

Lake Turbo Renegade 270

Pilot's Manual



A Production of
The Renegade and Seawolf Design Group (RSDG)

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Aircraft History

The Lake Amphibian evolved from the Grumman line of great amphibians, the Widgeon, Goose and Albatross. The Lake line started with the Colonial Skimmer. Colonial Aircraft Company first flew the Skimmer in 1948. Lake Aircraft introduced the LA4 (180 HP) in 1960 and the LA4/200 (The Lake Buccaneer) in 1970. Lake Aircraft first introduced the LA 250 (The Lake Renegade) in 1984 and the Turbo Renegade (270 hp) in 1987. In 1994, Lake introduced a new product with a salt water “beef up” for added corrosion protection, the Seafury. Today, the Seafury and the Seawolf, a military version, are still being produced.

The Renegade and Seawolf Design Group (RSDG) model for Microsoft Flight Simulator 2002 is based upon the 270hp, Turbo model. Its basic specifications are listed in Table 1.

SPECIFICATION	270 HP TURBO
Engine Make/Model	Lycoming TIO-540-C4B5 -AA1AD
Horsepower	270 hp @ 2575 RPM @ Sea Level
TBO Hours	2000
Gross Take Off Weight	3140 lbs (1424 kg)
Empty Weight (Std)	2075 lbs (941 kg)
Useful Load	1065 lbs (483 kg)
Fuel Capacity Std (Opt)	76 gal (90 gal)
Wheel Track	11 ft 2 in (3.41 m)
Seating Capacity	4 Std (6 Opt)
Cabin Doors	3
Baggage Capacity	200 lbs (90.72 kg)
Service Ceiling	23,800 ft (7254 m)
Certified Ceiling	20,000 ft (6096 m)
Best Rate of Climb @ Sea Level	900 ft/min (274 m/min) @ 3140 lbs (1424 kg) 1240 ft/min (378 m/min) @ 2600 lbs (1179 kg)
Time to Climb from Sea Level to 20,000 ft (6,096 m)	25 minutes
Cruise Speed	155 kts (286 km/hr) @ 20,000 ft (6096 m) @ 78% power
Max Range (No Reserve)	1120 Nm (2080 km) @ 55% power
Fuel Consumption	15.6 gal/hr (59.05 L/hr) @ 78% power
Stall Speed – (Flaps Up, Gear Up)	55 kts (104 km/hr)
Stall Speed – (Flaps Down, Gear Down)	49 kts (91 km/hr)
Takeoff Roll – Land	880 ft (268 m) @ 3140 lbs (1424 kg) 600 ft (183 m) @ 2600 lbs (1179 kg)
Takeoff Roll – Water	1250 ft (381 m) @ 3140 lbs (1424 kg) 800 ft (244 m) @ 2600 lbs (1179 kg)
Landing Roll – Land	475 ft (145 m)
Landing Roll – Water	600 ft (183 m)

Table 1: Turbo Renegade Specifications

About the “RSDG” model for Flight Simulator 2002

The source files for the model were kindly provided by John Woodward, who having insufficient time to add polish to his original work, gave his backing to a team led by Peter Ridge, to complete the task he had started.

Peter had been a member of the “Duck Design Group” that previously reworked the Grumman Duck amphibian for Flight Simulator 2002 (FS2002), and proposed that a similar process be adopted for the Lake Renegade. In addition, the group would make a model of the Renegade’s sister plane, the military Seawolf.

Joining Peter on the team, later to be known as “The Renegade and Seawolf Design Group,” were accomplished 3D Modeller, Brian Gladden, first time developers for FS2002 Pete Collis (2D panel design), and Jack Morris (virtual cockpit panel design).

Around this core group a small army of painters busily got to work creating new liveries for the project, including Dan Watkins, Jack Morris, Peter Ridge and Brian Gladden. Thanks also go to “Lizardo” for his help with tweaks of the flight dynamics files.

Background research for the project was gleaned from various resources on the Web . You might like to visit some of them yourself:

<http://www.teamlake.com/>

http://www.aeronautx.net/FlyingMachines/content/flyi_04003.htm

<http://www.risingup.com/planespecs/>

<http://www.lakeaircraft.com/>

http://www.photovault.com/Link/Technology/Aviation_General/AircraftType/LakeRenegade.html

http://ww.prime-mover.org/Engines/Lycoming/Lyc_Cert_list.html

<http://www.prime-mover.org/Engines/Lycoming/Flyer/Operation.html>

<http://www.lycoming.textron.com/main.jsp?bodyPage=/support/publications/keyReprints/operation.html>

The team also obtained a copy of the Type Data Certificate and Supplementary type certificates from the United States Federal Aviation Administration (F.A.A) Web site.

Installing and Flying

Installation

To install the Turbo Renegade do the following:

1. Extract the contents of the zip file into your main FS2002 folder, with the “use folder names” option enabled. This will put all the files into the correct folders.
2. Then using Notepad or a similar text editor, change or add the following section in the main FS2002.cfg file:

```
[ OLDMODULES ]  
fssound.dll = 1
```

This module is required to make the S-tec autopilot (a 3rd party freeware gauge) work correctly.

3. Start Flight Simulator 2002 and go flying in your new Renegade.

Flying

The Renegade is straightforward to fly and has no vices. Operations in icing and aerobatic manoeuvres are not permitted by the type certificate. Overall, its handling characteristics can be best summed up by one of our beta testers, Cecil (in his words):

“Loaded it with the self-install to FS2002 and all the files went to the right places. Started the aircraft at Sanderson Field, as that’s where my virtual hanger is. It loaded good and is a nice looking plane. Checked out the different panels and all look proper. Ran through all the checks and found nothing amiss. Engine started great. Sounds are nice. Taxied out to runway and the craft handles very good on the ground. Steers nice with a little help with the brakes. Ran engine up and checked mags. Every thing checked out good. Started down runway and it holds good straight line on take off roll, I don’t have rudder pedals but a touch of brake keeps it lined up. No flaps and at 80-85 she lifts off like a dream. I say she LIFTS off not jumps off. Gear comes up with nice sound. Trimmed out at 140 with 26 inches manifold pressure and holds that airspeed great.

“Twice around Shelton and set up for landing back at Sanderson. I have flown out of this Field since 1949 in a lot of different planes. I don’t have any time in a Lake but have flown a Seabee from here. One thing I noticed that when I throttled back she stated to drop, a little power and she held the glide. Flaps and gear down and she slowed to around 80. On final she was steady as a rock. Had to keep a little power on till almost touch down and it was right on the numbers. Lifted flaps and braked to a stop in about 500–600 feet. GREAT AIRFILE.

“Took her out to a couple local lakes and made some water landings. And again she handled like a dream. A touch of power and flaps and she settled down on the water like a SWAN. No bounce and the wake effects are great. Take off from water with flaps at around 65-80 and again she doesn’t jump off but takes to the air with a gentle lift off. I used the AP and again all was as should be. Its nice to watch the AP keeping trim by watching the trim wheel. All in all Peter, it’s one great aircraft. It’s hard to believe it’s to be freeware. I tried every thing I could think of but found nothing wrong. On a scale from 1 to 10, I would give it a 10. I felt as though I was flying a plane and not a sim.”

Engine Handling

Textron-Lycoming recommended engine power settings, based on Sea Level performance:

- Take-off , 100% , (Prop rpm 2575, and max allowable MP for conditions of the day), ten minutes duration.
- Climb, 90% (Prop rpm 2400, and 40" MP, Max allowable CHT, 400f, 204c)
- Cruise, 63% (Prop rpm 2200 RPM and 31" MP. Max CHT, 420f ,215c; Best airspeed, 155 knots @ 78%)
- Economy Cruise, 55% (Prop rpm 2200, MP set for 90kts , /Max CHT,420f,215c)
- Descent, (Prop rpm 2000, and 20"-25" MP)

WARNING: Rapid cool down during initial descent can damage the engine. Gradual cool down is preferable. The descent power reduction should be accomplished in several steps. Ideally, the descent should begin by nosing the aircraft over slightly while engine power and mixture remain at the cruise setting. The added speed will initiate a gradual cool down. When the CHT has stabilized reduce the manifold pressure to 25" After period of at least one minute, a further reduction of manifold pressure to 20" Hg can be made, if required. Following landing, the minimum necessary taxi power will aid in engine cool down. Extending the ground idle cooling period reduces turbo charger temperature and reduces the tendency of turbo-coking following hot engine shutdown. Ideally, a five-minute minimum cooling period is desirable. (Following landing, opting for the second turnoff can aid the cool down)

Speeds

T/O 'rotate' @ 65 kts min. 'unstuck'.

Vlo (landing gear operation) , & Vle (landing gear extended) 109 kts

Vfe (flaps extended) 109kts

Va (rough air speed/manoevring) 117kts

Vne (never exceed) 170kts

Vmo (normal operation,maximum) 155kts

Vs (stall, clean) 55 kts

Vs (stall,gear and flaps extended) 49 kts

Vref (for landing) Vs+10 kts

More specific handling procedures and notes can be found in the checklist.txt, ref.txt and notes_V2.txt files which are also available in the aircraft's kneeboard window (press the F10 key in the simulator).

Panel Notes

Controls

For ease of use, the 2D panel does NOT feature a throttle/prop RPM control. In the real Renegade, these controls are situated overhead of the pilot and would not be within normal forward vision. Likewise, the fuel injected and turbocharged Lycoming TIO-540-C4B5-AA1AD engine does not have a mixture control. Instead, it has an automatic charge density pressure regulator. However, we have not ruled out an upgrade to introduce these controls in a separate view, depending on customer (that's YOU) feedback.

There is no fuel tank selector valve either. Again, this would not be a feature one would see in a forward view. By default the aircraft.cfg has only one fuel selector.

An extra component in this model as compared to the real Renegade is the water rudder. This was added to improve the on-water handling in the simulator. The real plane uses the lower part of its flight rudder as a water rudder, but quirky Microsoft flight dynamics do not recognise this.

It is recommended that you use the pop-up radio stack panel for autopilot functions. The autopilot controller is easier to see in that panel!

The Renegade only has *two* flap position settings: up or down. (Flaps down = 20 degrees.)

Gauges

Background research proved there is no such thing as a "Standard" Renegade fit. There are many options available either as customer options or retro-fitted as modifications. However, the layout you see in the 2D panel can be taken as a true *representation* (subject to the limitations on available space), rather than a photo-realistic one. All the gauges and avionics are typical to Renegades we have seen in our research. For truer realism, the virtual cockpit panel is as close as we could make it while coinciding with the 2D panel as much as possible.

This panel would not have been possible without the freeware gauge contributions of others, all of which were downloaded from the main flight simulation Web sites of Avsim.com, Simviation.com, or FltSim.com. Thanks go to the following for their gauges:

Ike Slack, Coyote Avionics
Dragonflight Design
Serguei Gorelik

Please take the time to read the User's Guide(s) for the various avionics in the 'Panel Docs' folder.

If you see your gauge and are not credited here, then accept our apologies and sincere thanks for your work. Several of the gauges have been obtained from older (FS98/2000) packages.

The team would also like to thank "Father Bill," the Avsim Ombudsman for his help with the 2D co-pilot's view panel.

Produced by “The Renegade and Seawolf Design Group”

Project coordination	Peter Ridge
Original 3D model	John Woodward
3D model	Brian Gladden
2D panel layout	Pete Collis
Virtual cockpit panel layout	Jack Morris Peter Ridge
Panel backgrounds	Peter Ridge
Paint	
“Blue”	Jack Morris
“Blue & Red”	Jack Morris
“Bush Flying Unlimited”	Peter Ridge
“Chrome”	Dan Watkins
“Red 1”	Brian Gladden
“Red 2”	Jack Morris
“Teal”	Peter Ridge
Sounds	Aaron Swindle John Woodward
Renegade XML gauges	Pete Collis
Manual	Pete Collis
Checklists	Peter Ridge

Feedback

Bug reports, congratulations on a job well done, etc., can be made to the team via the [Bush Flying Unlimited General Discussion Forum](#) at www.avsim.com

While you're online, why not take a look at Bush Flying Unlimited: <http://bfu.avsim.net/>
Where "Up close and personal" means something!

Legal Stuff

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As-Is

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~ Happy Flying ~

RSDG

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