

NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

# WARTIME REPORT

## IL-2 Compare for HSFX User's Guide



WASHINGTON

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## Table of Contents

1	Purpose .....	- 1 -
1.1	GUI .....	- 1 -
1.2	Aircraft Selection Menu .....	- 2 -
1.3	Program Exit.....	- 3 -
1.4	Next Graph Controls.....	- 4 -
1.5	Flaps Overlay Controls .....	- 5 -
2	Performance Graphs.....	- 6 -
2.1	Summary Graph .....	- 6 -
2.2	Altitude vs. TAS .....	- 7 -
2.3	Altitude vs. ROC .....	- 8 -
2.4	ROC vs. Climb Speed at SL.....	- 9 -
2.5	Turn Time vs. TAS at 1km .....	- 10 -
2.6	Fan Plot .....	- 11 -
3	Flight Test Map .....	- 12 -
4	Data file notation .....	- 13 -
4.1	IL-2 in-game Data .....	- 13 -
4.2	Real World Data (RWD).....	- 13 -
5	Installation .....	- 14 -
6	Acknowledgments .....	- 14 -
7	Contact.....	- 14 -

## Table of Figures

Figure 1	IL-2 Compare GUI .....	- 1 -
Figure 2	IL-2 Compare Aircraft Selection.....	- 2 -
Figure 3	IL-2 Compare Program Exit(s).....	- 3 -
Figure 4	IL-2 Compare Next Graph .....	- 4 -
Figure 5	IL-2 Compare Flaps Overlay Control.....	- 5 -
Figure 6	IL-2 Compare Summary Graph .....	- 6 -
Figure 7	IL-2 Compare Altitude vs. TAS .....	- 7 -
Figure 8	IL-2 Compare Altitude vs. ROC .....	- 8 -
Figure 9	IL-2 Compare ROC vs. Climb Speed at SL.....	- 9 -
Figure 10	IL-2 Compare Turn Time vs. TAS at 1km.....	- 10 -
Figure 11	IL-2 Compare Fan Plot .....	- 11 -

## Table of Tables

Table 1	Map Pressures and Temperatures.....	- 12 -
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## 1 Purpose

To provide a brief description on how to use IL-2 Compare for HSFX to view the performance of one plane or compare the performance between two planes.

### 1.1 GUI

Upon starting the program you should see the initial IL-2 Compare for HSFX GUI shown in Figure 1

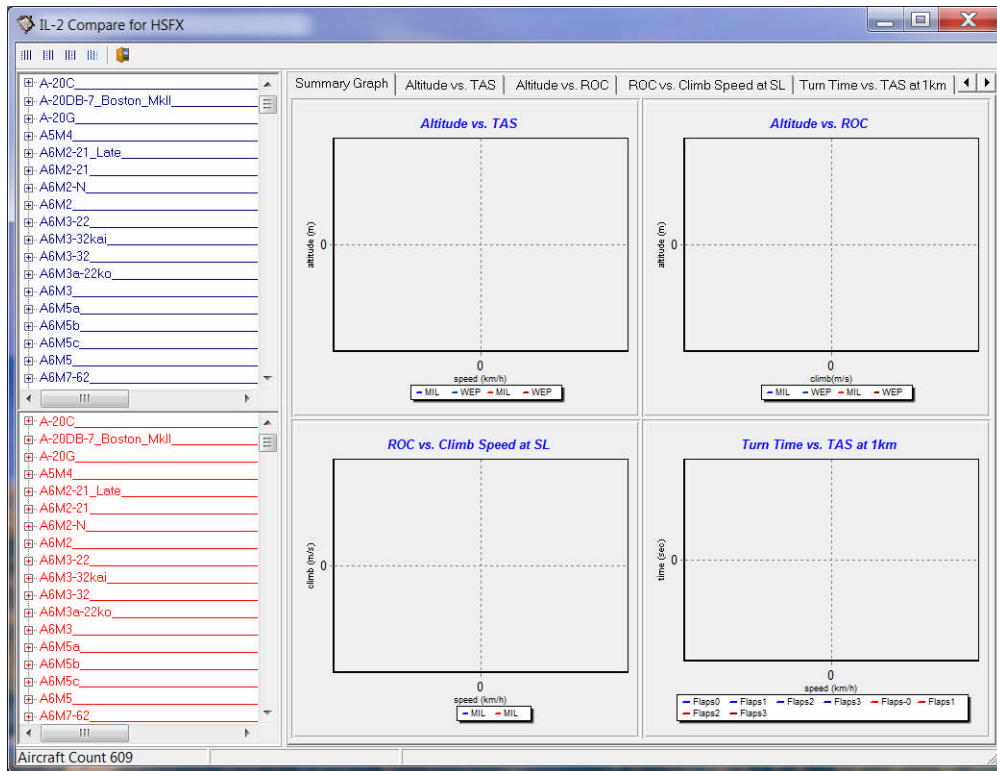


Figure 1 IL-2 Compare GUI

To zoom an area on an graph simply use the mouse to drag a box around the area of interest, this will result in that area being zoomed to provide more detail of the area of interest. To revert back to the un-zoomed view simply use the mouse to drag a box around the top left hand corner of the graph and it will revert back to the stock scaling.



## 1.2 Aircraft Selection Menu

The aircraft selection menu is shown in the red outline of Figure 2.

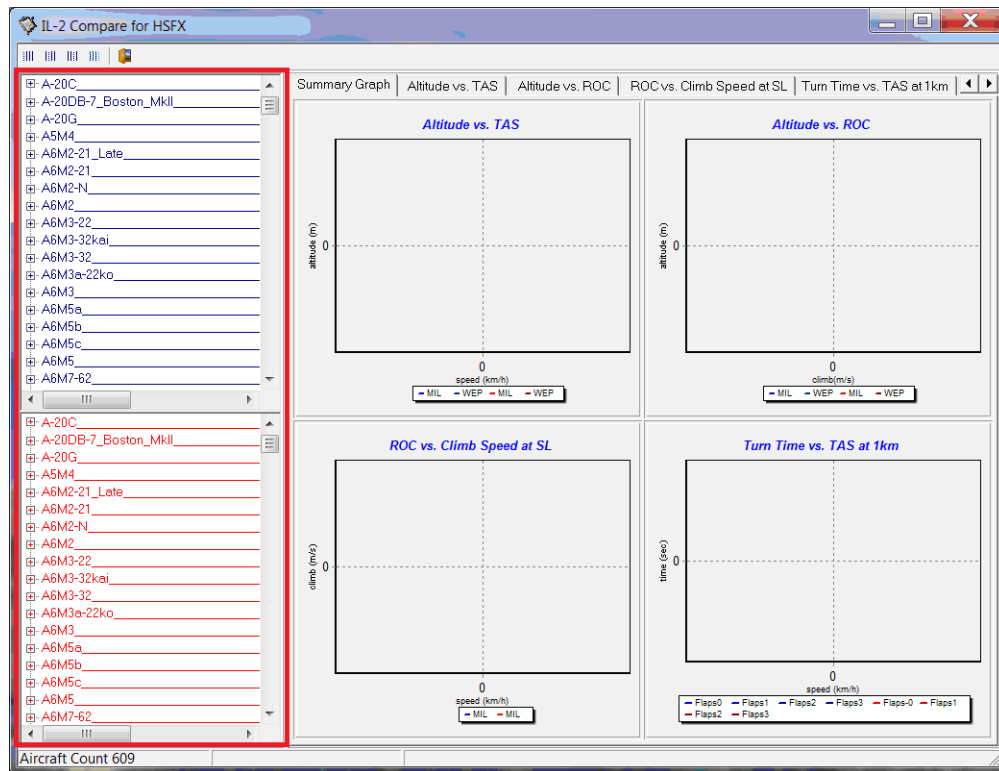


Figure 2 IL-2 Compare Aircraft Selection

The aircraft are listed alphabetically using the name of the aircraft as they appear in the full mission builder listing. Note the aircraft selection menu is broken into two sections (top and bottom) and two colors (blue and red). To select an aircraft from either menu simply click on the aircraft name in the menu. When you select an aircraft from the menu it will display the corresponding graphs for the plane you selected in blue and dark blue for the top aircraft selection menu and red and dark red for the aircraft selection bottom menu. Where the dark color corresponds to the performance at War Emergency Power (WEP aka > 100%) and the nominal color corresponds to the performance at Military Power (MIL aka 100%). NOTE if a plane does not have a WEP option than the MIL and WEP graphs will reside on top of each other appearing as one graph. After selecting an aircraft with the mouse you can then use the up and down arrow keys to select other planes within the menu. A typically method of comparison is to select the plane of interest (base-line) in the top/blue menu and then select a plane you would like to compare to it, then use the up and down arrow key to quickly scroll through a family of planes or all planes.



### 1.3 Program Exit

The program exit controls are show in the red outlines in Figure 3

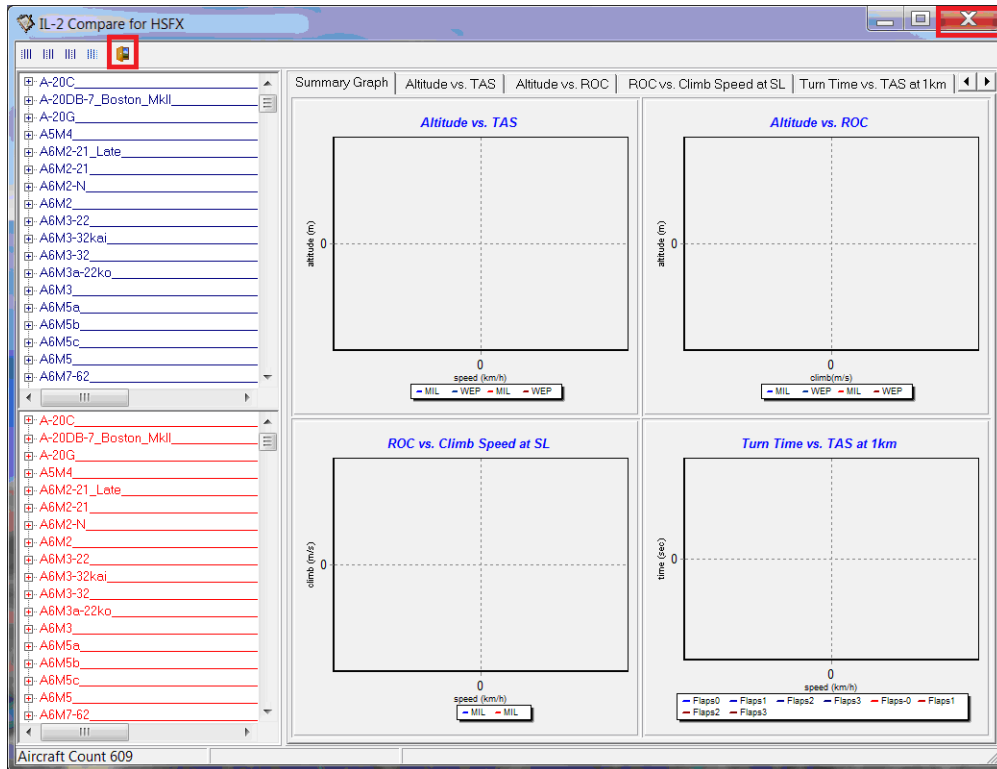


Figure 3 IL-2 Compare Program Exit(s)

To exit IL-2 Compare for HSFx simply click on one of the two buttons.



## 1.4 Next Graph Controls

The next graph controls are shown in the red outline in Figure 4

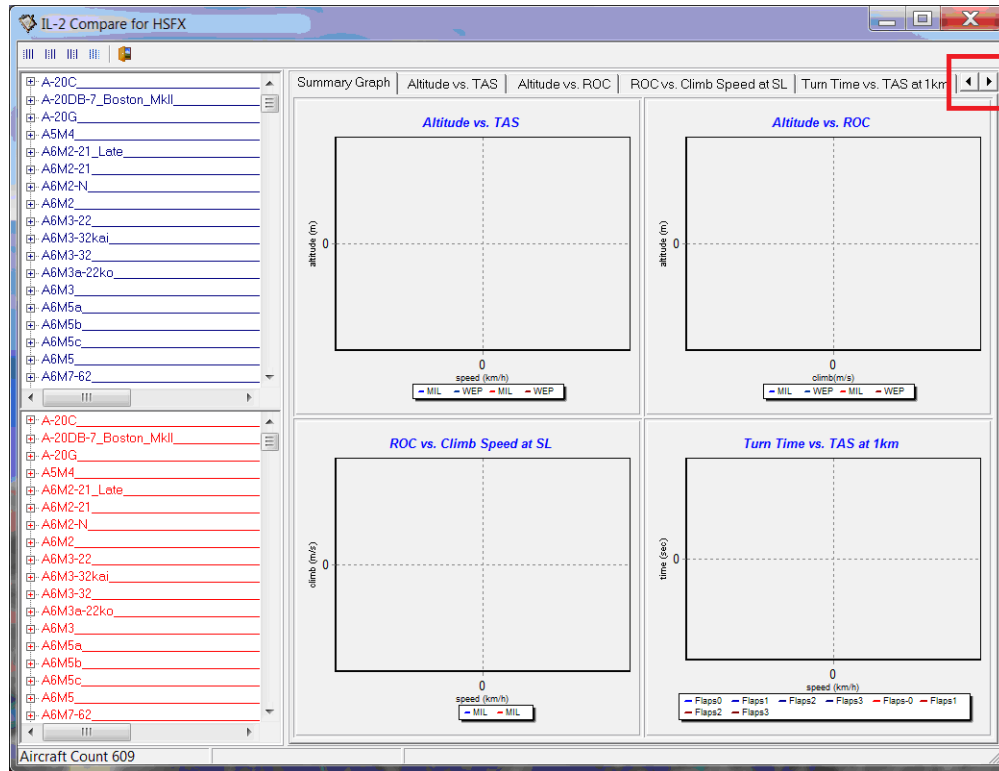


Figure 4 IL-2 Compare Next Graph

The tabs of each graph are listed at the top along the same row as the next graph controls, to see more graph taps simply press on the left and right arrows



## 1.5 Flaps Overlay Controls

The flaps overlay controls are shown in the red outline of Figure 5

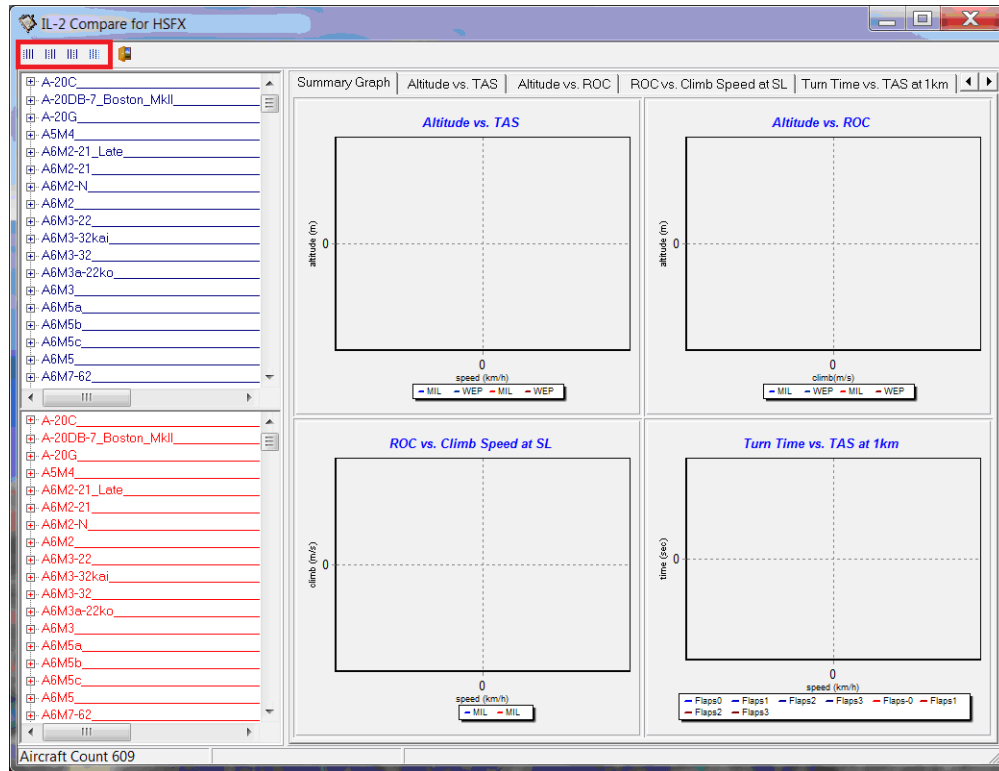


Figure 5 IL-2 Compare Flaps Overlay Control

The flaps overlay controls only affect the 'Turn Time vs. TAS at 1km' and 'Fan Plot' graphs by toggling between showing and not showing the corresponding performance due to different flap settings. Starting from left to right the four buttons are as follows:

1. No Flaps
2. Combat Flaps
3. Take off Flaps
4. Landing Flaps



## 2 Performance Graphs

Note in the following section a comparison is between a P-51D-20NA and a Bf-109G-10 is displayed on the graphs, where the P-51D-20NA is in blue and dark blue and the Bf-109G-10 is in red and dark red.

### 2.1 Summary Graph

The summary graph shown in Figure 6

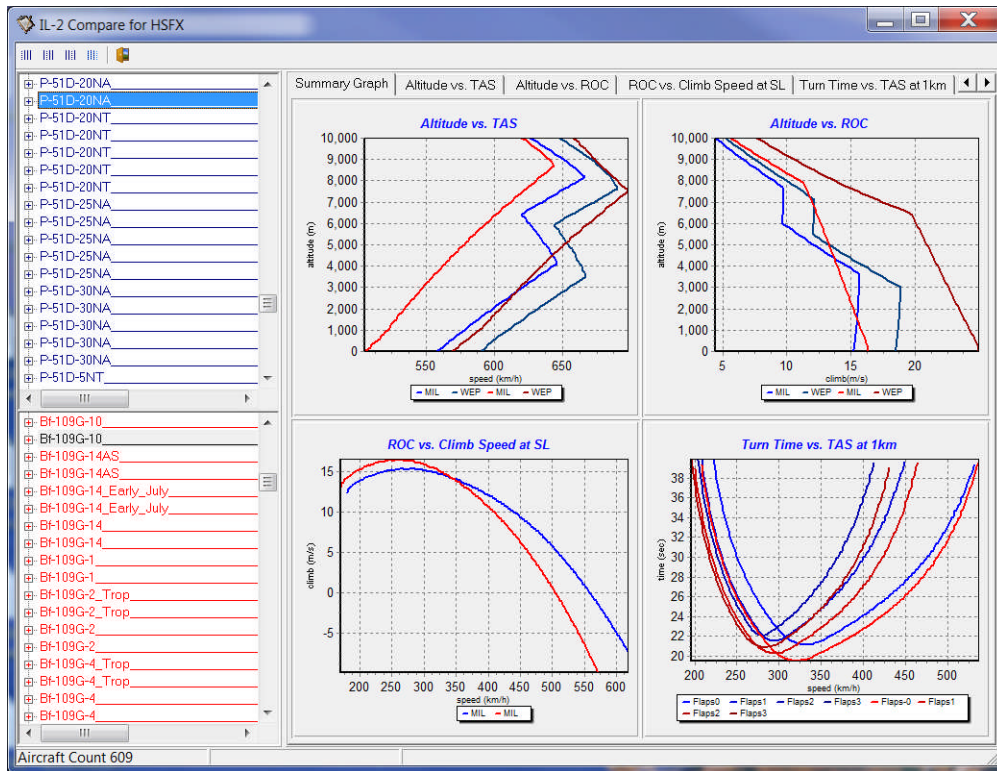


Figure 6 IL-2 Compare Summary Graph

The summary graph shows four graphs on one graph allowing you to visually compare them side by side.





## 2.2 Altitude vs. TAS

The altitude vs. TAS graph is shown in Figure 7

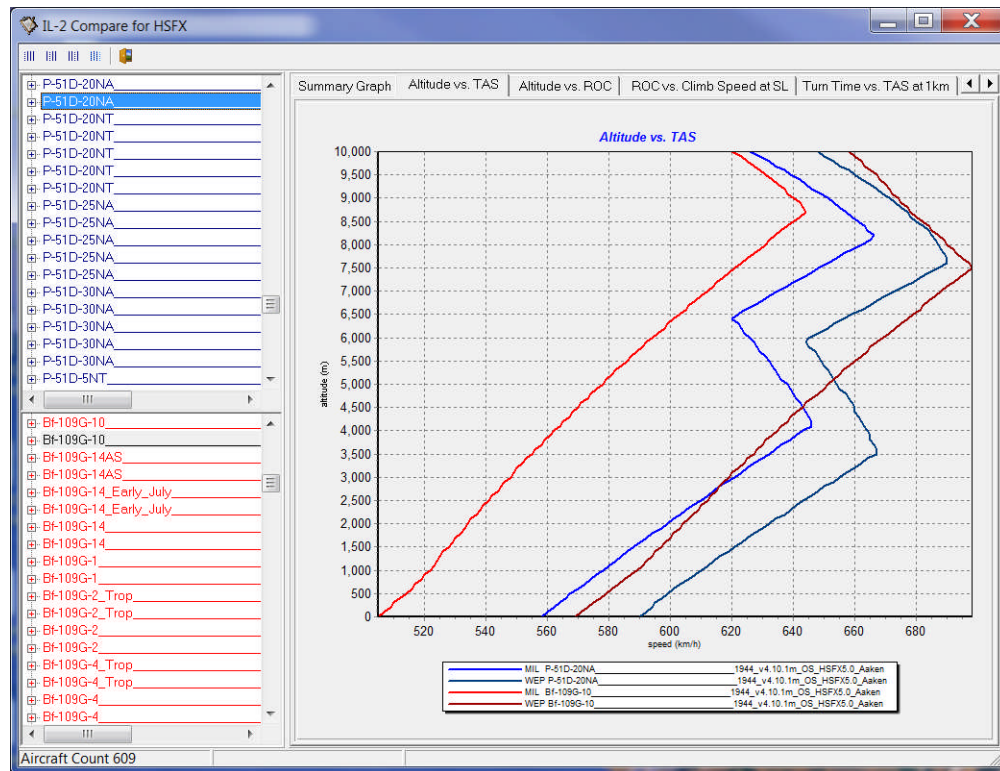


Figure 7 IL-2 Compare Altitude vs. TAS

The altitude vs. TAS graph shows the top speed of the aircraft(s) at both MIL and WEP settings.



### 2.3 Altitude vs. ROC

The altitude vs. rate of climb (ROC) graph is shown in Figure 8

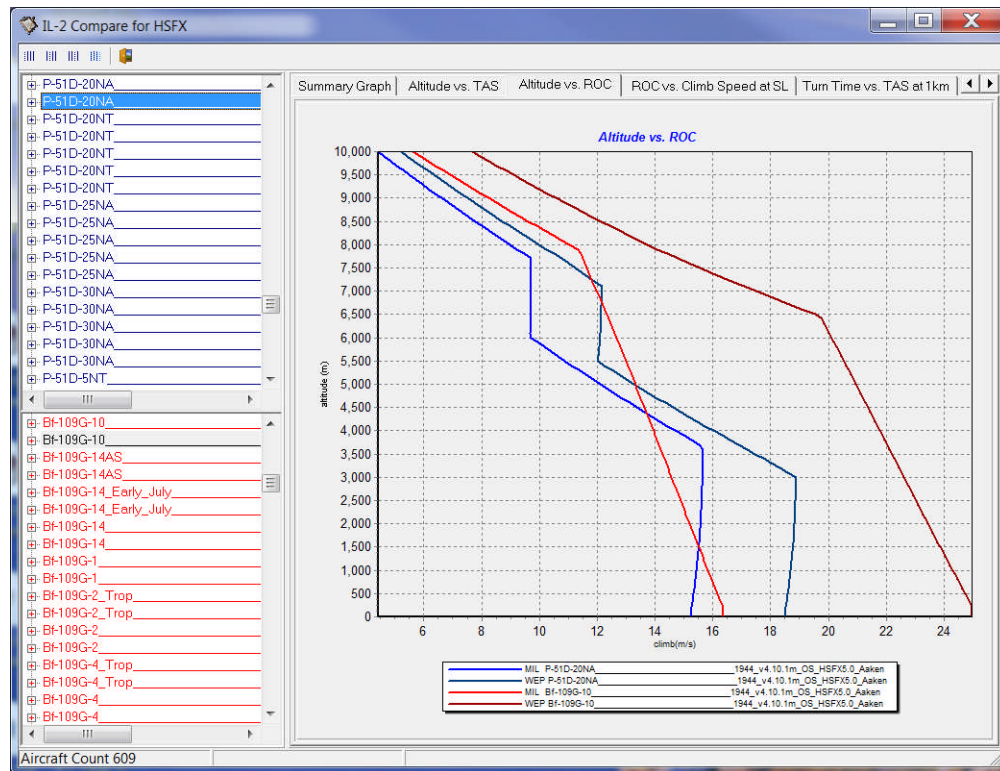


Figure 8 IL-2 Compare Altitude vs. ROC

The altitude vs. ROC graph shows the rate of climb of the aircraft(s) at both MIL and WEP settings.



## 2.4 ROC vs. Climb Speed at SL

The rate of climb (ROC) vs. Climb Speed at SL is shown in Figure 9

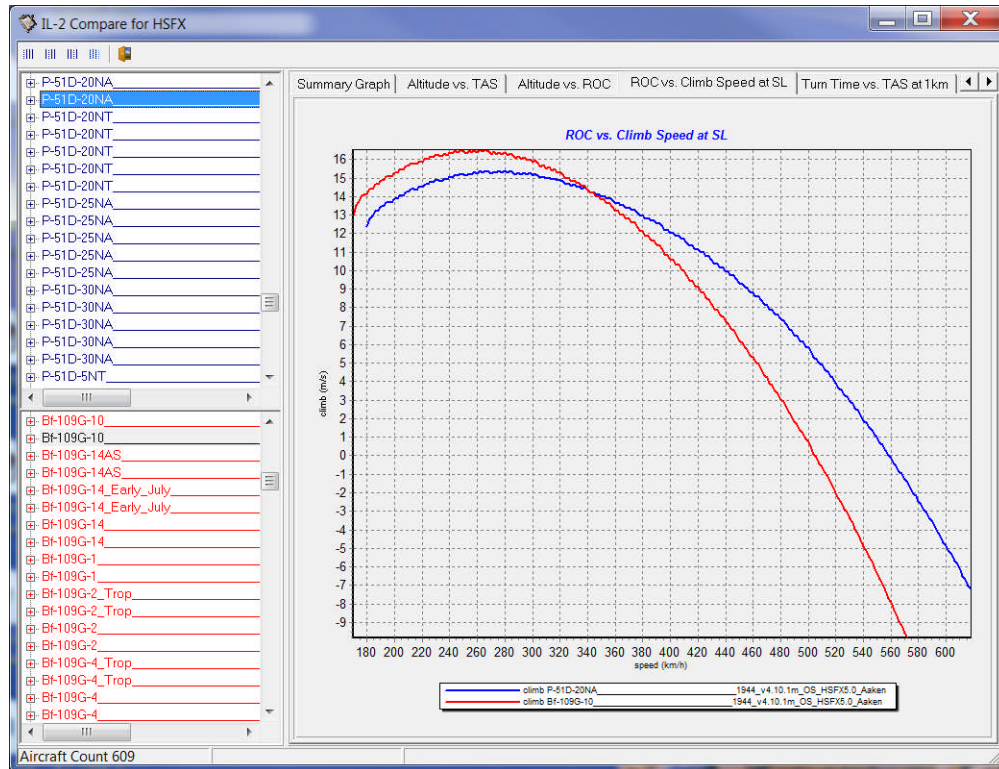


Figure 9 IL-2 Compare ROC vs. Climb Speed at SL

The ROC vs. climb speed graph can be used to find the corresponding climb rate for a given speed at MIL power. The best climb rate corresponds to the best climb speed. Note that at zero climb rate the top speed matches the MIL top speed at sea level listed in Figure 7, also note that negative values of climb rate are shown in the graph of Figure 9, where a negative climb speed is the same as a dive speed, it is highly advised that you don't dive at sea level!



## 2.5 Turn Time vs. TAS at 1km

The turn time vs. TAS at 1km is shown in Figure 10

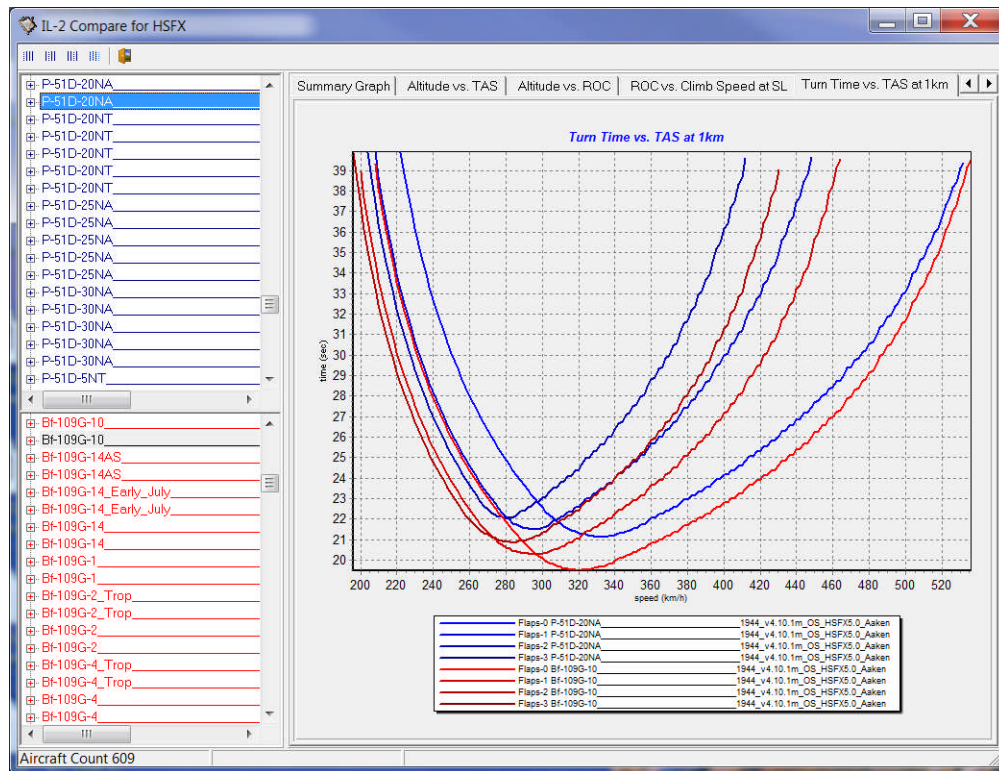


Figure 10 IL-2 Compare Turn Time vs. TAS at 1km

The turn time vs. TAS at 1km shows how long it will take in seconds to do a complete circle ( $360^\circ$ ) at different speeds at an altitude of 1km. To do a complete circle in the shortest amount of time find the speed and flap setting that results in the lowest point on the graph.



## 2.6 Fan Plot

The fan plot is shown in Figure 11

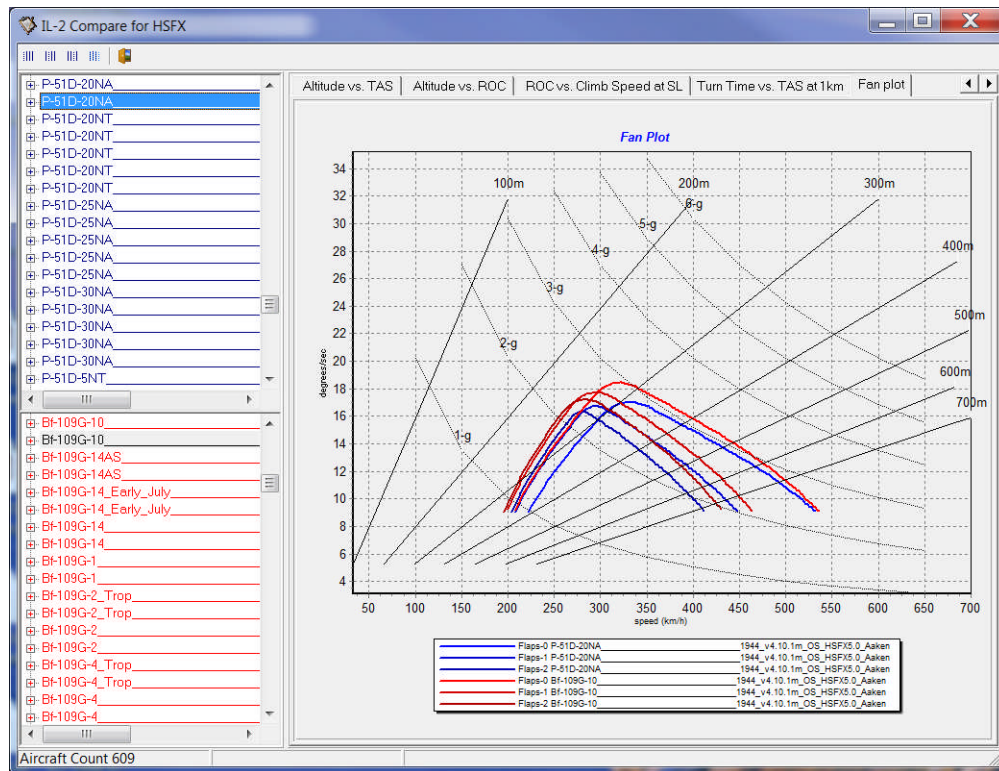


Figure 11 IL-2 Compare Fan Plot

The fan plot shows the sustained turn rate in degrees per second at different speeds at an altitude of 1km. A sustained turn rate is defined as a circular turn where the altitude does not change. The radius of the circle is depended on the speed at which the plane is flying as is the corresponding g force that the pilot will feel. To find the fastest turn rate find the speed and flap setting that results in the highest point on the graph, which is also equal to the shortest turn radius and the highest g force.



### 3 Flight Test Map

The flight test map by BBury was the map used for testing and data collection. The purpose for using the flight test map is two fold; one the flight test map is set to standard atmospheric conditions; two most if not all real world test data is converted to standard atmospheric conditions. Therefore using the flight test map to collect data on allows for the direct comparisons between in-game data and real world data. For years we were told by Oleg that 'the map' that is close to standard atmospheric conditions is the Crimea map, but as you can see in Table 1 the Crimea map is not very close to standard atmospheric conditions.

Table 1 Map Pressures and Temperatures

Map	Pressure	Temp.
Flight Test Map	760	15
Kuban	760	24
BalatonW	750	-5
Berlin	750	17
FinsGulfW	750	-20
MoscowW	750	-17
StalingradW	750	-15
Ardennes	745	25
ArdennesW	745	-5
Balaton	745	25
Bessarabia	745	24
Burma	745	25
ChichiJima	745	25
Coral Sea	745	25
Crimea	745	25
FinsGulf	745	15
Gaudalcanal	745	25
Hawaii	745	25
ItalyDF	745	20
IwoJima	745	25
Kurland	745	8
KurlandW	745	1
Kursk	745	20

As a matter of fact there are other stock maps that are actually 'closer' as in the case of the Berlin map for example. Therefore you may 'see' differences in the performance results in this version of IL2Comp relative to older versions of IL2Comp, the reason being the older versions of IL2Comp used the Crimea map for testing and data collection.

With regards to the standard atmosphere, it was standard practice by all nations involved in WWII to convert aircraft performance data to standard atmospheric conditions. Also the standard atmospheric values were well defined and agreed upon up to about 50kft by all nations since the early 1920s. It was only after WWII with the advent of rocket testing that the need to define the standard atmosphere above 60kft became necessary. During that process the standard atmosphere values above 60kft were in a state of flux during the 1950s, 60s and 70s. Several revisions were issued during those periods, but the changes typically only affected the values above 60kft. Long story short the standard atmosphere values below 50kft have changed very little since the early 1920s.





## 4 Data file notation

There are two types of data IL-2 in-game data and real world data (RWD). The IL-2 in-game data is obtained using a version of SJack's zINFOMOD; the real world data is obtained from many sources, too many to list here but enough info is provided in the file name such that the data can be referenced on-line.

### 4.1 IL-2 in-game Data

The IL-2 in-game data file name notation is as follows:

<plane><pad><year><version><slot><pack><FM>

Where:

- plane: The name of the plane as listed in the full mission builder.
- pad : Pads the plane name to position 40 to line up year.
- year: The year of the plane as listed in the full mission builder.
- slot: Where OS = original slot (stock IL-2) and NS = new slot (aka mod).
- pack: The name of the mod pack where 1C = stock IL-2
- FM: The name of the flight model maker

### 4.2 Real World Data (RWD)

The real world data comes in two types, flight test data and estimated (read calculated on paper) data. Where the flight test data is data collected during an actual flight test and the estimated data is data that was derived by flight test engineers. One should keep in mind that estimated data can be very optimistic in some cases and very conservative in others and therefore should not be taken as fact. Also note that only the altitude vs. rate of climb and altitude vs. TAS data is provided, in that these were the two standard tests done in WWII. Thus the other graphs and features in IL2Comp will not work with RWD. The brackets at the beginning and end of the file name are used to separate and sort the RWD from the in-game data. More RWD will be added over time as a separate download.

[<plane><pad><type><year><month><day><info>]

Where:

- plane: The name of the plane as listed in the full mission builder.
- type: Where RWDE = estimated and RWDT = flight test
- pad : Pads the plane name to position 40 to line up year.
- year: The year of the real world data
- month: The month of the real world data
- day: The day of the real world data
- info: General info on the test



## 5 Installation

If you are using the HSFx mod pack there is no need to install or re-install this program in that it is included/installed as part of the HSFx installation. If you are not using the HSFx mod pack and received or downloaded the 'IL-2CompHSFx\_v###.zip' separately the installation is as follows. There is no automatic windows type of installation involved, thus the windows registry will not be affected, this is a manual installation where you un-zip the 'IL-2CompHSFx\_v###.zip' file to any location you desire and run the 'IL-2CompHSFx.exe' to start the program. It is recommended that you create a short cut to the 'IL-2CompHSFx.exe' and placing it in a handy location.

## 6 Acknowledgments

I want to thank ROSS Youss who created the original IL-2Comp program and SJack for including the IL-2Comp file format output in his zINFOMOD mod for IL-2. I also want to thank all the members of the HSFx community for all their help in process of making mods and a special thanks to Monguse and Storebror for all their one on one help with the mod making process; I also want to thank Aaken for all his hard work on the flight model changes, Aaken is an aeronautical engineer with a Ph.D. in computational fluid dynamics so we are very lucky to have him as part of the HSFx team. Last but not least I want to thank Oleg for making the best flight sim I have played in the past 20 years.

## 7 Contact

Please feel free to contact me at [naca\\_testing@yahoo.com](mailto:naca_testing@yahoo.com) or in HyperLobby, where I go by several different handles.. Too many to mention them all here but the ones I use the most are ACE-OF-ACES, Tagert, GSENN. I can also be reached at most of the main mod pack sites under the same handles listed above. And also feel free to visit my website dedicated to flight simulation testing at [www.flightsimtesting.com](http://www.flightsimtesting.com) where you can find a verity of detailed test reports and utilities along with updated downloads for IL2Comp.