THE AIRCRAFT: This is a replica of the de Havilland DHC-3 (military U-1A) Otter. The data for the flight model was taken from its Type Certificate Data Sheet (TCDS), from the Pilot’s Operations Handbook (POH), from Papamac’s personal records and from data found on several Otter-related web sites. The models have been extensively flight tested by Papamac and other highly qualified Otter pilots. The piston otter is a combination of our original otter and Mike Wilson’s which we acquired rights to in 2010. Propellers designed by and provided courtesy of Valentin Diakhaté valentin3032@hotmail.fr

AIRCRAFT SPECIFICATIONS: See Appendix A

3D COCKPIT CONCEPTS. This model has a fully animated 3D cockpit. There is no 2D cockpit.

The various controls, switches, and handles are located in positions similar to their real world locations which requires a shift in thinking about how you access them. The easiest solution is the purchase of our TrackerXP plugin which converts any webcam into a head tracking device, shifting the point of view (POV) to where you are looking and allowing you to click on the controls located in the field of view (FOV). If that is not an option then use one of these techniques:

First, the Keyboard & Mouse Method:
To look around the cockpit you can press the [ctrl]+ [o] keys simultaneously. This is called the “mouse view” and your mouse cursor becomes a pointer which you can position to any part of the visible cockpit. Once pointed in the proper direction, press any of the normal keyboard navigation/shortcut keys to “decouple” the mouse and you can then use it to click on and control any of the visible animated controls. Pressing [ctrl]+ [o] again returns to the straight ahead view.
The Joystick Button & Mouse Method: You can also assign the “toggle 3D view” function to a joystick button and the desired view functions from the X-Plane Settings->Joystick & Equipment menu’s Buttons tab to one or more of your joystick’s “hat” switches. I like using the joystick method because it frees up the mouse to use to click on controls. So, assuming that you have at least one 4 way “hat” switch, assign the following functions starting with the 12 O’clock position and going clockwise: View: Tilt Up; View: Pan Right; View: Tilt Down; and View: Pan Left. Now you can press the Toggle 3D Cockpit button (or alternatively Press keyboard Ctrl+o) to “unlock” the 3D Cockpit and use the hat switch or the mouse cursor and the arrow keys to view and move around the cockpit.

The Mouse Cursor: Changes shape when hovered over a manipulator (a 3D object that moves when clicked, pulled, pushed, or twisted) or a clickable region. Each manipulator or clickable region has an associated tool tip which can be viewed by turning on object descriptions (Aircraft -> Show Object Descriptions).

The cursor shape indicates how the control is moved. For example a pointing finger indicates a control to be clicked. The Hand shape indicates clicking and holding the mouse button down to drag/move the control. Curved arrows indicate that clicking or clicking and holding the button down rotates the control in the indicated direction. The same logic holds for the straight up — down or left — right arrows.

Animated Controls: The following types of animated controls are used:

- Clickable regions – flat areas of the instrument panel which can be clicked to affect an action
- Buttons – round, square, rectangular or some other geometric shapes which are typically pushed or moved sideways or up/down to activate a function. The annunciator test button is an example. The push-to-test stall warning light is another.
- Rotary knobs – controls which either have detents or steps which need to be clicked, or a range of motion through which they move.
- Rheostats – Rotary knobs which increase and decrease in amplitude. Used for things like adjusting a light’s illumination level.
- Handles – Levers which move up, down, back, or forward. Flaps, carburettor heat, & parking brake are types of handles.
- Pumps – Single or double-action knobs or levers which move fluids. The fuel primer is one, and the flap handle connects to a pump.

X-PLANE SCREEN SIZE: We recommend setting the X-Plane screen resolution to at least 1024x1024 or 1280x1024 for best viewing. We also recommend setting the Field of View (FOV) to at least 55 degrees in XP’s Rendering Options menu. The wider the screen, the wider the FOV needs to be in order to maintain the proper cockpit perspective.

THE STMA DOCK: Our unique control center pops into view when the mouse cursor is hovered at the left margin of the X-Plane window. See Appendix B for a picture of the dock and explanation of each function controlled. Each line of text in the Dock is a button which changes color and/or wording to indicate that the requested action is taking place. The Dock uses show/hide technology and custom STMA datarefs to control the functions.
ANIMATED COCKPIT CONTROLS

1. **Push-to-test Lights.** Move the mouse cursor over each light’s bezel until it changes shape to a pointing finger and then click. The light and bezel will push in towards the instrument panel and the light will illuminate to prove that it’s not burned out.

2. **Parking Brake:** Click and push in to release or pull out to apply.

3. **Yoke:** Moves with joystick/yoke movement. Not a manipulator on this model.

4. **Rudder Pedals:** Moves with rudder pedal or joystick’s yaw axis movement. Not a manipulator.

5. **All Instruments with adjusting knobs:** Move the mouse cursor until it changes shape to a curved arrow and then perform the indicated click/hold/move action.

6. **8-Day Clock (piston otters only).** This clock mimics the clock/elapsed time timer found in U.S. Army Otters and many other military aircraft of that era. The lower left knob is the stem-winder. This one is a dummy since there’s no mechanism in X-Plane to actually wind the clock, which is a good thing. Many were broken by being wound too tightly. The upper right knob starts, stops, and resets the timer’s second hand. Move the mouse cursor until it changes into a pointing finger to start and stop the timer. Move the cursor slightly left, right, up, or down until it changes into a hand and click to reset the timer to zero.

7. **Instrument panel/radio panel switches:** Move the mouse cursor until it changes shape to a pointing finger and then perform the indicated click to toggle the switch. In some cases, the cursor will change to a left-right or up-down arrow pair. Move the cursor in the indicated direction to perform the selected function. Thanks to the wizardry of Bob Feaver, our
oters have Automatic Direction Finders (ADF) with functioning manual loop antennas and bearing indicators. For an exciting time, try flying a Non-Directional Beacon (NDB) approach using the manual loop. Internal Communication System (ICS) panels and dome light are located on the triangular shaped panel above and just forward of the cockpit doorway. The ICS panels are still a works-in-progress.

8. **Fuel Tank Selector:** Move the mouse cursor until it changes shape to a hand and then click/hold/pull to reposition the selector as desired.

9. **Flaps:** The flap selector handle sits on the right side of the pilot’s seat, next to the flap pump handle. Click/hold and push or pull to set the flap selector to Up or Down. Then click/hold the flap pump handle with what, in the real cockpit, would be an up and down motion. It takes approximately 3 to 4 double-action strokes to move the flaps one detent (approximately 15 degrees).

10. **Cheat:** The area surrounding the words “CRUISE, T-O, APCH, & LAND on the flap indicator are clickable regions which move the flaps to that setting.

11. **Tailwheel Lock Switch:** Used for takeoffs and landings. When up the green light illuminates the tailwheel is locked. It centers and doesn’t respond to rudder inputs. The Ground Steering (down) position is used for ground taxiing only. The yellow warning light illuminates and the tailwheel moves in response to rudder inputs.

12. **Trim:** Movement of the trim wheels is conventional. The mouse cursor changes to a hand. Click/hold/and push/pull to move the wheels.
   
   a. Elevator trim is the wheel located alongside the right side of the pilot’s seat.
   
   b. Rudder trim is a wheel located on the cockpit overhead to the left of the radio panel. It takes approximately 4 and ½ turns to move the rudder trim from full left to full right.
   
   c. Aileron trim is a small wheel located near the middle of the control yoke vertical column. It takes approximately 5 and ½ turns to move the aileron trim from full left to full right.

13. **Retractable Skis:** Works the same way the flaps selector and flap pump handle do.

14. **Primer:** Cursor changes to a hand. Click/hold and pull/push to inject fuel into the engine.

15. **Carburettor Heat Lever:** Cursor changes to a hand. Pull down to increase or up to decrease carburettor heat.

16. **Alternate/Filtered Air Lever:** Cursor changes to a hand. Pull down to open or up to close the alternate air door. The normal position is UP.

17. **Emergency Fuel/Oil Shutoff Handle:** Cursor changes to a hand. Pull to perform an emergency shutoff of the fuel and oil.

18. **Generator Bus Switch (On circuit breaker panel):** Cursor changes to a pointing finger. Click to toggle generator bus open or closed. During normal operations this switch is always left ON.

The pilot and Copilot internal communication system (ICS) panels (not pictured) are located just above and forward of the cockpit doorway. See Appendix B, The STMA Dock, for details on using the ICS.
FEATURES UNIQUE TO THE TURBINE OTTER

The Turbine Otter uses the ubiquitous Pratt & Whitney PT6-135 split-shaft turbine engine. The engine controls are similar to the piston otter’s although the nomenclature is different. Documentation, including a checklist and engine operating manual, is available in the PT6 Wheels model’s documents folder.

1. **ENGINE START PANEL:** Contains the engine start controls and engine systems controls.
   - **MASTER SWITCH:** Provides electrical power to the aircraft busses.
   - **STARTER:** Engages the Starter. Click on the red switch guard and it will open. Click and hold on the starter button until the engine lights off and then release. Click the guard again to close it.
   - **DE-ICE:** Toggles the engine inlet boots and other anti-ice systems on/off.
   - **DE-ICE:** Toggles the engine igniters on to provide the spark needed to ignite the fuel in the engine burner can. Must be on for start and whenever environmental conditions may result in an engine flame-out unless the spark is maintained.
   - **PROP TEST:** Test the AutoFeather system.

2. **POWER LEVER:** Identical in function to the throttle lever with the addition that movement of the lever aft over the BETA Gate (requires pulling up on the toggles mounted on the sides of the power lever shaft) moves the propeller into BETA (Zero Pitch and idle power) or reverse (propeller blades increasingly move to reversed pitch settings as power increases) modes.

3. **PROPELLER LEVER:** Identical in function to the piston otter’s propeller lever. Controls the propeller RPM and pitch through the action of the propeller governor. Adds the function of propeller blade feathering … increasing the blade pitch until they are streamlined with the relative wind. Because the PT-6 is a split-shaft engine, the engine can continue to run at idle to provide electrical power, heat, etc, with the propeller feathered.

4. **CONDITION LEVER:** Similar, but not identical, in function to the piston otter’s Mixture Lever. The lever is left full forward position during normal operations but can be retarded to the FLT IDLE position for ground operations. Further aft movement of the lever shuts the fuel to the engine off, shutting the engine down.
5. **ENGINE INSTRUMENTS:** The PT6 engine’s instruments are turbine engine standard:

6. **Torque:** A direct indication of the power the engine is producing.

7. **Interstage Turbine Temperature (ITT):** Usually the limiting factor in engine performance. Monitor during all power changes to make sure limits aren’t exceeded.

8. **Propeller RPM:** Works the same way a comparable piston engine works.

9. **Turbine RPM (N2) in Percent:** A direct indication of engine speed.

**FEATURES UNIQUE TO THE SUPER OTTER**

The Super Otter uses the Garrett TPE-331 fixed-shaft turbine engine. Because of this engine’s single shaft design, operation and engine controls are decidedly different from the PT6-powered Turbine Otter. Documentation, including a checklist and engine operating manual, is available in the “T” Wheels model’s documents folder.

1. **ENGINE SWITCH PANEL:** All engine control switches are centrally located on a panel above and to the left of the throttle quadrant.

   - **AUTO IGN SWITCH:** The Auto-Ignition switch automatically fires the engine igniters to aid in keeping the engine running in the event of a flameout or other engine failure. Turn on prior to engine start.

   - **FUEL PUMP SWITCH:** Provides pressurized fuel to the engine so that flow is maintained under all conditions. Turn on prior to engine start.

   - **START-GEN(erator) Switch:** Move the cursor until it changes into a two-headed arrow and then hold & move the cursor up to engage START. Releasing the mouse button releases the starter switch which will move to the (center) OFF position. Once the engine is started, move the cursor until it changes into a pointing finger and click and the switch will move down to the GEN(erator) position.
• **ANTI-ICE SWITCH:** Click to toggle all engine/propeller anti-ice features on/off.
• **NTS CHK SWITCH:** Click & hold this momentary-on switch to test the Negative Torque Sensing (NTS) system which feather the propeller whenever torque drops without an accompanying power lever movement, indicating that the engine has failed. With the switch engaged, the RPM should decrease indicating that the propeller blades are being driven towards the feathered position.
• **UNF SWITCH:** Click & hold this momentary-on UNFeather Switch activates an electrically driven pump which forces engine oil into the propeller dome, driving the propeller blades out of feather so that they windmill and restart the engine during an air start. As soon as the blades start to rotate out of feather, release the switch.

2. **POWER LEVER:** Identical in function to the turbine otter’s power lever.
3. **CONDITION (RPM) LEVER:** Similar in function to the turbine otter’s propeller lever. Controls the propeller RPM and pitch through the action of the propeller governor. Unlike the turbine otter, however, it does not control propeller blade feathering. Because the TPE-331 is a fixed-shaft engine, the engine must be shut down before the propeller blades can be feathered.

4. **FUEL SHUTOFF/FEATHERING LEVER:** Similar, but not identical, in function to the turbine otter’s Condition Lever. The lever is left full forward position during normal operations. Retarding the lever shuts off fuel to the engine, shutting it down. Prior to the RPM spooling down below 50%, pulling up on the feathering toggles and lifting the lever over the feathering gate.

5. **ENGINE INSTRUMENTS:**
6. **TORQUE:** A direct indication of the power the engine is producing.
7. **N1 (RPM):** Measures the ENGINE RPM at the N1 turbine stage.
8. **OIL PRESSURE/TEMPERATURE:** Combined gauge. Click the switch on the instrument face to switch between pressure and temperature.
9. **EGT:** Engine exhaust gas temperature.
10. **FUEL FLOW:** Fuel flow to the engine, in pounds.
11. **VOLT/AMMETER:** Combined gauge. Click the switch on the instrument face to switch between volts and amps.

**OPERATING TIPS:**
• Flaps: Use Takeoff (1st notch) of flaps for normal and float version takeoffs.
• Tail Wheel Lock: Lock for takeoffs and landings. Place in STEER for taxiing.
• Floats: Make sure water rudder is up for ALL landings and takeoffs. Make sure that wheels are up for water operations and down for land operations.

See Appendix C, Water Take-offs, for a detailed description of float plane operations.

**DOCUMENTATION:** Each wheels models documents folder contains a pilot’s checklist, an engine operating manual (except for the piston otter), and an older POH which includes performance charts for the piston model. This manual is from an early version of the Otter and some features don’t match with the later U.S. Army Otter we are modelling. Reference material for the turbine powered otters is difficult to find. We’ve included the pertinent material we’ve been able to locate. From time to time, we find additional and will share it upon request. Send an e-mail to papamac@shadetreemicro.com specifying the format you’d prefer. Digital versions of Otter operator manuals/handbooks are available online from sites such as http://www.esscoaircraft.com and http://www.eflightmanuals.com/

**REGISTRATION (TAIL) NUMBERS:** Each skin comes with its own aircraft registration, or “tail” number (Also called the Bureau Number or BN by the U.S. military), as shown on the plane.jpg file. Each of our liveries is accompanied by a small text file which contains that skin’s tail number. Our proprietary plugin reads that text file when you change the skin and automatically changes the tail number displayed in the cockpit.
SKINS: The Piston Otter currently has 6 skins: Army, Canadian Air Reserve, CFODU, Harbour_Air, Metal, and Sea_Airmotive. The U.S. Army skin is from the airplane that Papamac flew during the Viet Nam Conflict in 1968-69. The Super Otter has 5 skins: Katmai, N336AK Blue, N337AK Yellow, N338AK Green, and N339AK Red. The Turbine Otter has one Skin: Harbour_Air. Physically, the texture files are located in the Liveries folder. Changing the livery (skin) for a single session is as simple as clicking on the Aircraft -> Open Livery menu and choosing the livery to display. As soon as you exit the menu the selected livery will become the aircraft’s skin. To make a livery the default skin … The one that appears when the model is opened in X-Plane, open it in Plane-Maker, select the desired livery in the File -> Open Livery menu and then save the model (File -> Save) before exiting Plane_Maker.

Additional skins created by STMA’s very own master painter, Kerry “Kezza” Cross, are planned and will be available in the Aircraft Skins section of the X-Plane.org website as they are released.

Users are encouraged to create their own skins and may freely distribute those skins as long as they don’t require modification to or distribution of the dhc3.acf or any associated files, which are all copyrighted by STMA.

Although we prefer that each customer creates new texture files, the following STMA texture files may be customer-modified when creating a skin: fuselage.png, wings.png, glass.png, and cabin.png. As long as you paint within the object layout areas on each of those texture files your new skins should display properly. If modified files are used, STMA must be given proper attribution as the source of the files. Under no circumstances may you modify the Fwdcockpit.png or panel.png without express STMA permission.

We ask that you do allow us to look over an advance copy of your skin before you release it. We try hard to offer only quality products and ask that you help us in that effort. Contact us at papamac@shadetreemicro.com and we’ll be happy to help you with your project.
STMA’S HANGAROPS REMOTE

To Operate:

- Press the + or - buttons to select the number of the hangar door to open
- Press the Shade Tree icon to toggle the door.
- Remove and store the chocks (see Appendix B, STMA DOCK).
- Release the parking brake by clicking, holding and moving it, or by pressing the “b” keyboard key.
- Use the remote control’s directional arrow buttons to move the aircraft in the desired direction.

If you have four extra joystick buttons, or a spare joystick hat switch, program the buttons to STMA/Remote/PushForward,
STMA/Remote/PushBack,
STMA/Remote/TurnLeft, and STMA/Remote/TurnRight then switch to chase view (press the “a” keyboard key) and you can watch the Otter’s remote controlled tug move the airplane into the desired position at a touch of a button!

See the HangarOps ReadMe for detailed instructions.

PLUGINS

The STMA plugin is correctly pre-installed into the dhc3/plugins folders! This and all STMA plugins are compatible with Mac, Win and Lin platforms. Do not to remove, rename or delete any of its component parts. The changing tail number with different liveries is known not to work on some Linux distributions.

**STMA Plugin:** These STMA plugins perform a variety of functions that greatly extend the capability of X-Plane to meet the specifications of the unique Otter aircraft. This will greatly enhance your X-Plane experience.

The plugins enable many features that allow the user to show, hide, and display custom instruments sets, create the STMA preference dock, open and close doors and compartments, accurately display FMS waypoints, change the users POVs and place instruments in convenient and visible locations. And much more.

These plugins create custom STMA datarefs and commands used to animate many of the controls and manipulators unique to the aircraft.

When you first open your Otter aircraft you will notice that the Hobbs time is set to zero. The plugin keeps accurate Hobbs time for every STMA aircraft version and model over the life of your aircraft. The Hobbs time is activated by engine oil pressure. You can reset the Hobbs time by removing the STMA_DHC3_Settings.txt file and restarting your aircraft OR by editing the STMA_Settings.txt data to show zero seconds.

The plugin automatically matches the aircraft tail number panel plaque to the STMA livery tail number.

The plug-in creates a STMA_Settings.txt file in the models’ root folder which stores the current settings. To restore the default settings delete this file and restart X-Plane.

**HangarOps Plugin:** The models installation package includes a folder labelled “HangarOps”. Drag and drop this folder into your X-Plane/Resources/plug-ins folder in order to activate the HangarOps™ plug-in the next time you load X-Plane. Created by Bob Feaver, this remote control allows you to manoeuvre the aircraft on the ground as if it was being towed by a tug and to open/close 100 different hangar KeyCodes in our HangarOps™ series of hangars.
**To Install:** Drag the entire HangarOps folder to X-Plane’s/Resources/plugins folder. Do not separate, remove, or rename any of its component parts.

HangarOps includes three customizable hangars that you can install at the airport of your choice. Complete instructions are included in the HangarOps ReadMe.

See our Scenery page at http://shadetreemicro.com for our unique Carson City (KCXP) scenery package which incorporates many of our HangarOps Hangars.

See more quality aircraft at www.shadetreemicro.com

**LEGALITIES:** © (copyright) May 2012 by Shade Tree Micro Aviation (STMA) collectively and by its individual associates.

This aircraft model and all associated files requires X-Plane flight simulation software by Laminar Research to be functional and is subject to X-Plane’s user’s agreement and licensing. This model is payware. Do not use it for any commercial purpose or distribute it by any means without permission of the authors. For commercial licensing, or if you desire to alter it for your personal use, send an e-mail to papamac@shadetreemicro.com at Shade Tree Micro Aviation.

This model is believed to be defect free but is offered without warranty, either express or implied.
APPENDIX A

DHC-3 (U-1A) OTTER AIRFRAME SPECIFICATIONS:

Tech data: Remarks:
Engine: P&W R-1340-59 (AN-2) or R-1340-61 (AN-3)
Propeller: Hamilton Standard 23D40 Hydromatic, 3-bladed, CS
Wingspan: 58 feet
Wing area: 375 sq. ft.
Aileron area: 26.3 sq. ft.
Flap area: 98 sq. ft.
Fin area: 33.2 sq., ft.
Rudder area: 27.0 sq. ft. (includes tab)
Tailplane area: 39.0 sq. ft.
Elevator area: 46.0 (includes tab)
Length: 41 feet 10 inches
Height: 12 feet 7 inches
Tailplane Span: 21 feet 2 inches
Wheel Track: 11 feet 2 inches
Wheel base: 27 feet 10 inches

WEIGHT:
Weight: (E/G) 4431/8000 pounds
Wing loading 21.3 lb. sq./ft
Max Power loading 13.3 lb./hp

PERFORMANCE:
Speed: (Cruise/Max) 120/133 KTS
VNe: 167 KTS
Stall speed: 50 KTS
Rate of Climb s/l: 735 ft/min.
Service ceiling: 17,400 feet
Takeoff run: 630 ft.
Takeoff to 50 ft. 1155 ft.
Landing run: 880 ft.
Landing from 50 ft. 440 ft.

FUEL CAPACITY: 208 US Gallons in three main tanks. (60/108/40)
Range: “normal tanks,” w/45 min reserve
200 miles at 2920 lb payload.
500 miles at 2580 lb payload.
875 miles at 2100 lb payload.

Armament None. Some with 7.62 M60 LMG in SEA
Accommodations: Three crew (pilot, copilot, & crew chief), ten passengers.
## AIRCRAFT COMPARISON

<table>
<thead>
<tr>
<th>Feature</th>
<th>Standard Otter</th>
<th>Vazar Turbine Otter</th>
<th>TTC Super Otter</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Engine</strong></td>
<td>P&amp;W R1340</td>
<td>PT6A-135</td>
<td>TPE331-10/-12JR</td>
</tr>
<tr>
<td><strong>Horsepower</strong></td>
<td>600 hp</td>
<td>750 shp</td>
<td>900 shp flat-rated</td>
</tr>
<tr>
<td><strong>Torque</strong></td>
<td>2101 ft-lbs</td>
<td>1876 ft-lbs</td>
<td>2971 ft-lbs</td>
</tr>
<tr>
<td><strong>TBO</strong></td>
<td>1000 hrs</td>
<td>3500 hrs.</td>
<td>7000 hrs</td>
</tr>
<tr>
<td><strong>Useful Load (wheels)</strong></td>
<td>3400 lbs</td>
<td>3800 lbs</td>
<td>3800 lbs</td>
</tr>
<tr>
<td><strong>Useful Load (floats)</strong></td>
<td>3000 lbs</td>
<td>3767 lbs</td>
<td>3767 lbs</td>
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<tr>
<td><strong>Std empty wt (wheels)</strong></td>
<td>4600 lbs</td>
<td>4200 lbs</td>
<td>4200 lbs</td>
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<tr>
<td><strong>Std empty wt (floats)</strong></td>
<td>5000 lbs</td>
<td>4600 lbs</td>
<td>4600 lbs</td>
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<tr>
<td><strong>Max gross wt (floats)</strong></td>
<td>8000-8367 lbs</td>
<td>8000-8367 lbs</td>
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</tr>
<tr>
<td><strong>Max landing wt (floats)</strong></td>
<td>8000 lbs</td>
<td>8000 lbs</td>
<td>8000 lbs</td>
</tr>
<tr>
<td><strong>Climb (ISA- g.w. wheels)</strong></td>
<td>850 ft/min</td>
<td>1200 ft/min</td>
<td>1700 ft/min</td>
</tr>
<tr>
<td><strong>Climb (ISA- g.w. floats)</strong></td>
<td>450 ft/min</td>
<td>1100 ft/min</td>
<td>1600 ft/min</td>
</tr>
<tr>
<td><strong>Cruise (10K ft. wheels limited)</strong></td>
<td>105 kts</td>
<td>144 kts</td>
<td>155 kts (airframe)</td>
</tr>
<tr>
<td><strong>Cruise (10,000 ft. floats limited)</strong></td>
<td>100 kts</td>
<td>130 kts</td>
<td>145 kts (airframe)</td>
</tr>
<tr>
<td><strong>Cruise fuel flow</strong></td>
<td>244 lbs/hr</td>
<td>338 lbs/hr</td>
<td>315 lbs/hr</td>
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<tr>
<td><strong>Takeoff (wheels)</strong></td>
<td>630 ft</td>
<td>560 ft</td>
<td>490 ft</td>
</tr>
<tr>
<td><strong>Takeoff (floats)</strong></td>
<td>18-20 sec</td>
<td>15-18 sec</td>
<td>8-10 sec</td>
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<tr>
<td><strong>Landing (wheels)</strong></td>
<td>440 ft</td>
<td>310 ft</td>
<td>290 ft&gt;</td>
</tr>
<tr>
<td><strong>Landing (floats)</strong></td>
<td>500 ft</td>
<td>400 ft</td>
<td>300 ft</td>
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<tr>
<td><strong>Powerloading</strong></td>
<td>13.3 lbs/hp</td>
<td>10.66 lbs/shp</td>
<td>8.89 lbs/shp</td>
</tr>
<tr>
<td><strong>Stall Speed- clean</strong></td>
<td>63 kts</td>
<td>63 kts</td>
<td>70 kts</td>
</tr>
<tr>
<td><strong>Stall Speed- flaps</strong></td>
<td>50 kts</td>
<td>50 kts</td>
<td>49 kts</td>
</tr>
<tr>
<td><strong>Cargo area</strong></td>
<td>480 cu ft</td>
<td>480 cu ft</td>
<td>480 cu ft</td>
</tr>
<tr>
<td><strong>Range (cruise- standard fuel)</strong></td>
<td>5.36 hrs</td>
<td>4.32 hrs</td>
<td>4.64 hrs</td>
</tr>
</tbody>
</table>
APPENDIX B

The STMA Dock

**Overhead Radio Panel**: Click and the panel slides down into the pilot’s field of view (FOV) for easy operation of the controls. Another click returns the panel to its overhead position.

**Autopilot**: A click slides the autopilot and flight director switch, if visible, into the pilot’s FOV.

**GPS**: A click slides the Garmin 430 GPS, if visible, into the pilot’s FOV.

**Transponder**: A click slides the transponder into the pilot’s FOV.

The pilot’s ICS panel can be zoomed to a position in front of the pilot so you can more easily change the desired audio selections. Clicking each switch toggles that radio receiver’s audio so you can hear what is being transmitted. Clicking on the transmitter selector switch selects that transmitter and toggles the matching receiver switch up.

**Doors**: This model has working cockpit and cabin doors. To operate a door click on the appropriate line on the Dock or click on the inside yellow door handle.

**Chocks and Remove-Before-Flight Flags**: Click to install or store them. With chocks in place the aircraft won’t move regardless of the parking brake position.

**Control Locks**: Click to install or store the control yoke and rudder pedal locks. The flight controls won’t move and the aircraft won’t be controllable in flight with them in place.

**Tiedown**: Click to engage or disengage Tiedown. This is a feature of HangarOps which “locks” the aircraft in place just as if you had physically used ropes or chains to tie the aircraft down to the ground. It’s especially helpful when tying seaplanes/floatplanes up to a dock.

**Remote and Tug**: This model has our unique HangarOps Remote Control. It controls the robot “tug” which locks in place around the tail wheel and, by pressing the appropriate remote control buttons pushes the aircraft forward, back, left, and right. See the HangarOps section, below, for detailed instructions on the use of the remote. The remote and tug won’t appear or be usable when the aircraft engine(s) are running.

**Self-Taxi**: 4 commands (Push FWRD, Push BACK, Turn LEFT, & Turn RIGHT) which allow you to reposition the aircraft on the ground without invoking the remote control. Wheels turn and castor appropriately for each command. Parking brake has to be released and chocks and control locks stowed before these commands are active.

**Autopilot Option**: Some people like having an autopilot. Others don’t. So we’ve given you the option: Click and it’s hidden and the command is greyed out.

**GPS Option**: Some people like having a GPS. Others don’t. So we’ve given you the option: Click and it’s hidden and the command is greyed out.

**Pilots Yoke Option**: Hides the Pilot yoke to make the lower part of the instrument panel more visible.

**Copilots Yoke Option**: Hides the Copilots yoke to make the lower part of the instrument panel more visible.

**View Option**: Click to toggle between 3D Mouse, 2D, and 3D View. 3D Mouse is the same as pressing [ctrl]+[o]. 2D locks the cockpit into a straight-ahead view but allows the use of the up-down arrow keys or the [q] and [e] keys to look at specific parts of the cockpit. 3D view is the same as pressing “Toggle 3D Cockpit.”
APPENDIX C

Water Take-Offs:

Water Takeoff in the DHC-3 Otter

This technique will help everybody make water takeoffs with the Otters, especially in XP10.

1. First go into XP’s Environment -> Weather menu and click on the radio button “apply weather uniformly.....” This displays the old weather menu. Look in the center right of the panel for the wave height box and change it from its default 4.0 feet, which is an absolutely ridiculous value, to a more reasonable 1.0 feet. X-Plane has drastically overstated wave height for as long as I can remember. Well, it’s not the wave height alone: it’s the wave height and associated wave length which is too short coupled. You used to be able to adjust the distance between waves, but in the later X-Plane versions you can’t. So, instead of “rollers” you have steep water “mountains”. Every time the floats hit one of these waves it greatly increases drag and stops the aircraft from accelerating. There are techniques for takeoff, and landing, in high waves but we’ll save them for a later discussion. Once you become more proficient with the airplane you can try increasing the wave height if you want.

2. Next, drop the anchor (press the “V” key or apply the parking brake). Let the aircraft turn and swing around the anchor as it wants. When it stops turning it’s facing into the wind. That becomes your takeoff direction.

3. Make sure that both the landing gear and water rudders are up. I’d leave the tail wheel in the locked position. I can’t prove that it’s causing drag but why chance it.

4. Set flaps to take-off. A cheat is to click on the flap annunciator, located at the base of the windshield center post, opposite the flap setting you want.

5. When you’re ready to take off click the “V” key or release the parking brake to stow the anchor and then add power smoothly and rapidly, but not so rapidly that you have difficulty maintaining the takeoff track with rudder pressure.

6. During the takeoff run, make sure you keep the ball in the center and allow the airplane to accelerate with a neutral yoke. If the airspeed starts to slow down .... to quit accelerating .... apply elevator back pressure. Nose up of about 5 degrees works really well for me. This is called getting the floats onto the step. The center of pressure moves aft on the floats and they’ll lift themselves out of the water. You should see the airspeed accelerating again. As long as it continues, hold that elevator position. Very shortly after that the airplane will fly itself off the water.

I tested this technique on all three float models and it will get off the water in less than 3000 foot in all cases. This is at sea level. Take-offs at higher altitude will require longer runs because the true airspeed has to be higher (indicated will remain the same) to get the lift necessary for lift off.