

Tutorial: Customizing flightdynamics of tow-plane in FSX



Preamble

first let me say that English is not my native language (is German), wherefore I trouble you to be appreciative of my possibly made mistakes in writing or grammar. If you have suggestions for improvement concerning to my phraseology, vocabulary or typing error I would be deeply grateful for giving me notice. In advance thank you for your effort.

Since the FSX-distribution it's possible to call for a towplane that will get the glider pilot in the air (hold CTRL and SHIFT and press Y). Although this feature is great on first view it's not realistic on second view:

- The Standard tow plane Maule is too fast. You can imagine that the pilot of such a tow plane gets some trouble with the glider pilot if he tows him with 160 km/h (85 kts)
- The climb rate (vario is as far as it will go) of the tow plane would be a dream of all glider pilots – the charge of towing would be very cheap. The reality looks different.
- The Standard tow plane Maule is flying with elevator-up-limit, what's completely unrealistic
- The tow plane is always flying straight ahead and at first view at FSX there is neither possible to stick around the airfield nor to navigate the towplane directly into the thermals or to avoid crashing in an obstacle (e.g. in the mountains). To fix this see my other tutorial „Flying banked turns with Tow-Plane in FSX“ ([tut_twpl.zip](#))
- A change of the Tow-Plane is not featured with one or two „Button-Clicks“, concerning this (please see also „[tutchtwp.zip](#)“)

With this tutorial I assume to the first three items and I want to show alternatives to the last point concerning to the tutorial „Change Tow Plane in FSX“ ([tutchtpw.zip](#)).

Requirements

Only needed is MS-Flightsimulator X , tested with „Professional“ respectively „Deluxe“

Choice of the tow plane

1. Copy the tow plane of your choice (also the Maule) and rename it in e.g. DR-400 in Towplane_DR-400 oder Maule_M7_260C in Towplane_Maule

Background: Now you are able to edit especially the <aircraft.cfg> or <.air>-file of the copied plane without necessity to change the flight-dynamics of the original plane (which should be flyable in FSX with original behaviour)

2. Delete the data from *[fltsim.5]* until *description* in the used <aircraft.cfg> of the original „Maule“.

3. Now you can proceed on two different ways:

a.

Open the copied <aircraft.cfg> of your new tow-plane (in our example is „Towplane DR400“ or „Towplane_Maule“) and change the „**title**“ below **[fltsim.0]** in „**Maule M7 260C**“ (without quotes)

If you use the copied Maule, delete the data from *[fltsim.0]* to *[fltsim.4]* and rename *[fltsim.5]* in *[fltsim.0]*

b.

Second possibility: You define the tow plane in the file FSX.cfg under the [SIM]-Section like this:

```
-----  
[SIM]  
TowPlaneTitle=Towplane_DR400  
-----
```

Attention should be paid to the title in the aircraft.cfg of the tow plane which have to be the same:

```
-----  
[fltsim.0]  
Title=Towplane_DR400  
-----
```

4. Ready, start FSX and call your new tow-plane (CTRL+SHIFT+Y)



Customize the tow plane

Mostly a change of the flight-dynamics is necessary if the tow-plane is an aircraft without flaps. In this case the given 75 % throttle (defined in <sim1.dll>) will make the tow-plane too fast and you have to customize the tow plane characteristics to make things realistic as possible.

To better understanding: FSX does not account for the weight of the glider behind the tow plane but tries to simulate this with reduced throttle (75 %).

The sim1.dll in the main directory of FSX contained some variable; e.g the **TowPlaneClimbPitch** (default is -8 degrees) which can be important later.

0x0C9A0	4D61 756C 6520 4D37 2032 3630 4300 0000	Maule M7 260C...
0x0C9B0	546F 7750 6C61 6E65 5475 726E 4672 6571	TowPlaneTurnFreq
0x0C9C0	7565 6E63 7900 0000 546F 7750 6C61 6E65	uency...TowPlane
0x0C9D0	5475 726E 4465 6C74 6148 6561 6469 6E67	TurnDeltaHeading
0x0C9E0	0000 0000 546F 7750 6C61 6E65 4D69 6E54TowPlaneMinT
0x0C9F0	7572 6E41 6C74 6974 7564 6500 546F 7750	urnAltitude.TowP
0x0CA00	6C61 6E65 5469 746C 6500 0000 546F 7750	laneTitle...TowP
0x0CA10	6C61 6E65 436C 696D 6250 6974 6368 0000	laneClimbPitch..
0x0CA20	0000 0000 0000 2E40 CDCC CCCC CCCC 2F40@íííííí/@
0x0CA30	0000 803F 546F 7275 7274 466F 7262 6572	FSXThrustFactor

This information should give you a little view behind the scenes but you should not change anything in this file because if you make some mistakes your FSX won't start anymore. So make a backup if you are not able to help doing changes in the <sim1.dll>!!!

The **TowPlaneClimbPitch** can be specified in the FSX.cfg under the [SIM]-section, may like this:

```
-----
[SIM]
TowPlaneClimbPitch =-10
-----
```

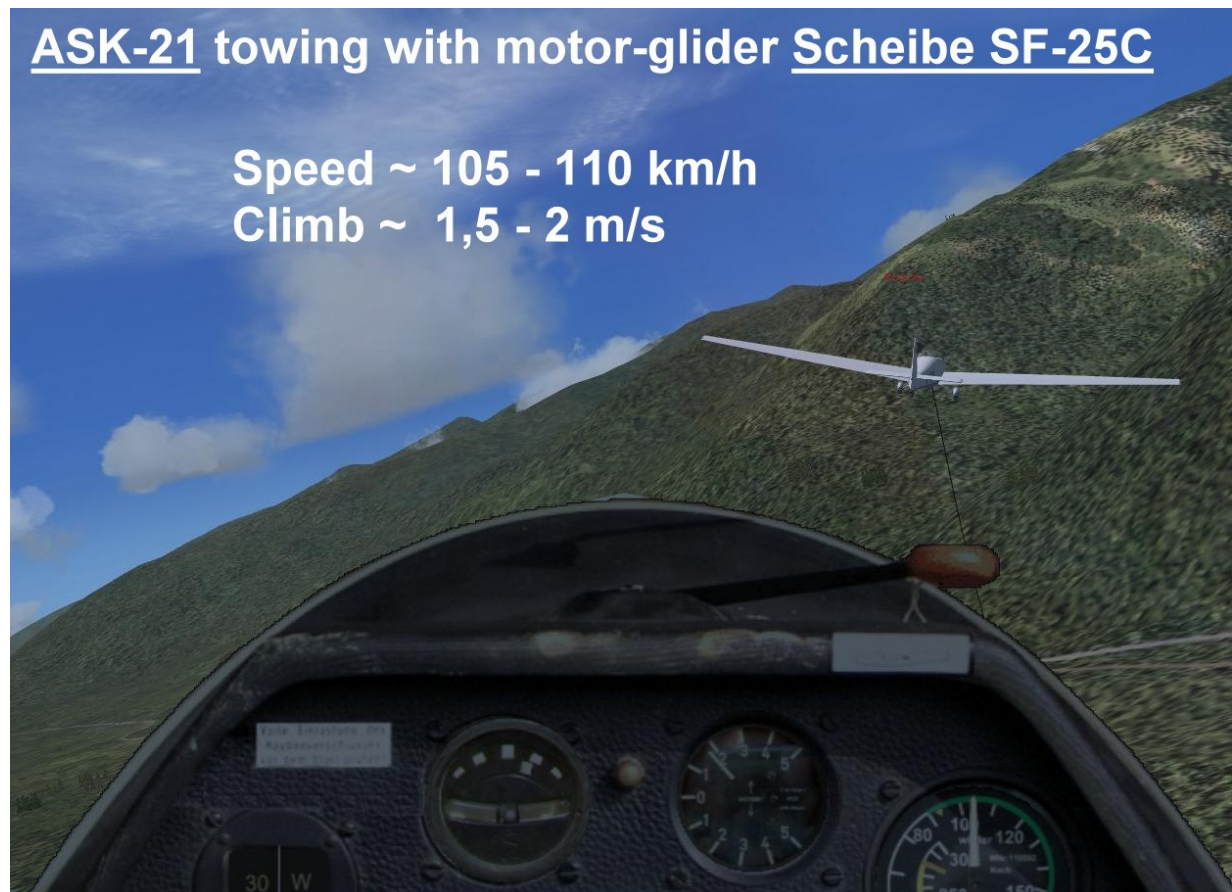
Other starting points to manipulate the behaviour of the tow plane are to be found in the **aircraft.cfg** of the tow plane:

First the entry **maxRated_hp** under section **[piston_engine]** is important. Although the editing of this entry has normally no effect to normal flyable planes in FSX it has consequences to the tow plane.

Second the editing of the entries **cruise_lift_scalar** , **parasite_drag_scalar** and **induced_drag_scalar** under section **[flight_tuning]** can be very helpful to get the desired performance of the tow plane.

The unrealistic elevator deflection (only happend by using the Maule, all my other tow planes does not have this problem) is get under control if you edit the **elevator_effectiveness** under **[flight_tuning]**.

Surely there are lot's of other possibilities to customize the behaviour of the tow plane such as it is on the normal planes in FSX but I think with edting of this parameters you will succeed fast. See example overleaf.



Example: Modifying the standard tow plane Maule

To test the things I used the great ASK-21 from Wolfgang Piper as glider (see his website <http://www.fsglider.de>) .

The change of following parameters in the aircraft.cfg of the tow plane (not original-flyable Maule!) lead to an acceptable result:

```
[flight_tuning]
cruise_lift_scalar=1.3 //original setting 1.0
parasite_drag_scalar=4.0 // original setting 1.0
elevator_effectiveness=5.0 // original setting 1.0
```

As you can see from the cover picture (screenshot) of this tutorial, above settings reduced the speed of the tow plane Maule from 160 km/h (85 kts) to 122 km/h (66 kts) and causes the climb rate to be realistic with about 3-3,5 m/s.

In this case another adjustments, e.g. **max _rated_hp** under section **[piston_engine]** in the aircraft.cfg or **TowPlaneClimbPitch** in the FSX.cfg , were not necessary.

Tip

If you store copies of different tow-planes in a separately directory (out of FSX) you can quickly switch your tow-plane to be compatible with the used glider-model by deleting the current used tow-plane in the Airplanes-Folder and replacing it by copying the plane of your decision (out of your pool of precised tow-planes, e.g. with adapted settings as described in this tutorial) and restarting FSX.

So it is possible to tow a SG-38 with an Ultralight (e.g. Savannah) with realistic 65-70 km/h, a Duo-Discus or ASK-21 with a Robin DR400 Regent with 130-140 km/h and a KA-8 or Lerche (KA-4) with a Scheibe SF25 Rotax motorglider and 110 km/h (see screenshots to the different tow-planes in the package „tutchtwp.zip“).

Last but not least

Have lot's of fun with realistic soaring in FSX.

If you want to fly turns behind your tow-plane, see my other tutorial „Flying banked turns with Tow-Plane in FSX“ (tut_twpl.zip).

It would give me great pleasure if you have helpful suggestions to the theme or if you send me your feedback !



Screenshots:

The used planes from the screenshots over „Zell am See“ in Austria are:

- Duo Discus and ASK-21 from Wolfgang Piper (he has designed lot's of realistic gliders and motor-gliders)
- as tow plane the „Robin DR400 Regent“ from Yannick Lavigne, Fred Banting, Rob Young and Christian Daboudet with textures (repaint) „D-EGVZ“ from Mike Formatschek.
- as tow plane the Scheibe SF-25 Rotax-Falke from Wolfgang Piper
- as tow plane the default Maule of FSX

Thanks to all this designers, I have the highest respect for their ability !