rear Engine): Turn on Rear Fuel Pump Switch.
- Magnetos (Rear Engine): Turn on Rear 1 and Rear 2 Magneto Switches
- Throttle Handle (Rear / Right Handle): Slight Increase to >7% Throttle.
- Strobe Lights: Turn on Strobe Lights Switch to Indicate Engine Starts.

Starting Rear Engine:

- Start Rear Engine: Hold the Rear Engine Starter Switch in the Forward Position.
- Rear Alternator: After engine start-up, switch on Rear Alternator Switch.
- MVP-50P Top Display: Monitor Engine Data for oil temperatures and any Anomalies.

Before Starting Front Engine:

- Airmaster AC-200R (Top Unit): Ensure Mode Switch is set to Auto.
- Fuel Selector (Front Engine): Select Left, Right or Both.
- Fuel Pump (Front Engine): Turn on Front Fuel Pump Switch.
- Magnetos (Front Engine): Turn on Front 1 and Front 2 Magneto Switches
- Throttle Handle (Front / Left Handle): Slight Increase to >7% Throttle.

Starting Front Engine:

- Start Front Engine: Hold the Front Engine Starter Switch in the Forward Position.
- Front Alternator: After engine start-up, switch on Front Alternator Switch..
- MVP-50P Bottom Display: Monitor Engine Data for oil temperatures and any Anomalies.

CHAPTER #6: CHECKLIST

Before Taxi:

- Headphones: Put on headphones to optionally reduce cockpit noise as desired.
- Auxiliary Fuel Feed (Optional): Begin feeding additional fuel to the left/right tanks if desired.
- Pitot Heat (Optional): Turn on Pitot Heat Switch during cold weather operations.
- Windshield De-Ice: Turn on Windshield De-Ice during cold weather operations.

Taxi:

- Transponder: Verify Transponder is set to On.
- Parking Brakes: Retract Parking Brake Lever.
- Slowly Increase Throttle Levers: Monitor Engine Data on MVP-50P Units for any Anomalies.

Prior to Take-Off:

- Landing Light: Turn on Landing Light Switch.
- Verify Flaps Lever: Verify Flaps/Slats is in the proper position as necessary for take-off.
- Elevator Trim: Verify Elevator Trim is in the neutral position for safe take-off.
- Auxiliary Fuel Pump (Optional): Stop Feeding additional fuel to ensure safe take-off.
- MVP-50P Digital Gauge Screen: Cycle SCR N Button to display Heading, Airspeed, Altitude, and Vertical Speed.

Take-Off:

- Slowly Increase Throttle Levers to Full Power for take-off.
- Flaps Lever: Once safe to do so, set Flaps/Slats to your desired flap position for take-off.

Cruising:

- Front Fuel Pump: Switch off at a safe altitude and ensure positive fuel flow.
- Rear Fuel Pump: Switch off at a safe altitude and ensure positive fuel flow.
- Auxiliary Fuel Pump (Optional): Continue Feeding additional fuel as desired.
- Flight Director (Optional): Utilize the Flight Director Pitch and Bank leveling if desired.

Before Landing:

- Landing Light: Ensure Landing Light is in the on position.
- Auxiliary Fuel Pump (Optional): Stop Feeding additional fuel to ensure safe landing.
- Flight Director: Ensure Flight Director is in the off position.
- Verify Elevator Trim is in the neutral position for safe landing.
- Flaps Handle: Once safe to do so, set Flaps/Slats to desired position for landing.

Shutdown:

- Parking Brakes: Extend Parking Brake Lever.
- Landing Light: Switch off and signal to the crew engine shutdown intentions.
- Auxiliary Fuel Feed (Optional): Ensure Feed Switches and Auxiliary Fuel Pump are in the off positions.
- Throttle Handle (Front / Left Handle): Decrease Throttle Fully.
- Front Alternator: After engine shut-down, switch off Front Alternator Switch.
- Magnetos (Front Engine): Turn off Front 1 and Front 2 Magneto Switches
- Fuel Pump (Front Engine): Ensure Fuel Pump is in the Off Position.
- Fuel Selector (Front Engine): Select Off.
- Throttle Handle (Rear / Right Handle): Decrease Throttle Fully.
- Rear Alternator: After engine shut-down, switch off Rear Alternator Switch.
- Magnetos (Rear Engine): Turn off Rear 1 and Rear 2 Magneto Switches
- Fuel Pump (Rear Engine): Ensure Fuel Pump is in the Off Position.
- Fuel Selector (Rear Engine): Select Off.
- Strobe Lights: Switch off Strobe Lights once all motions has stopped.
- Nav Lights: Switch off Navigation Lights.
- Windshield De-Ice: Switch to the off position.
- Pitot Heat Switch: Switch to the off position.
- Aircraft Configuration Page: Use MVP-50P Knob and cycle to the Aircraft Configuration Page and Install Pitot Cover and Tie-Downs. Alternatively, Deploy your Campsite if you are in the Backcountry.
- Avionics Switch: Switch to the off position.
- Master Battery Switch: Switch to the off position.
- Door: Open door, exit aircraft and begin post flight inspections. **Find that loose fastener!**

CHAPTER #7: FAQ (Frequently Asked Questions)

QUESTION: Will my DoubleEnder purchase be transferred to Microsoft Flight Simulator 2024?

ANSWER: Asobo has released a statement stating that all add-ons will work by default in Microsoft Flight Simulator 2024. This includes DoubleEnder and the rest of our products. If there are any major issues in the translation process, we will work to update the DoubleEnder to fully take advantage of the next generation of MSFS.

QUESTION: How do I enable Beta Mode for the DoubleEnder?

ANSWER: Only the forward Engine supports putting the propeller in Beta. To do so, ensure your forward Airmaster unit switch is in "Manual" mode, place your Manual Flight Mode Selection Knob into Beta, and finally arm Beta by using the Beta Arming Switch. In order to get adequate reversing momentum, place your rear propeller in Feather or shut-down the rear engine completely. If this is not done, you may be fighting the other engines forward thrust, thus fighting the effect of Beta not producing adequate reverse thrust.

QUESTION: How do I interact with the MVP-50P Unit?

ANSWER: The MVP-50P unit used a large scroll knob you can interact with using your mouse. Use your scroll wheel to rotate the knob, and right-click to make a selection. By default, scrolling your mouse will change screens. Left clicking once will put you in a cursor select, allow you to scroll and click again to make a selection. After that, you can right-click again to change any setting. After you've changed your setting using the scroll to cycle through various options, you can right click to go back one step. Alternatively, you can simply press the "EXIT" button to also go back a step. Console users can use their A-button + Analogue stick to make selections, and B-button to exit out of selection mode. This can be a complex process for console users and we understand the limitation of not having a touch-screen device. We have chosen to accept these limitations to properly simulate the MVP-50P units as they are in real-life. We apologize for any inconveniences caused by this decision and hope that most console players choose to plug-in a mouse into their console in order to simplify this process. As the simulator matures and the next generation of simulator is released, we plan on refining these controls further with additional options given to us from Asobo.

QUESTION: How do I disable engine damage and electrical failures?

ANSWER: You can disable failures by cycling either MVP-50P screens to the Aircraft Configuration Page and disabling the Realism Setting. Take Note, all Wear and Tear will stop accumulating but will not reset. This way users can choose to continue degrading their aircraft components in the future when they turn Realism back on. When realism is turned off, all failures (current or future) will cease working and you will be able to fly the DoubleEnder at its most simplistic settings. This can be very beneficial for new players and we highly recommend you turn off Realism until you have a firm grasp of the DoubleEnder.

QUESTION: Why can't I see the camping gear when deployed?

ANSWER: Ensure you have the rear seat option removed in the MVP-50P and also ensure you have some weight, at least 40 lbs (up to 170 lbs) to be able to see the tent and various campsite accessories. All visible elements are fully dependent on your weight and balance settings. So if you only have 50 lbs loaded, only 50 lbs of campsite accessories will show.

QUESTION: How do I change the barometer / QNH so my Altimeter is reading correctly?

ANSWER: You can do this on the Engine Data Page when the Digital Gauge Screen is displayed. If you don't see your Digital Gauge Screen, press the "SCRN" button on the MVP-50P unit to cycle the screen to it. Once there, right click your MVP-50's Large Knob and then scroll the knob to adjust your settings. Right click again to exit or alternatively press the "EXIT" button to go back.

QUESTION: How do I reset my ground roll distance?

ANSWER: You can do this on the Engine Data Page when the Competition Screen is displayed. If you don't see your Competition Screen, press the "SCRN" button on the MVP-50P unit to cycle the screen to it. Once there, right click your MVP-50's Large Knob to reset all data points.

CHAPTER #7: FAQ (Frequently Asked Questions)

QUESTION: How do I use the PMS50 GTN-650 Option?

ANSWER: This option is for PC only. You must have the latest version of the PMS GTN650 installed in your community folder. Please download it from here: <https://pms50.com/msfs/> And follow their instructions for installation. The PMS50 GTN-650 option is built into the DoubleEnder and no additional package aside from their core package is required from us in order to use their GTN-650. You can change Asobo's GTN-650 to PMS' by either clicking the SD Card on the GTN-650 Bezel or by selecting it via the Aircraft Configuration Page on a MVP-50P Unit.

QUESTION: How do I use the TDS GTN-650Xi Option?

ANSWER: This option is for PC only. You must have the latest version of the TDS Core Package installed in your community folder. Please download it from here: [TDS GTNXi for Flight Simulator \(tdssim.com\)](https://tdssim.com) And follow their instructions for installation. **The TDS GTN-650Xi option is not built into the DoubleEnder by default and you must install our additional replacement package in order to use it.** Please download it from here: [Replacement Mods – Got Friends \(got-friends.com\)](https://got-friends.com). You can change Asobo's GTN-650 to TDS' by either clicking the SD Card on the GTN-650 Bezel or by selecting it via the Aircraft Configuration Page on a MVP-50P Unit.

QUESTION: I blew an Engine, disabled realism but, it still says the engine is broken on the MVP-50P?

ANSWER: Disabling realism restores your working engine but saves the state that you broke it for when you feel ready to re-enable realism. At which point you will need to deal with it by landing, shutting down, parking, and repairing via the workshop page. This allows the system to continue to track your wear and tear even with realism off so you aren't losing any data associated with your DoubleEnder. If your engine is completely blown and you've disabled realism, you will need to start the engine again in order to use it. The engine will not magically start without user input.

QUESTION: My Screens are completely black?

ANSWER: First, ensure that your Avionics or Master Circuit Breakers haven't popped. You can do this by checking the upper right side-wall. If you are still having issues and restarting your flight doesn't fix the issue, please check your community folder and ensure you have the latest additional mods being used on the DoubleEnder. This could be a community livery, our replacement package, PMS50's GTN-650 Core Package, TDS' GTN-650Xi Core Package, or a bad DoubleEnder installation. Please install the latest versions of all packages used and if you are still having issues after restarting MSFS, please contact our support team through email or our Discord Server linked in the credits.

QUESTION: Is there a paint-kit available?

ANSWER: Yes, please visit our official website and download the paintkit at: [Official Paintkits – Got Friends \(got-friends.com\)](https://got-friends.com). Follow the included readme to ensure full compatibility. If you are new to painting aircraft, we highly recommend you follow various YouTube tutorials on the matter before jumping right in.

QUESTION: Why are my flaps not indicating any degree change in position two?

ANSWER: Due to the DoubleEnder's unique flap design, you have multiple positions that do various changes:

- Position One (Handle Fully Down): Fully Retracted Flaps and Spoilerons are Unlocked.
- Position Two: Extended Flaps with no change in degrees. Spoilerons are Locked by the retaining flap hook. This position will maximize overall wing surface areas and should be your go-to setting for cruising.
- Position Three: 20 Degrees with Unlocked Spoilerons
- Position Four: 40 Degrees with Unlocked Spoilerons
- Position Five (Handle Fully Up): 60 Degrees with Unlocked Spoilers. Use this last position sparingly. This position should be used in situations where you need to dive into landing or to dramatically decrease speed.

QUESTION: Can I keybind the Flight Director System?

ANSWER: You can assign the "Toggle Recognition Lights" to your hardware to turn On/Off the Flight Director. You can also keybind "Select Heading Bug" and "Select VSI Bug" or alternatively, "Increase Heading Bug" and "Decrease Heading Bug" and with your hardware to control the Flight Director.

CHAPTER #8: CREDITS

Got Friends' Team:

- **Got Gravel:** Flight Model Expert, Systems and Avionics Programmer
- **Jonx:** Project Manager, Animator, Lead XML Programmer
- **Twoseventyinc:** Lead Texture Artist and Wwise Sound Engineer
- **Mykrode:** 3D Modeling artist, Animator and Texture Artist

Beta Testers:

- **RotorNut44:** Alpha & Beta Tester, Emerald Scenery Design (Scenery Partner)
[ESD - Website](#)
- **PhotosbyKev:** Beta Tester, Scenery Creator
[PBK - Discord](#)
- **Willy:** Alpha & Beta Tester, Twitch Partner & Got Friends Community Moderator
 - [swjneufy - Twitch](#)
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- **FrankiePoops:** Beta Tester & Community Marketing
- **NorCally:** Beta Tester & Community Outreach

Got Friends Website:

Discover more Add-Ons, Information and Support at our website and online store!

[Got Friends | Website | Store \(got-friends.com\)](#)

Got Friends / Got Gravel Discord:

[Got Gravel / Got Friend Official Discord Server](#)

A special thanks to all you fine folks that support our projects for Microsoft Flight Simulator. We have more exciting projects on the horizon and plan on bringing them to MSFS2020 and beyond...

