



FLIGHT MANUAL

AMERICAN CHAMPION SCOUT 8GCBC

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Welcome & Developer Note

Thank you for choosing the **American Champion (8GCBC) Scout** for Microsoft Flight Simulator 2020 & 2024.

This aircraft has been developed with the same attention to detail and authenticity that I bring to all my projects under **Hangar Studios 713**.

While every aspect of the modeling, coding, and integration was handled solely by me, two respected members of the MSFS community offered their expertise in key areas and I would like to personally thank them for their contributions to this project:

- **Chunky Flyer** – Known for his exceptional livery work and eye for detail, Chunky brought several striking paint schemes to the Scout. His ability to blend realism with visual appeal gives each aircraft variant its own personality.
- **Smitty** – A highly respected flight model engineer within the sim community, Smitty's technical insight was invaluable in fine-tuning the Scout's handling. His knowledge ensured that the performance in MSFS stays true to the real-world 8GCBC, especially across the different landing gear and float configurations.

Their contributions added a level of polish and authenticity that complements my work on the aircraft systems, custom coding, and visual design.

My goal is to deliver a Scout that not only looks and feels like the real thing, but also responds to changes in weight, balance, drag, and environment the way you'd expect in real-world operations. I'm proud to bring it to the sim community and I look forward to seeing it in your screenshots, videos, and bush adventures.

Aircraft Overview & Lineage

The Scout is the backcountry workhorse of the American Champion family, complementing the aerobatic Super Decathlon by trading inverted loops for rugged utility. Designed for short takeoffs and landings (STOL), the Scout's high wing, powerful Lycoming O-360 engine, and strong taildragger gear make it perfectly suited for bush strips, float bases, and remote operations.

This MSFS version carries forward my commitment to authenticity, blending FAA-approved performance data with custom MSFS coding to ensure you feel every subtle change in weight, balance, and aerodynamic drag.

Variant Overview & Key Differences

The Scout in this package is available in **three landing gear configurations**, each modeled to perform differently in MSFS:

- **26" Bush Wheels (Standard Backcountry)**
Balanced performance for most bush strips. Easy to handle on pavement and grass with minimal ground roll, but retains authentic taildragger handling quirks.
 - **Denali with 35" Tundra Wheels (Extreme Bush Operations)**
Larger wheels for rougher terrain. The Denali Scout is fitted with the 210HP Lycoming IO-390-A1B6 engine which offers improved takeoff and climb rates even with the heavier wheels.
 - **Whipline 2100 Amphibious Floats**
A first for me in development — and a game-changer for Scout operations. These floats include both water and land capability, modeled with accurate displacement, water drag, and weight penalties. MSFS users will notice a realistic difference in handling during takeoff runs, water taxiing, and when landing on pavement.
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Unique MSFS Features & Performance Factors

The **Hangar Studios 713 American Champion Scout** is not just a digital model — it is a complete simulation package meticulously engineered to immerse the pilot in a living, reactive cockpit environment. Every system, surface, and control has been tuned to behave and respond like the real aircraft, in both *Microsoft Flight Simulator 2020* and *Microsoft Flight Simulator 2024*.

Immersive Cockpit Experience

From the moment the aircraft loads, subtle visual wear on switches, levers, and panel edges tells the story of a well-used, well-maintained workhorse. Control surfaces respond with the correct mechanical delay, while the airframe creaks, rattles, and hums as it interacts with airflow, propwash, and terrain.

The **analog cockpit** delivers tactile authenticity:

- **Throttle Lever** — Smooth push-pull movement with progressive resistance and audible detent sounds when adjusting for fine power control.
- **Mixture Control** — Adjusted in small increments, with visual cues and subtle RPM fluctuations, affecting both fuel economy and engine temperature.
- **Propeller Lever** — Fine-tunes RPM, changing not just engine output but the *tone* of the prop noise, from low-frequency growl to high-RPM whine.
- **Instrument Accuracy** — Every gauge, from manifold pressure to vertical speed, is live-linked to aircraft performance, giving you exact feedback in real time.
- **Navigation Stack** — Functional comm/nav radios, transponder, and GPS interface behave as they would in reality, including authentic knob detents and display refresh rates.

Dynamic Environmental Interaction

This Scout actively reacts to the world around it, providing a multi-sensory simulation:

- Airframe buffeting in turbulence, with matching sound profile changes.
- Distinct ground roll vibration and rattle over grass, gravel, or water operations.
- Audible changes when opening the cabin window or door mid-flight — from a whistle at cruise speed to deep rushing wind during STOL approaches.

Hand-Crafted FX

- **Wheel Water Spray** — Triggered when landing gear touches down in water, dynamically responding to speed and weight.
- **Float Foam** — Disturbed water trails from amphibious operations.
- **Wingtip Water FX** — Spray arcs during tight water taxi turns.
- **Land Dust** — Kicks up appropriately based on terrain type and thrust.

Aerodynamic Drag System

- Opening doors, sliding windows, or attaching the cargo pod changes drag coefficients in real time.
- These factors directly influence cruise speed, climb rate, and STOL performance, requiring pilots to adjust power and pitch accordingly.

Cargo Pod Weight Logic

- Cargo pod installation automatically adjusts aircraft empty weight and CG.
- Improper distribution will impact takeoff rotation speed, climb angle, and landing flare handling.

Saved Aircraft States

- Over 35 unique saved states for cockpit, systems, and payload allow you to start flights in a variety of pre-set conditions — from cold & dark to fully configured STOL competition mode.

Systems & Features

This American Champion Scout for Microsoft Flight Simulator 2020/2024 is modeled to reflect the key operational systems of the real-world 8GCBC while integrating unique MSFS-specific logic to enhance realism and multiplayer interaction.

Electrical System

- **Battery/Alternator Logic (Unique MSFS Feature):**
The alternator is tied directly to the main battery switch — there is no separate alternator control. Charging begins only when the engine is running above ~500 RPM. At idle with all electrical systems on, a slight battery drain may occur; a brief increase in RPM will restore positive charging. Higher RPM = faster charge rate.
- All avionics, lighting, and systems draw simulated electrical power; excessive use with the engine off will deplete the battery.

Fuel System

- Two wing-mounted fuel tanks (36 gallons each), total capacity **72 gallons**.
- **2 gallons unusable** total.
- Single **ON/OFF fuel selector** — there is no BOTH or LEFT/RIGHT position.
- Correct fuel weight, CG, and usable fuel logic modeled per variant.

Engine & Propeller Systems

- **Lycoming O-360-C1G/IO-390-A1B6 series** engine modeled with accurate power curves.
- Functional **cowl flaps** and **carburetor heat** that directly influence engine performance in MSFS.
- Manual mixture control fully simulated.

Flight Model & STOL/E-STOL Optimization

- Engine and aerodynamic tuning allow for real-world comparable **STOL performance**.
- In optimal weather, **takeoff/landing rolls can be under 200 feet**, with E-STOL competition techniques allowing distances below 50 feet.
- Drag effects modeled for:
 - **Cargo pod installed**
 - **Window open**
 - **Door removed**

Avionics & Autopilot

- Glass cockpit variants feature **Garmin G3X Touch** paired with **GNS430** or **GTN650**, plus **G5 backup**.
- Integrated autopilot available in glass cockpit variants for VFR/IFR navigation.
- Pitot heat available; no other anti-icing/de-icing equipment installed.

Multiplayer Compatibility (WIP)

Some systems, doors, and visual effects are visible to other players in multiplayer, but not all. Work is ongoing to expand visibility for all interactive elements in future updates.

SECTION 1 - AIRCRAFT INFORMATION

1.1 Airspeed Limitations

<i>Speed Designation</i>	<i>MPH (CAS)</i>	<i>Knots (CAS)</i>	<i>Airspeed Indicator Marking</i>
<i>Maneuvering (V_A)</i>	<i>115</i>	<i>100</i>	<i>None</i>
<i>Normal Operating Range</i>	<i>55–130</i>	<i>48–113</i>	<i>Green Arc</i>
<i>Flap Operating Range</i>	<i>48–100</i>	<i>42–87</i>	<i>White Arc</i>
<i>Maximum Structural Cruising (V_{NO})</i>	<i>130</i>	<i>113</i>	<i>Upper Green Arc Limit</i>
<i>Caution Range</i>	<i>130–162</i>	<i>113–141</i>	<i>Yellow Arc</i>
<i>Never-Exceed (V_{NE})</i>	<i>162</i>	<i>141</i>	<i>Red Radial Line</i>

Variant Notes in MSFS:

- **35" Wheels** – Slight increase in drag at higher speeds may limit practical cruise to ~125 MPH before noticeable performance degradation.
- **Floats** – Maximum cruise generally limited to ~115–120 MPH due to hydrodynamic drag and added weight.

1.2 Powerplants

- **Engine:**
 - 26" & Float: Lycoming O-360-C1G (180 HP)
 - 35": Lycoming IO-390-A1B6 (210 HP)
 - **RPM Limit:** 2700 RPM (all operations)
 - **Fuel:** 91/96 minimum grade aviation gasoline (100/130 acceptable)
 - **Propeller (Constant Speed):** Hartzell HC-C2YR-1BF/F7666A – Dia. 80 in
-

1.3 Powerplant Instrument Markings (As Modeled in MSFS)

Tachometer:

- *Green Arc: 2200–2550 RPM*
- *Red Radial: 2700 RPM (maximum)*

Oil Pressure:

- *Green Arc: 30–60 PSI*
- *Red Radial (Low): Below 20 PSI*
- *Red Radial (High): Above 85 PSI*

Oil Temperature:

- *Green Arc: ~40°C to ~120°C (approx. 100°F–245°F)*
- *Red Radial: Above ~120°C (245°F)*

Manifold Pressure:

- *Red Radial: ~29 inHg*

Fuel Flow:

- *Scale 0–12 GPH (no colored arcs; monitor per power setting)*
-

1.4 Miscellaneous Instrument Markings (As Modeled in MSFS)

Airspeed Indicator:

- *Outer Scale: MPH 0–180*
- *Inner Scale: KTS 0–157*
- *White Arc (Flap Operating Range): ~48–100 MPH (≈42–87 KTS)*
- *Green Arc (Normal Operating Range): ~55–130 MPH (≈48–113 KTS)*
- *Yellow Arc (Caution Range): ~130–162 MPH (≈113–141 KTS) – Smooth air only*
- *Red Radial (VNE): 162 MPH (141 KTS)*

Fuel Quantity Indicators:

- *Left and Right tanks individually marked: E, ¼, ½, ¾, Full*

Ammeter:

- *Scale -60 to +60 Amps (no arcs; center zero)*
-

1.5 Weight Limits

<i>Configuration</i>	<i>Max Gross Weight</i>	<i>Notes</i>
<i>26" Bush Wheels</i>	<i>2,150 lbs</i>	<i>Standard taildragger ops 72gal fuel capacity</i>
<i>35" Bush Wheels</i>	<i>2,150 lbs</i>	<i>Higher rolling resistance 72gal fuel capacity</i>
<i>Whipline 2100 Floats</i>	<i>2,150 lbs</i>	<i>Includes float structure weight 36gal fuel capacity</i>

1.6 Performance Charts & Tables

(Microsoft Flight Simulator 2020/2024 – Simulated Operation)

Notes

- Values reflect this aircraft's tuned MSFS flight model at MTOW
- Use as **in-sim** guidance, not real-world data.

1.6.1 V-Speeds

(IAS, sea level, standard conditions, typical training weights)

Speed	Notes	MPH	Knots
V_{S0} (Full Flap Stall)	All Variants	40	35
V_R (Rotate)	All Variants	50	43
V_{S1} (Clean Stall)	All Variants	52	45
V_X (Best Angle)	26", Floats	61	53
	35" Denali	56	48
V_G (Best Glide)	Clean	70	61
V_Y (Best Rate)	26", Floats	76	66
	35" Denali	82	71
V_{FE} (Max Flap Extended)	White arc upper limit	102	89
V_A (Maneuvering)	Varies with weight	118	103
V_{NO} (Max Structural Cruise)	Upper green arc	133	116
V_{NE} (Never Exceed)	Red line	166	144

1.6.2 Weights, Fuel & CG (Per Variant)

Variant	Empty Wt	Max Gross	Fuel (Total / Usable)	CG Datum / EW CG (Z,X,Y ft)
26" Bush Wheels	1,444 lb	2,150 lb	72 / 70 gal	Datum (3.6, 0, 0) • EW CG (-4.7, 0.04, -0.2)
35" Tundra Wheels Denali	1,478 lb	2,150 lb	72 / 70 gal	Datum (3.6, 0, 0) • EW CG (-4.7, 0.04, -0.2)
Amphibious Floats (Whipline 2100)	1,736 lb	2,150 lb	36 / 34 gal	Datum (3.6, 0, 0) • EW CG (-4.7, 0.04, -1.0)

Fuel System: Wheeled: Two wing tanks, **36 gal each**; **2 gal unusable** total.

Floats: Two wing tanks, **18 gal each**; **2 gal unusable** total.

Selector **ON/OFF** only.

CG Behavior: CG shifts with **fuel burn, slip-angle transfer, fuel tank level difference, roll attitude when parked, cargo pod, door/window state** (sim-coded).

1.6.3 Configuration Drag & Performance Penalties (MSFS-Specific)

Configuration Change	Effect in Sim
Cargo Pod Installed	↑ Drag, slight aft CG shift → ↓ cruise, ↑ TO/LDG distances
Door Removed	↑ Drag, altered crosswind feel → plan extra margin
Window Open	↑ Drag at speed → ↓ cruise, longer TO/LDG
35" Tires vs 26"	↑ Rolling drag → slightly longer TO/LDG, ↓ cruise
Floats	↑↑ Drag & weight → lower climb & cruise; water ops enabled

1.7 Center of Gravity (CG) Limits

- **Datum:** *Wing leading edge*
- *At 2,150 lbs: +14.2 in to +19.2 in aft of datum*
- *At 1,450 lbs or less: +10.5 in to +19.2 in aft of datum*
- *Linear variation between points*

MSFS Note: *CG can dynamically shift in flight due to:*

- *Fuel burn (per tank)*
 - *Slip angle fuel transfer (custom-coded)*
 - *Cargo pod installation*
 - *Door/window configuration*
-

1.8 Maneuver Limits

- **Positive Load Factor (Flaps Up):** +3.8 G
 - **Positive Load Factor (Flaps Down):** +2.0 G
 - **Negative Load Factor:** -1.52 G
 - **Aerobatics:** *Not approved*
 - **Spins:** *Prohibited*
-

1.9 Kinds of Operation

- **VFR & IFR Approved** in Microsoft Flight Simulator 2020/2024 for both analog and glass cockpit configurations, provided pilot proficiency and compliance with simulator weather limitations.
- **Autopilot** (AS307) available in glass cockpit configurations for IFR navigation and enroute workload reduction.
- **Not approved for flight into known icing conditions** — only pitot heat is installed; no propeller, wing, or windshield de-ice systems.
- **Day/Night operations** permitted.
- Solo flight from **front seat only**.
- Door/window may be opened in flight (drag effects modeled in MSFS).

Note: In real-world operations, IFR use of amphibious or straight floats is often restricted due to regulatory requirements for alternate landing sites and environmental conditions. In MSFS, these limitations do not apply unless self-imposed, and the amphibious Scout is fully IFR-capable in the simulator.

1.10 Placards (As Modeled in MSFS)

- “MANEUVERING SPEED 115 MPH (100 KTS) CAS”
- “SPINS PROHIBITED”
- “DO NOT EXCEED 90 MPH WITH DOOR OPEN”
- “AVOID 1700–2100 RPM DURING DESCENT” (fixed pitch)
- “AVOID 2000–2250 CONTINUOUS OPERATION” (constant speed)
- “MAXIMUM BAGGAGE 100 LBS”
- “TURN OFF STROBE LIGHTS WHEN TAXIING NEAR OTHER AIRCRAFT OR IN CLOUDS/FOG”

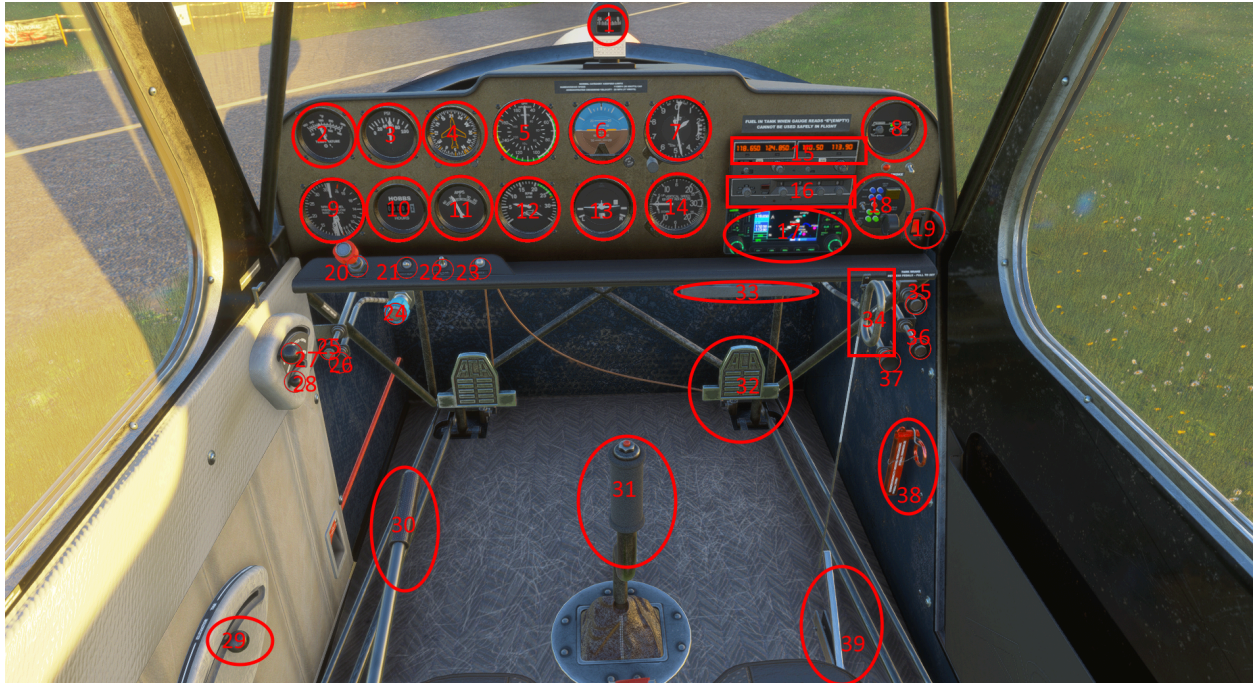
SECTION 2 – CLICKABLES

2.1 Analog Upper Left Panel



1. Circuit Breakers
2. Landing Strobes
3. Landing Light
4. Strobes
5. Navigation
6. Avionics
7. Master Battery/Alt
8. Ignition L
9. Ignition R
10. Map Light power
11. Map Light
12. left fuel gauge

2.2 Analog Panel



- | | | |
|---------------------------|--------------------|----------------------------|
| 1. Compass | 14. Vertical Speed | 27. Throttle |
| 2. Oil Temp | 15. Comms | 28. Carb Heat |
| 3. Oil Pressure | 16. Transponder | 29. Elevator Trim |
| 4. HDI | 17. GNS/GTN Swap | 30. Flap Handle |
| 5. Airspeed Indicator | 18. Float Gear | 31. Flight Stick |
| 6. Artificial Horizon | 19. ELT | 32. Rudder/Brake |
| 7. Altimeter | 20. Mixture | 33. Tablet |
| 8. Audio | 21. Pitot Heat | 34. Anchor |
| 9. Manifold/Fuel Pressure | 22. Fuel Pump | 35. Parking Brake |
| 10. Hobbs/Hours | 23. Starter | 36. Heat |
| 11. Ammeter | 24. Prop Pitch | 37. Air Vent |
| 12. RPM | 25. Heat | 38. Emergency Door Release |
| 13. Turn/Slip | 26. Air Vent | 39. Water Rudder |

2.3 Glass Panel



1. AS307 AutoPilot
2. Glass Panel Circuits/Electrics
3. G3X Touch Display GPS
4. G5 Backup GPS
5. Airspeed indicator
6. G330 Transponder
7. GNS430 or GTN650 Variant dependant
8. Smoke Generator/Indicator switch

SECTION 3 – EMERGENCY PROCEDURES

NOTE: The following procedures are **simulated operations only** for Microsoft Flight Simulator 2020/2024. While modeled after real-world practices for the American Champion Scout, they are not a substitute for certified pilot training or the actual Pilot's Operating Handbook (POH).

Always treat emergencies in the simulator as an opportunity to reinforce correct procedures.

3.1 Engine Failure During Takeoff Roll

1. **Throttle** – IDLE
 2. **Brakes** – APPLY
 3. **Mixture** – CUTOFF
 4. **Ignition Switch** – OFF
 5. **Master Switch** – OFF
 6. **Fuel Selector** – OFF
-

3.2 Engine Failure After Takeoff (Below 500 ft AGL)

1. **Airspeed** – 60 MPH (Best Glide)
 2. **Land Ahead** – MINOR TURN ONLY if required to avoid obstacles
 3. **Flaps** – AS REQUIRED
 4. **Mixture** – CUTOFF
 5. **Ignition Switch** – OFF
 6. **Master Switch** – OFF
 7. **Fuel Selector** – OFF
-

3.3 Engine Failure in Flight

1. **Airspeed** – 60 MPH (Best Glide)
 2. **Fuel Selector** – ON
 3. **Mixture** – RICH
 4. **Throttle** – OPEN SLIGHTLY
 5. **Carb Heat** – ON
 6. **Ignition Switch** – BOTH (if applicable)
 7. **Primer** – LOCKED
 8. **If Power Not Restored** –
 - a. Establish forced landing plan
 - b. Mixture – CUTOFF
 - c. Ignition Switch – OFF
 - d. Master Switch – OFF
 - e. Fuel Selector – OFF
-

3.4 Precautionary Landing (Power Available)

1. **Flaps** – AS REQUIRED
 2. **Airspeed** – 60–70 MPH
 3. **Approach Path** – CHECK FOR OBSTRUCTIONS
 4. **Radio** – TRANSMIT INTENTIONS
 5. **Landing** – Execute normal landing with minimal flare
-

3.5 Forced Landing (No Power)

1. **Airspeed** – 60 MPH
 2. **Best Landing Area** – SELECT IMMEDIATELY
 3. **Flaps** – AS REQUIRED
 4. **Cabin Doors** – UNLATCH
 5. **Master Switch** – OFF
 6. **Fuel Selector** – OFF
 7. **Mixture** – CUTOFF
 8. **Ignition Switch** – OFF
 9. **Touchdown** – TAIL LOW / MINIMUM SPEED
-

3.6 Electrical Fire in Flight

1. **Master Switch** – OFF
 2. **Avionics** – OFF
 3. **All Electrical Switches** – OFF
 4. **Cabin Heat & Air** – OFF (to close vents)
 5. **Fire Extinguisher** – ACTIVATE if available
 6. **If Fire Out** – Turn Master & Avionics back ON one at a time to isolate cause
-

3.7 Engine Fire During Start

1. **Cranking** – CONTINUE to suck flames into engine
 2. **If Engine Starts** – RUN at high RPM for a few moments
 3. **If Engine Fails to Start** –
 - a. Throttle – FULL OPEN
 - b. Mixture – CUTOFF
 - c. Cranking – CONTINUE
 - d. Master Switch – OFF
 - e. Fuel Selector – OFF
 - f. Fire Extinguisher – ACTIVATE
-

3.8 Engine Fire in Flight

1. **Mixture** – CUTOFF
 2. **Fuel Selector** – OFF
 3. **Master Switch** – OFF
 4. **Cabin Heat & Air** – OFF
 5. **Airspeed** – 100 MPH (to extinguish flames)
 6. **Execute Forced Landing**
-

3.9 Smoke & Fumes in Cabin

1. **Cabin Heat & Air** – OFF
 2. **Open Windows** – AS REQUIRED for ventilation
 3. **Land as Soon as Practicable**
-

3.10 Emergency Descent

1. **Throttle** – IDLE
 2. **Mixture** – RICH
 3. **Airspeed** – 120 MPH MAX
 4. **Flaps** – AS REQUIRED for rapid descent
 5. **Bank** – 30–45° to maintain forward visibility
-

3.11 Ditching (Amphibious Variant)

1. **Gear** – UP (if water landing)
 2. **Approach** – INTO WIND, parallel to swells
 3. **Flaps** – 20–30°
 4. **Airspeed** – 60 MPH
 5. **Cabin Doors** – UNLATCH
 6. **Touchdown** – Level attitude, minimum rate of descent
 7. **Evacuate Aircraft** – As quickly as possible after stopping
-

3.12 Simulated Failures in MSFS

The Scout for MSFS includes simulated failures tied to its **circuit breakers** and other systems. These can impact:

- Electrical availability
- Avionics functions
- Engine performance (carb heat, cowl flaps, etc.)

SECTION 4 – NORMAL PROCEDURES

(Microsoft Flight Simulator 2020/2024 – Simulated Operation)

Developer Note:

Procedures are based on the real-world Scout but adapted for simulator use.

Certain systems are simplified or behave slightly differently from the real aircraft due to simulator constraints.

Pay close attention to “Variant Notes” — operating the amphibious float version differs in important ways from the wheel variants.

4.1 Preflight Inspection

(Applies to all variants unless otherwise noted)

Exterior Walk-Around

1. **Fabric** - Check Condition
 2. **Window** - Check Condition Cleanliness and Security
 3. **Antennaes** - Check Secure
 4. **Horizontal Stabilizer and Wires** - Check Condition
 5. **Vertical Stabilizer and Tail Light** - Check Condition
 6. **Elevator and Trim Tab** - Check Condition
 7. **Tail Wheel** - Check Condition
 8. **Antennaes** - Check Secure
 9. **Cowl Flap** - Check Position
 10. **Engine Inspection** - Check Oil and Engine Conditions
 11. **Wheels** - Check Condition
 12. **Prop and Spinner** - Check Conditions
 13. **Wing Root Covers** - Check Condition
 14. **Wing and Struts** - Check Condition
 15. **Fuel Vent** - Check for Stoppage
 16. **Tie-Down** - Remove
 17. **Windshield** - Check for Cleanliness
-

4.2 Before Starting Engine

1. **Belt-Harness** - Secured
 2. **Parking Brake** - Set
 3. **All Switches** - OFF
 4. **Cockpit Door** - Closed and Secured
 5. **Radios and Electrical** - OFF
 6. **Fuel Valve** - ON
-

4.3 Engine Start

1. **Battery Switch** - ON
 2. **Mixture** - RICH
 3. **Prop Speed Control** - MAX RPM
 4. **Left Ignition** - ON
 5. **Starter** - ENGAGE
 6. **Right Ignition** - ON
-

4.4 After Engine Start

1. **Cabin Door** - Latched and Secured
 2. **Lights** - As Needed
 3. **Trim Tab** - Neutral
 4. **Flight Controls** - Free and Correct
-

4.4 Taxi

Wheels (26" / 35")

1. **Parking Brake** - Release
2. **Brakes** - Test
3. **Rudder** - Test

Amphibious Floats

1. **Gear** - UP for water taxi
2. **Water Rudder** - DOWN
3. **Rudder** - Test

All Variants

4. **Throttle Setting** - 2100
 5. **Mixture** - Set Full at Altitude
 6. **Flaps** - Set as needed
 7. **Magnetos Check** - 150 rpm maximum drop - 50 rpm maximum differential
 8. **Alternate Air** - Check Operation - Cold Weather
 9. **Engine Instruments** - Within Green Arc
 10. **Throttle Setting** - 1500
 11. **Propeller** - Cycle
 12. **Throttle** - Idle Check
-

4.5 Before Takeoff

1. **Parking_Brake_Set**
 2. **Flight Controls** - Free and Correct
 3. **Control Stick** - Full Aft
 4. **FUEL_SHUTOFF_CHECK**
 5. **Mixture** - Rich
 6. **Prop Speed Control** - MAX RPM
-

4.6 Takeoff

1. **Mixture** - Full Rich or Lean for altitude
 2. **Propeller** - Full Forward
 3. **Fuel Pump** - On
 4. **Alternate Air** - Cold
 5. **Throttle** - Full
 6. **Engine Instruments** - Within Green Arc
 7. **Rotate** - ~50 MPH
 8. **Climb out** at 65–70 MP
-

4.7 Climb

1. **Throttle** - Full
 2. **Mixture** - Full Rich or Lean for Altitude
 3. **Propeller** - Full Forward
 4. **Fuel Pump** - Off
 5. **Climb Speed** - Best Rate
 6. **Engine Instruments** - Within Green Arc
-

4.8 Cruise

1. **Power** - As Required
 2. **Elevator Trim** - Adjust As Needed
 3. **Mixture** - Best Power or Best Economy - 75%
 4. **Power** - As Required
 5. **Engine Instruments** - Within Green Arc
-

4.9 Descent

1. **Reduce Power** - Gradual to prevent shock cooling
 2. **Mixture** — enrich as needed.
-

4.10 Approach & Landing

1. **Mixture** - Rich
 2. **Carb Heat** - Cold (Unless icing conditions exist)
 3. **Airspeed** - 75-80 MPH
 4. **Flaps** - As Desired
-

4.11 Balked Landing (Go Around)

1. **Throttle** - FULL
 2. **Carb Heat** - Cold (Unless icing conditions exist)
 3. **Airspeed** - 75-80 MPH
 4. **Flaps** - UP
 5. **Trim** - Re-set
-

4.12 After Landing

1. **Carb Heat** - Cold
 2. **Flaps** - UP
-

4.13 Shutdown & Securing

1. **Parkin Brake** - SET
 2. **Radios & Electrical Equipment** - OFF
 3. **Mixture** - FULL OUT
 4. **Ignition & Master Switches** - OFF
 5. **Flaps** - FULL DOWN
 6. **Controls** - Lock
-

SECTION 5 - SPECIAL FEATURES IN MSFS

Hand-Crafted FX

The American Champion Scout includes a set of custom visual effects optimized for Microsoft Flight Simulator, enhancing both realism and immersion:

- **Wheel Water Spray:** Triggered when taxiing or taking off from wet or waterlogged surfaces.
- **Float Foam & Spray:** Amphibious float variants produce foam and spray patterns during water taxi, takeoff, and landing.
- **Wingtip Water FX:** Visible during aggressive turns in water or at high taxi speeds.
- **Land Dust FX:** Generated when operating from dirt, sand, or gravel surfaces.

Aerodynamic Drag System

A custom aerodynamic drag logic is implemented to realistically model changes in aircraft performance based on configuration:

- **Door Open:** Increased drag; noticeable speed reduction.
- **Window Open:** Moderate drag effect; primarily felt in cruise.
- **Cargo Pod Installed:** Adds drag proportional to weight carried inside the pod.

Cargo Pod Weight Logic

The cargo pod's weight dynamically adjusts based on the payload station contents. MSFS weight and balance is updated in real-time, and any additional weight impacts climb rate, takeoff distance, and fuel burn.

Saved Aircraft States

Over 35 saved aircraft states are included, remembering switch positions, avionics configurations, and system states between flights for each variant.

Multiplayer Visibility Toggles

All major animations and FX are multiplayer-synchronized, including:

- Door and window positions.
 - Cargo pod visibility and door animations.
 - FX such as water spray, dust, and smoke.
-

Developer Contact & Support

For support, updates, and community discussion:

- **Website:** <https://hangarstudios713.com>
- **Discord:** <https://discord.gg/4U792JgBnB>
- **YouTube:** <https://www.youtube.com/@HangarStudios713>
- **Facebook:** <https://www.facebook.com/b4gunnerHS713/>
- **Instagram:** <https://www.instagram.com/hangarstudios713/>

Acknowledgements

The **Hangar Studios 713 American Champion Scout** represents far more than just a digital aircraft — it's the result of countless hours of dedication, testing, feedback, and community support.

I would like to extend my deepest gratitude to everyone who has been part of this journey:

- **My Tester Team** – For your patience, precision, and relentless attention to detail, ensuring this aircraft performs as close to reality as possible.
- **Preview Pilots & Early Reviewers** – For offering your honest impressions, catching the little things, and pushing the Scout to its limits in every imaginable scenario.
- **The Community** – For embracing this project, sharing in the passion for aviation, and helping create a space where like-minded pilots can connect, learn, and inspire one another.
- **Smitty & Chunky Flyer** - Can't thank you guys enough!

To everyone who has flown the Scout, provided feedback, or simply cheered this project forward — **thank you**. Your enthusiasm and friendship have made this more than just a simulator project. You've helped shape it into a shared experience.

Here's to many more flights together, and to the adventures still ahead.

– *Hangar Studios 713*