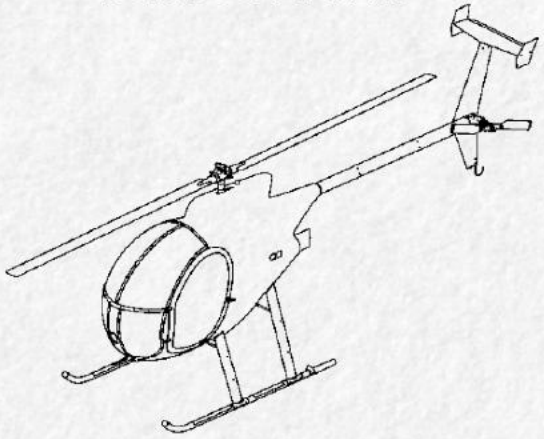
GOTFRIENDS FLIGHT MANUAL

MINI-500 HELICOPTER

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



ISSUED BY GOT FRIENDS DEVELOPMENT GROUP AND UNDER THE DIRECTION OF MICROSOFT FLIGHT SIMULATOR MARKETPLACE GUIDLINES.

Chapter #1: Introduction

Background: The Mini-500 is a 1990s single-seat light helicopter. The helicopter was deliverable in a kit to enthusiasts around the world for a unique home building experience. Originally designed to be powered by a single Rotax 582 piston engine, the two stroke engine proved to be underpowered in application and failed many times in-flight. The engine's vibration levels proved to be a problem as they, combined with excessive rotor vibrations, lead to cracked frames and other component failures. In 2003, plans were put into place that provided replacement engines to existing Mini-500s that replaced the under-powered Rotax 582. This would allow owners to shift to a more reliable Solar T-62 Turbine Engine. To this day, there is no indication that any T-62 turbine kit was delivered with an aircraft kit. However, some owners have incorporated the proposed design and you can find a few Mini-500s with this unique turbine engine modification.

Development: Our rendition is heavily inspired by the design of the original kit helicopter produced by Revolution Helicopter Corporation. However, we have adopted the Stitt Industries' proposed plans and modified our kit with the Solar T-62 Turbine Engine. Our Mini-500 has all the amenities of a great single seater helicopter with modified systems to ensure maximum stability, safety, speed and enjoyment.

NOTICE

The Mini-500 was exclusively designed with Microsoft Flight Simulator's Native Helicopter SDK. Therefore, you are not required to download any additional software in order to fly. Keep in mind, Asobo Studios is constantly improving helicopter dynamics and systems. You can expect more updates from our team in the future as helicopters are improved in the simulator.

DISCLAIMER

Helicopters were first natively released for Microsoft Flight Simulator on their 40th Anniversary Update. Asobo Studios is aware of the current turbine helicopter limitations. The Mini-500 is currently limited to a bugged governor clutch system. The Mini-500 is still capable of great flight dynamics, however, as addressed by Asobo Studios, most of these systems won't be introduced until a later date. Our team is following their development closely and will include these additional features once these systems are available to the public. For now, these systems are not implemented. Thank you for your understanding and future support.

Chapter #2: Specifications

Characteristics:

Crew:	1 Person
Length (with rotor):	22 ft 6 in / 6.90 m
Length (without rotor):	18 ft / 5.49 m
Cabin Width:	3 ft / 0.91 m
Strut Width:	5 ft 3 in / 1.60 m
Height:	8 ft 3 in / 2.51 m
Gross Weight:	820 lbs / 372 kg
Empty Weight:	407 lbs / 185 kg
Powerplant:	Solar T-62 Titan (CH-47 Chinook Auxiliary Power Unit)
Horsepower:	115 HP
Fuel Capacity:	25 US Gal. / 95 L

Rotors:

Main Rotor Diameter:	19 ft 2 in / 5.84 m
Main Rotor Weight:	17.60 lbs / 7.98 kg (per blade)
Tail Rotor Diameter:	3 ft 10 in / 1.17 m
Tail Rotor Weight:	1.88 lbs / 0.85 kg (per blade)

Performance:

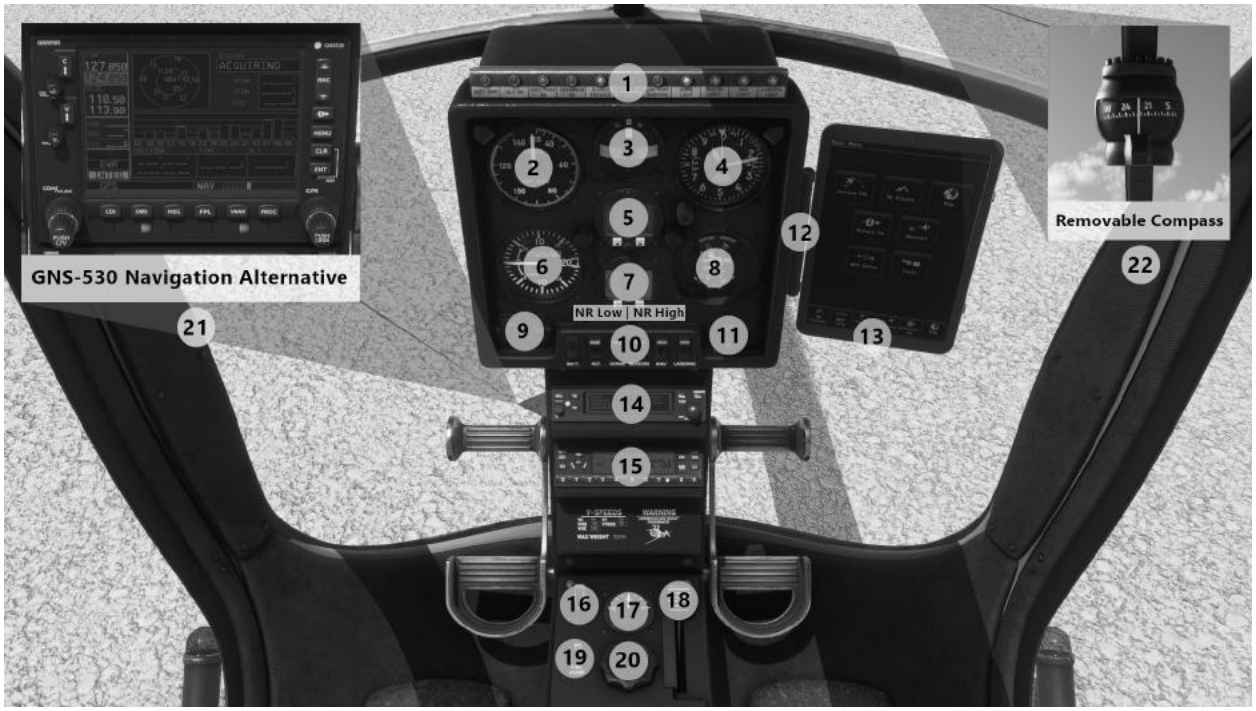
Never Exceed Speed:	130 kts / 241 kph
Maximum Cruise Speed:	115 kts / 213 kph
Normal Cruise Speed:	99 kts / 183 kph
Range:	275 nm / 209.3 km
Endurance:	2 hr 45 min
Service Ceiling:	10,000 ft / 3,048 m
Rate of Climb:	2,000 ft/min / 10.16 m/s

Chapter #3: Virtual Cockpit

Virtual Cockpit Layout (Main Panel | Bottom Panel):

1. Annunciation Light Bar
2. Airspeed Indicator
3. Turn Coordinator
4. Altimeter
5. MGL Digital Display (Top)
6. Vertical Speed Indicator
7. MGL Digital Display (Bottom)
8. Engine and Rotor RPM Gauge
9. Hobbs Meter
10. Main Switch Panel
11. Clutch Switch ***HIDDEN UNTIL ASOBO UPDATES HELICOPTERS***
12. Tablet Mount
13. Tablet Menu Button
14. GTR-220 Radio
15. GTX-330 Transponder
16. Fuel Valve Switch
17. Fuel Gauge
18. Rotor Brake Lever
19. Fuel Pump Switch (Upper) & VRS/RBS Switch (Lower)
20. Vibration Effects Knob (Reduces Cyclic, Compass and Tablet Vibration)
21. GNS-530 Navigation System (Alternative)
22. Magnetic Compass

★ NR Low & NR High Warning Indicators



Chapter #3: Virtual Cockpit (Continued)

Virtual Cockpit Layout (Rear Panel | Real Controls):

23. Collective Lever
24. Twist Grip (Governor) ***HIDDEN UNTIL ASOBO UPDATES HELICOPTERS***
25. Governor Switch ***HIDDEN UNTIL ASOBO UPDATES HELICOPTERS***
26. Starter Off Button (Red)
27. Starter Off Button (Green)
28. Headphone Jack (In-Game Noise Reduction)
29. Door Visibility Switch
30. Dash Lights Switch
31. Avionics Suite Switch
32. Longitudinal and Lateral Trim Hat Switch
33. Helmet Mounted Display (HMD) Brightness Knob

Chapter #3: Virtual Cockpit (Continued)

Instrumentation & Functionality:

- **Magnetic Compass:** Displays Current Magnetic Heading (Degrees)
- **Annunciation Light Bar:** Illuminates Various Systems Power Status
- **Airspeed Indicator:** Displays Current Airspeed (Knots)
- **Turn Indicator:** Displays Current Rotorcraft Slip (Degrees)
- **Altimeter:** Display Current Altitude (Feet)
- **MGL Digital Displays:** System Status Digital Displays (7 Pages Available)
- **Tablet Arm:** Stows or Extends Tablet
- **Tablet Menu Button:** Access Additional Aera Map Navigation Options
- **Vertical Speed Indicator:** Displays Current Vertical Speed (100 Feet per Minute)
- **Engine Rotor RPM Gauge:** Displays Current Engine and Rotor RPM
- **NR Low/High Indicators:** Displays Flashing/Steady Indications for Rotor Inertia
  - **Left Light:** Flashing (Unsafe Rotor Inertia within Lift Requirements)
  - **Left Light:** Steady (Critically Unsafe Rotor Inertia to Maintain Lift)
  - **Right Light:** Flashing (Unsafe Rotor Inertia within Descent Requirements)
  - **Right Light:** Steady (Critically Unsafe Rotor Inertia for Descent)
- **Hobbs Meter:** Displays Current Hours in Airframe
- **System Switch Panel:** Various Switches to Turn On and Off Various Systems
  - **Master Battery Switch:** Turns On or Off Master Battery
  - **Alternator Switch:** Turns On or Off Alternator
  - **Dome Light Switch:** Turns On or Off Dome Light
  - **Beacon Light Switch:** Turns On or Off Beacon Lights
  - **Navigation Lights Switch:** Turns On or Off Nav Lights
  - **Landing Light Switch:** Turns On or Off Landing Light
- **Clutch Switch:** ***HIDDEN UNTIL ASOBO UPDATES HELICOPTERS***
- **GTR-220 Radio:** Garmin Nav/Com Radio
- **GTX-330 Transponder:** Garmin Transponder
- **GNS-530 Navigation System:** Garmin GPS Navigation (Alternative)
- **Fuel Valve Switch:** Opens Fuel Flow (Used to Shutdown Turbine Engine)
- **Fuel Gauge:** Displays Current Fuel Quantity Remaining
- **Rotor Brake Lever:** Up (Unlocked) | Down (Engaged)
- **Fuel Pump Switch:** Used to Inject Fuel into the Turbine Engine
- **Vibration Effects Knob:** Tighten Cyclic, Compass, and Tablet Vibration Effects
- **Starter On Button:** Ignites Turbine Engine Starter
- **Starter Off Button:** Shuts Down Turbine Engine Starter
- **Cyclic Stick:** Click Cyclic Base to Hide Cyclic
- **Headphones Jack:** Used to Plugin Headphones (Noise Reduction In-Game)
- **Door Visibility Switch:** Used to Remove or Install Doors
- **Dash Lights Switch:** Turns On and Off Dashboard Lights
- **Avionics Suite Switch:** Swaps Between a GTR-220/GTX-330 to a GNS-530/GTX-330
- **Longitudinal and Lateral Trim Hat Switch:** Adjustable Trim Set
- **Collective Lever:** ***HIDDEN UNTIL ASOBO UPDATES HELICOPTERS***
- **Twist Grip (Throttle):** ***HIDDEN UNTIL ASOBO UPDATES HELICOPTERS***
- **Governor Switch:** Used to Automatically Manage Rotor Speed and Engine RPM
- **HMD Brightness Knob:** Used to turn On/Off and Adjust Brightness of the HMD

Chapter #4: MGL Displays

1. **Estimated Range & Time:** Based on Remaining Fuel and Burn Rate
2. **Landing Deviation:** Displays Deviation, Vertical Speed, and Radio Altimeter
3. **Fuel Information:** Displays Remaining Fuel Quantity and Fuel Burn (Gallons/Hour)
4. **Engine Monitoring:** Displays N1/N2 Compression Stages, Collective Load, Rotor Torque, Rotor RPM, and Engine RPM
5. **Temperature Monitoring:** Displays Interstage Turbine Temperature and Oil Temperature (Farenheit)
6. **Temperature Monitoring:** Displays Interstage Turbine Temperature and Oil Temperature (Celsius)
7. **Turbine Load Monitoring:** Displays N1 Turbine RPM and Collective Load Percentage

Chapter #5: Features

Feature List: The Mini-500 was designed to take advantage of the following features:

- Realistic Solar T-62 Engine Flight Dynamics and Native Rotorcraft Flight Model
- Computational Fluid Dynamics
- Custom WWISE Soundpack
- 4K High Quality Textures
- 20 Included Liveries
- Visual Effects: Downwash, Landing, Combustion, Heat, Precipitation and Icing
- System Persistence (Flight-To-Flight):
    - MGL Pages: Pages Selected
    - MGL and Nav/Com: Brightness Settings
    - Avionics Suite: (GTR-220 or GNS-530 Selected)
    - Compass: (Installed or Removed)
    - Vibration Effects: (Percentage)
    - Tablet: (Stowed or Extended)
    - Headphones: (Noise Reduction On or Off)
    - Doors: (Open or Closed)
    - Door Visibility: (Installed or Removed)
- Fully Custom VRS and RBS Modeled into Flight Model (With Togglable Switch)
- Animated Main Rotor and Tail Rotor Components
- Multiplayer Compatible Rotor Animations
- Animated Skid Animations with Flexing
- Custom MGL Avionics with 7 Monitoring Pages
- Exchangeable Avionics Suites In-Flight
- Virtual Cockpit Vibrations based on Engine Values
- Virtual Cockpit Vibration Percentage Settings
- Adjustable Trim for Hands-Free Flying
- Removable Doors with Sound Design in Mind
- Working Headphone Simulation with Toggleable Audio Jack
- Animated Pilot Fully Compatible with Default Asobo Characters
- Toggleable Tablet with Aera Navigation Installed
- Safety Awareness Lights and Warning Indicators including NR Low/High Warnings
- Removable Magnetic Compass for Greater Forward Visibility
- Custom Lighting Effects with Accurate Electrical System Simulation
- In-Game Checklist with Evaluation Compatibility and Highlights
- Xbox Controller Support with In-Game Assistance Compatibility
- Special Stealth 3D Models/Livery: **Direct Purchase | Website Only Exclusive**
- Special Hunter 3d Models/Livery: **Direct Purchase | Website Only Exclusive**

  * Exclusives Contain Weaponry Visuals and are not available on the Marketplace

Chapter #6: Checklists

NOTICE:

This Checklist is designed to work in-game by using the “Checklist Panel” via the drop-down top bar selection window. We highly encourage that you turn on “Evaluation” compatibility by going to Assistance Options → Piloting → Assisted Checklist for a first time learning experience. Using both the in-game checklist and the flight manual checklist will enhance your knowledge depth on your new purchase.

Pre-Flight Checks:

- **Doors:** Verify doors are closed.
- **Door Visibility:** Install or remove doors as desired.
- **Magnetic Compass:** Install or remove magnetic compass from view.
- **Tablet:** Extend or stow tablet for additional navigation options.
- **Master Battery:** Switch on to power on various avionics.
- **Dome Light:** Switch on for further cockpit visibility during night conditions.
- **Vibration Effects:** Select 0% up to 100% to modify your virtual experience.
- **VRS/RBS Stall Effects:** Select On or Off to modify your flight model realism.
- **MGL (Top Display):** Select Engine Monitoring page.
- **MGL (Bottom Display):** Select Temperature Monitoring page.
- **MGL Brightness:** Adjust MGL display brightness to desired levels.
- **Altimeter:** Adjust Altimeter calibration for local conditions.
- **Turn On Radio and Transponder:** Verify power on GTR-220 and turn on GTX-330.
- **Nav/Com Brightness:** Adjust radio stack display brightness (Requires GTR-220).
- **Avionics Suite:** Install desired avionics suite.
- **Dash Lights:** Switch on for further gauge visibility during night conditions.
- **Beacon Lights:** Switch on to signal to crew that you are ready for engine start.

Before Starting Engine:

- **Collective:** Lower Collective Stick to the fully down position.
- **Fuel Valve:** Open fuel valve and allow 2-3 seconds for adequate fuel flow.
- **Fuel Pump:** Switch on fuel pump to ensure proper fuel injection into the engine.
- **Fuel Quantity:** Verify fuel quantity and check payload weight requirements.
- **Rotor Brake:** Verify Rotor Brake is in the unlocked position.

Starting Engine:

- **Clear Area:** Ensure area is clear of all personnel, equipment, and vehicles.
- **Signal Intentions:** Signal to crew intentions to start engine.
- **Starter:** Press the Green Button on the top of the Cyclic to start the engine.
- **Monitor ITT, N1 and N2:** Monitor engine, temperature and start-up levels.
- **Verify Turbine Engine:** Verify turbine load properly cycles to >50% RPM levels.
- **Verify Torque Load Decrease:** Verify turbine torque load initiates ramp offload.

Chapter #6: Checklists (Continued)

Before Hover Taxi:

- **Alternator:** After engine start-up, switch on alternator.
- **Navigation Lights:** Switch on and signal to crew to perform final checks.
- **Headphones:** Put on headphones to optionally reduce cockpit noise as desired.
- **MGL (Top Display):** Select Landing Deviation page.
- **MGL (Bottom Display):** Select Turbine Load Monitoring page
- **Tune Local Traffic Frequency:** Tune radio and announce departure intentions.
- **Insert Navigation Plan:** Insert flight plan into navigation systems as desired.
- **Announce Hover Taxi:** Announce hover taxi after receiving safe-for-flight.

Hover Taxi / Ramp Departure:

- **Landing Light:** Switch on and verify crew is clear of rotorcraft for hover taxi.
- **Verify Aircraft Clearance:** Verify aircraft clearance with local traffic.
- **Request Departure:** Request ramp departure or runway departure.
- **Slowly Increase Collective Lever to Hover:** Increase to stable hover, monitor engine systems, and adjust trims as necessary.
- **Proceed to Runway or Ramp Departure:** Proceed via local traffic instructions
- **Depart to Destination:** Depart local traffic and begin checkout procedures.

Cruising:

- **Request Flight Following:** Request flight following and proceed with check-in.
- **Fuel Pump:** Switch off at a safe altitude and ensure positive fuel flow.
- **MGL (Top Display):** Select desired monitoring page.
- **MGL (Bottom Display):** Select desired monitoring page.

Before Landing:

- **MGL (Top Display):** Select Landing Deviation page.
- **MGL (Bottom Display):** Select Engine Monitoring page.
- **Request Landing Clearance:** Request landing clearance through local traffic.
- **Proceed to Landing:** Proceed to designated landing area.
- **Announce Clear of Runway:** Announce clear of runway before arrival.
- **Verify Conditions:** Verify landing area is clear of obstructions and personnel.
- **Maintain Hover:** Slowly decrease collective and maintain a safe hover.

Landing:

- **Land Rotorcraft:** Land rotorcraft and prepare for engine shutdown.
- **Landing Light:** Switch off and signal to the crew engine shutdown intentions.
- **Fuel Valve:** Close fuel valve and monitor engine shutdown levels.
- **Rotor Brake:** Engage Rotor Brake once N1 RPM has reached <1%.
- **Verify Rotation:** Verify main rotor and tail rotation has stopped.
- **Alternator:** Switch off.
- **Navigation Lights:** Switch off.
- **Beacon Lights:** Switch off and signal to crew to start post-flight checks.
- **Stow Tablet:** If extended, stow tablet to power off and secure device.
- **Dome Light:** If on, switch off.

Chapter #6: Checklists (Continued)

Landing (Continued):

- **Dash Lights:** If on, switch off.
- **Master Battery:** Switch off battery power and log appropriate flight hours.
- **Rotorcraft Secured:** Secure rotorcraft and install doors if required.

HOTAS KEYBIND RECOMMENDATIONS:

Recommend Creation of a Mini-500 Controller Preset

Asobo "Default" Preset WILL WORK on the Xbox Controller

KEYBIND	HOTAS RECOMMENDATION	XBOX (OPTIONAL)
Remove Throttle Axis	Not Used with Helicopters	Remove
Remove Elevator Axis	Not Used with Helicopters	Remove
Remove Ailerons Axis	Not Used with Helicopters	Remove
Remove Rudder Axis	Not Used with Helicopters	Remove
Remove Elevator Trim Up	Not Used with Helicopters	Remove
Remove Elevator Trim Down	Not Used with Helicopters	Remove
Remove Toggle Parking Brake	Not Used with Helicopters	Remove
Remove Propeller Axis	Not Used with Helicopters	Remove
Remove Mixture Axis	Not Used with Helicopters	Remove
Add Set Cyclic Longitudinal Axis	Recommend Using Forward/Back Movement of Stick	-
Add Set Lateral Axis	Recommend Using Left/Right Movement of Stick	-
Add Tail Rotor Axis	Recommend Using Pedals or Stick Twist	-
Add Collective Axis	Recommend Using Throttle	-
Add Toggle All Fuel Valves	Recommend Using a Button on the Throttle	-
Add Toggle Master Starter Switch	Recommend Using a Button on the Stick	X
Add Toggle Rotor Brake	Recommend Using a Button on the Stick	B
Add Increase Rotor Longitudinal Trim	Recommend Using Down on Stick Hat Switch	D-Pad D
Add Decrease Rotor Longitudinal Trim	Recommend Using Up on Stick Hat Switch	D-Pad U
Add Increase Rotor Lateral Trim	Recommend Using Right on Stick Hat Switch	D-Pad R
Add Decrease Rotor Lateral Trim	Recommend Using Left on Stick Hat Switch	D-Pad L
Add Rotor Trim Reset	Recommend Using a Button on the Stick	Y

Chapter #7: Frequently Asked Questions (FAQ)

Question: Why am I being sucked into the ground and flipped upside down?
Answer: We have implemented Vortex Ring State and Retreating Blade Stall in the Mini-500. If you do not want these added stalling features during your flight, please use the VRS/RBS Switch below the Fuel Pump Switch to toggle On/Off those additional features.

Question: What do these steady and flashing red lights on my panel indicate?
Answer:

- **Left Light:** Flashing (Unsafe Rotor Inertia within Lift Requirements)
- **Left Light:** Steady (Critically Unsafe Rotor Inertia to Maintain Lift)
- **Right Light:** Flashing (Unsafe Rotor Inertia within Descent Requirements)
- **Right Light:** Steady (Critically Unsafe Rotor Inertia for Descent)

Question: Why is my rotor starting up extremely slow and I have poor lift?
Answer: Turn OFF (Disengage) your Rotor Brake Lever.

Question: What is the Cyclic and what is the Collective?
Answer: The Cyclic is your Pitch and Roll authority, while your Collective is your rotor pitch resulting in lift or loss of lift.

Question: Why is the Red Button on the Cyclic Stick not shutting down my engine?
Answer: With turbine engines, you must shutdown the turbine using the fuel valve. Ensure it is in the closed position to cut fuel flow to your engine.

Question: Where can I find my Starter Switch?
Answer: The starter button is located on the cyclic stick. After you've completed the proper procedures, start your turbine engine using the green button on the top of the cyclic.

Question: How can I change my Transponder, Illuminated Decal and Tablet Brightness?
Answer: All of your Navigation, Display, and Illuminated Decal Brightness is attached to the GTR-220 Brightness Buttons. If you are using the GNS-530, you must swap to the GTR-220 using the Avionics Suite Switch and adjust your brightness prior to swapping back to the GNS-530.

Question: The compass vibration is distracting, can I turn it off?
Answer: You can turn off Compass, Tablet, and Cyclic Vibrations using the Vibration Effects Knob located below the Fuel Gauge on the bottom panel.

Question: The MGL Displays are not working with Nav/Com Brightness, why are they dark?
Answer: Both MGL Displays' Brightness are individually controlled using the Brightness Knobs on the units themselves.

Question: This helicopter pulls too hard, how do I maintain flight without rudder pedals?
Answer: Consider turning on Both Helicopter Assistance Options in Assistance Options → Piloting → HELICOPTERS: ASSISTED CYCLIC & HELICOPTERS: ASSISTED TAIL ROTOR.

Chapter #8: Credits

Got Friends' Team:

- **Got Gravel:** Flight Model Expert and HTML Design
- **Jonx:** Project Manager and XML Lead
- **twoseventyinc:** Texture Artist and Sound Engineer
- **Mykrode:** Modeling Lead

Notable Beta Testers:

- **RotorNut44:** Emerald Scenery Design
  - Emerald Scenery Design | Scenery Addons For MSFS & P3D
- **Willy:** Twitch Partner & Got Friends Community Moderator
  - swjneufy - Twitch
- **Eight of Dragons:** Twitch Partner & Got Friends Community Moderator
  - Eight_of_Dragons - Twitch
- **OohCando:** Twitch Partner
  - oohcando - Twitch

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 Discord:

https://discord.gg/vYCq6T76pa

A special thank you to all of our supporters throughout our 1st helicopter journey!