Historic T-6 Racers *Complete Package*

Racers Handbook

This document is written for the express purpose of guiding the simulator pilot toward a most enjoyable experience with this free add-on for Microsoft Flight Simulator X

The FASA T-6 Racers *Complete Package* is a re-work of the original 'fsds' T-6 for FSX, published by David Eckert, Warwick Carter and Michael Flahault. The original model is *not needed*. This is a **FULL INSTALL**, and will work entirely independently of the original release(s).

FASA works with exclusive permission from the original author(s), to release this aircraft as a *complete package*.

Please read the entirety of this document, to best understand how to operate the T-6 Racer. It has been written in 'short & sweet' format, so to quickly inform the reader to the most pertinent items.

Notes

- PURPOSE

1. The goal of this production, in it's simulated form, is to generate a competitive and semi-realistic platform for online air racing, within the T-6 class. We've created more realism, unique and historic liveries, and an overall enhancement of the T-6 simulation as a whole. We believe this is now the definitive Texan for FSX.
2. To increase interest in Air Racing in general, and to promote the sport of air racing, through a means of the simulated, and interactive environment.
3. Give new ideas to other 3rd party developers. And generate new interest in the genre of air racing, within the realm of Flight Simulation.

- OVERVIEW OF CHANGES

1. The texture sets have been entirely re-worked, and original layers files created. Nearly the entirety of the external textures have been re-created, or modified. Many of the interior textures have been re-worked as well.
2. The Flight dynamics profile within both the .air file, and the aircraft.cfg, have been completely re-written. Performance tables of actual racing T-6 class examples, as well as critical flight data has been studied, and applied to the simulated characteristics of this aircraft. Real-world T-6 class racing pilots have contributed their knowledge, and experience, to lend toward a most realistic flight model. To the best of our ability, this aircraft performs in an envelope very similar with that of the real-world counterpart. The end result, and goal, has been to simulate performance of a cleaner, lighter, but essentially stock T-6.
3. New .xml programming has been added to implement more realism to the aircraft's flight model. How these changes effect the pilot will be outlined later in this document, but essentially the aircraft now contains code a customized version of the 'Real Engine' module. This code has been specially written for this T-6 package, with help of the original author of the code.
4. An entirely new sound-set has been created, from the ground up. Actual T-6 recordings from both inside, and out. FSX style 3D Cone techniques have been applied to give the most satisfaction. Even subtle engine noises can be heard, when the engine begins to stress, or run roughly. Also, cockpit click sounds have been added, special thanks to Daniel Gauthier.

Systems

Details to help with the FASA T-6 Racers
note; see the in-game checklist and reference sheet, under 'kneeboard'.

- OVERVIEW OF SYSTEMS

Within the limits of the simulator, and time for which to devote to such a hobby, the systems modeling has remained fairly simple, and elementary. However, we have made various improvements to enhance the experience, and increase realism. And since we are providing it as a free add-on, we feel no shame in admitting that the systems modeling is far from perfect. The systems modeling is strictly for the enjoyment of the hobbyist, and is not meant for extensive simulation, or for practice in real-world situations.

- Engine & Propeller

Type: Supercharged Pratt & Whitney R-1340 AN-1 Wasp 9 cyl. Radial.
Compression Ratio: 6:1
Blower: 10:1
Propeller: Hamilton Standard 2-blade, constant speed, variable pitch. 9Ft diameter.

The AN-1 Engine is an un-geared engine. (Short-nose, direct drive). When your engine is running 2,000rpm, so is your prop!

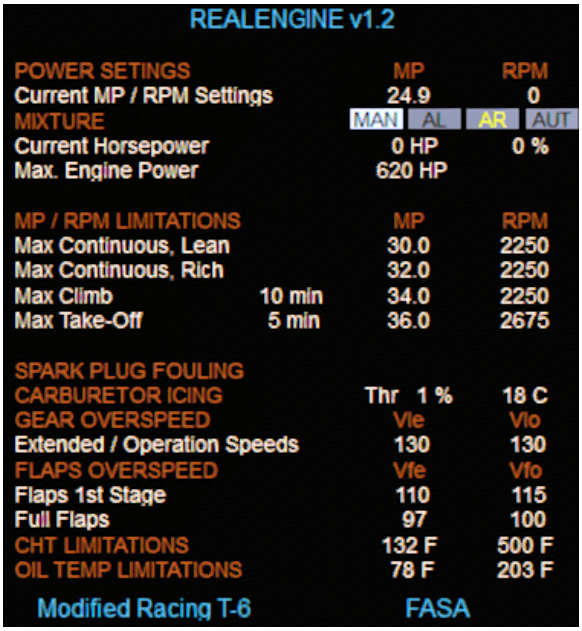
The engine simulated is factory-stock, but highly tuned with most precision. Your R-1340 as equipped in the T-6 Racer will deliver a max rating of 620hp, and 2675rpm.
Note power will differ according to atmospheric conditions, mixture, and engine health.
A few items to note would be; with the Constant Speed propeller, the desired RPM is

set, upon which the governor will then automatically maintain propeller pitch to achieve desired RPM. This, however, is relative to firstly engine power. (Throttle, power inHg), and secondly airspeed.

The common principle to increase power, is to set mixture, propeller, then throttle. This is then reversed for decreasing power. (set throttle, propeller, mixture.) These factors must be balanced with airspeed as well.

- Real-Engine Module

SHIFT + 4 will bring up the Real-Engine pop-up panel:



It is not required to display this panel for normal operation, as this is mostly a reference panel for your aircraft's settings, and limitations. There will be a brief pause when the panel first loads. Your systems are being simulated whether the status panel is loaded or not. The readings are pretty self explanatory. However, let's go over them.
Firstly there are color-coded highlights that can appear under each section of the panel.
White = Normal operating limits being exceeded.
Yellow = Potential damage occurring, or has occurred.
Red = Damage or failure.

POWER SETTINGS
This displays your current power setting. Manifold Pressure (inHG) and RPM.
When either the MP, or the RPM limits are exceeded, a colored highlight will appear.

MIXTURE
You have the option to choose **MAN** (Manual), **AL** (Auto-Lean), **AR** (Auto-Rich) or just **AUT** (A balanced Auto). **SHIFT + 5** will bring up JUST the mixture control panel. A white background indicates *selected*.

Your current engine power output is read, horsepower, and % of horsepower.
The max rated power is 620HP.

MP / RPM LIMITATIONS
Here are your reference figures for the engine. Use them wisely. The engine is not designed to be stressed beyond it's limitations, and rapid failure could occure.

SPARK PLUG FOWLING
This item will highlight if a rich condition, or extended low-idle produces fouled plugs. In such cases, engine power will suffer, and requires immediate attention. Lean, and increase throttle to clear.

CARBURETOR ICING
With certain atmospheric conditions, and particularly under cool-down, or decent, care must be given to the CARB Air temperature gauge, on the right side of the instrument cluster. The CARB HEAT control, located at the pilots left knee, can be used to prevent, or control icing.

GEAR OVERSPEED
The gear should ONLY be lower while under 150mph IAS (or 130 KIAS). Severe damage can result in over-speed of the gear.

FLAPS OVERSPEED
Likewise, care should be given not to operate the first stage of flaps above 125mph IAS (or 110 KIAS). And in similar fashion, the maximum speed during full-extension is about 111mph IAS (or 97 KIAS)

> *The factory placard on the left hand side of the instrument cluster references these speed as well.*

CHT LIMITATIONS
Current Cylinder Head Temperature is given, and maximum in Fahrenheit.

OIL TEMP LIMITATIONS
Current Oil Temperature is given, and also the maximum in Fahrenheit.

> ***Note to FASA race pilots.***
> *Tampering with, or otherwise removing the real-engine module from the aircraft is strictly prohibited while racing within the T-6 class, in association with FSX Air Sports.*

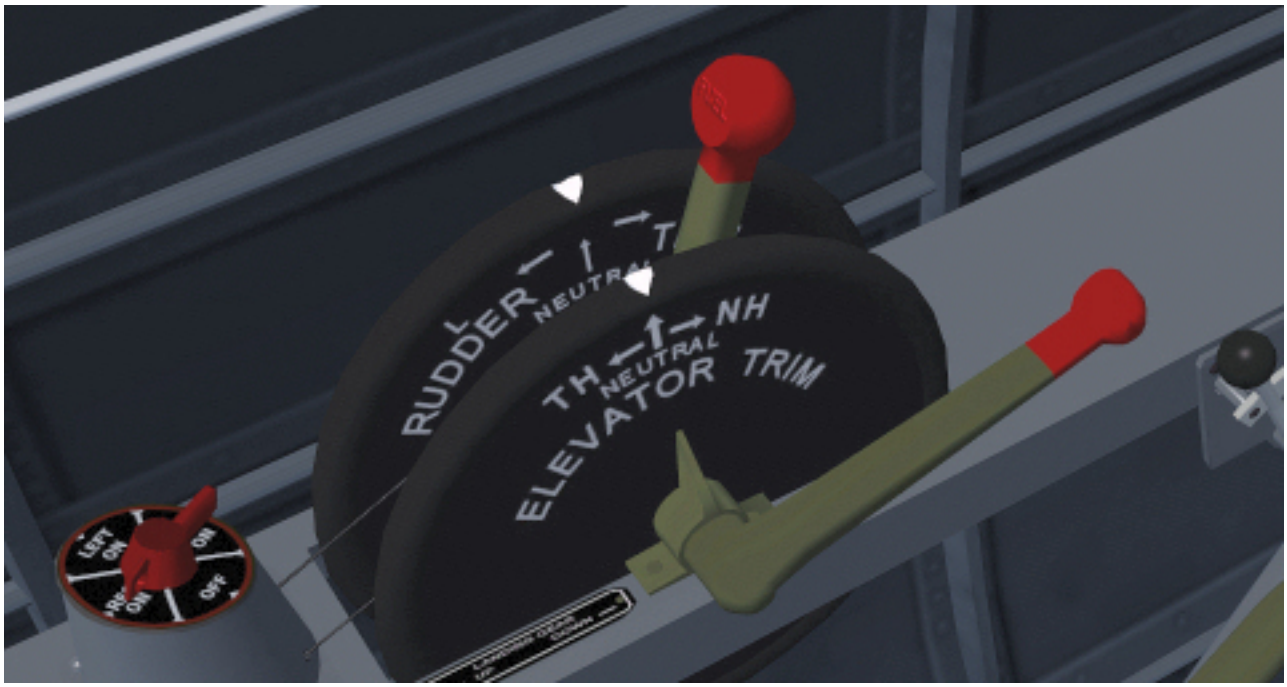
Flying the T-6

The T-6 is a straightforward aircraft to fly. It is the supreme trainer for military-type piston powered aircraft. Again, s*ee the in-game checklist and reference sheet for more information.*

1. Start-up

The checklist outlines the details of start-up. But in-case you are still confused, here's a few tips!

Firstly, make sure that there is fuel in the selected tank. The T-6 essentially has two tanks, 55 gallons in each wing. The total capacity is 110 gallons. However, within the left wing tank, there is a separate RESERVE tank, which holds 20 gallons. It is advised the the RESERVE tank be used for take-off and landing. Care should be given to balance fuel load, by switching between tanks during normal flight. Under your payload manager the RESERVE is listed as 'Center2'.



Second, there is no electric fuel pump! The T-6 simulated here does not use the later-model electric fuel pump. There is a engine driven mechanical pump that is used once the engine is running. However, for start-up, the only source of fuel delivery is the red-handled wobble pump, located between the rudder and elevator trim wheels. Consult the checklist for proper technique.

Third, prime! Keep an eye on your engine temp. If it's a cold-start, and it's cold outside..you're going to need some priming! On the other hand, if your CHT is already warm, or it's a warm day, you might not need more than a shot or two, if anything. Don't over-prime! Again, consult the checklist! And if all else fails..there's always **CTRL-E** but what fun is that? The original documentation for this add-on, from Warwick Carter, is made available \...\Airplanes\FASA_T-6_Racers\Documentation\Original\

2. Taxi

When taxiing, control stick FORWARD unlocks the tail-wheel. It's not steerable, but free castoring. When the control stick is AFT, the tail-wheel locks. Use the throttle, rudder, and differential brakes, if needed for turns. One advantage to the T-6, over similar taildraggers, is that the pilot sits high and forward. However visibility over the nose can be limited during taxi, so S-turns are recommended.

3. Take-off

With nose-up on initial roll-out, the T-6 can feel a bit nimble. Take caution to lock the tail-wheel, with stick aft. When at or around 45mph IAS, move stick neutral. You can let the tail come up, but it's recommended to allow the aircraft to take-off in near 3-point attitude. Keep centered using small rudder adjustments.

4. Flight

The more aerodynamic airframe, combined with lighter weight, and peppy engine, allow the race-modified T-6 to perform exceptionally well in the cruise, and through most envelopes of flight. She should cruise near 165kts, and burn 28GPH. Range 600-700 miles. Lean as needed for best power. Use 180mph indicated as a safe place to begin advanced aerobatics, and as a minimum airspeed before attempting loops or other maneuvers requiring a sufficient climb. Avoid intentional spins, or inverted flight for longer than 10 seconds.

5. Landing

Special care should be given to maintain proper speeds through the pattern, particularly prior to extension of gear and flaps. Speed over the fence, 80mph IAS. Touchdown speed , 64-72mph IAS. Keep in mind, it's a heavy bird, and can rapidly gain speed in decent. Keep the glide around 90-95mph.

Racing the T-6

What do you need to win?

- General tips for racing

1. Fuel-load
   Be sure to properly estimate fuel load for the duration of the race. You want enough fuel to complete any pre-race flying such as a formation or pace lap, and also to complete the race under high power settings. Calculate your fuel consumption. You'll need to allow for a cool-down pattern, and safe landing. In real-life, there's a 50 gallon minimum! Play safe!

2. Mixture
   Depending on altitude, and atmospheric conditions, the mixture should be leaned to the point of maximum power, without overheating. The T-6 has manually controlled mixture, however we give you the option with the Real-Engine module to control the mixture automatically. We suggest '**AR**' Auto-Rich for starters.

3. MP/RPM
   Find the 'sweet spot' for best power, thrust, and longevity. She likes turning a faster RPM, but take note not to let it run away! More isn't always better, and the engine will run stronger, longer, under a balanced setting. Experimentation and practice is key. Find the settings that give you consistency. Then focus on your line!

4. Flying Style
   The T-6 is not the most graceful bird. She bleeds speed easily under load, is sluggish to climb, and likes to fall-out on the bank. That wing's not laminar flow! Take special care to make crisp smooth control adjustments. And **KEEP THE BALL CENTER**. Your speeds will climb, the more balance you keep the bird and ball!

Thank-you!

For actually reading this document! Let's go Racing!

- CREDITS & Resources

  David Eckert – Original Model
  Warwick Carter – Original Model
  Michael Flahault– Original Model
  Gunter Teson – Gauge programming/Real Engine Module
  John Terrell – Paintkit /Beta
  Marcel Ritzema – Interior Textures
  Michael Flahault – Cockpit sounds
  Stu Graham – Beta/Counsel
  Edward Keller – Beta
  David Kingshot – T-6 Manuals and R-1340 Info.
  Randy Goss – History and Aircraft data, race #75
  Dennis Buehn – Aircraft data, race #43
  Tom Campau – Aircraft data, race #21
  Ralph Rina – Aircraft data, race #73
  Ken Dwelle – Aircraft data, race#7

There have been others contribute to this project, to whom we also add thanks!

FASA T-6 Racers Package by:

- **Alan Wengren** – Special work for this expansion pack, including liveries for #22, and #9. Endless beta testing on and off the course, and much needed support!
- **Joseph Thompson** – Re-work for the package, including 18 liveries, sounds, and flight profile.

FSX AIR SPORTS ASSOCIATION

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