The Flight Simulator Quick Access Recorder and Analyzer

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Introduction

What is FSQAR?

The Flight Simulator Quick Access Recorder and Analyzer (FSQAR) is an add-on for Lockheed Martin's Prepar3D(R) simulation software. It is a standalone application which should be run together with the flight simulator. It retrieves a lot of the simulator variables and displays these variables as charts and numerical values. Moreover, FSQAR allow to write these variables into a disk file for further analyze in spreadsheet program. The program is useful for simulator observation, flight analysis, aircraft model development, investigation of aerodynamics.

For whom this was made?

The program was made for users who want to improve flight techniques in the flight simulator and to know more about aerodynamics and about principles of aircrafts' flight. FSQAR is a powerful flight data recorder which can display 'live charts' of the simulator variables during flight. As well as I know, this software has no analogue in the flight simulator add-ons world. It allows observing at flight parameters in real time. The most direct way to use this program is to determine the g-load at touchdown during landing. Other graphs allow you to see aerodynamics characteristics and deflection of control surfaces of the aircraft.

How it works?

The Flight Simulator Quick Access Recorder and Analyzer (FSQAR) work only together with Lockheed Martin's Prepar3D(R) Flight Simulator. It works with the simulator by client-server principle. FSQAR uses this simulator as server to request flight datum. The Lockheed Martin's Prepar3D(R) Flight Simulator should be started first and the FSQAR program should be launched after it. The application cannot be operated when the simulator in not running. It is assumed that you use the flight simulator in "Window Mode" not in "Full Screen Mode". It is desirable for you to have any spreadsheet programs (it may be Microsoft Excel or other) for the analysis of the collected data and any plotting programs to display the charts when the simulator is off-line (for example gnuplot is the best for this purpose).

License

The Flight Simulator Quick Access Recorder and Analyzer (FSQAR) is a freeware open-source application for Microsoft Windows. Moreover, at present day, this program is not perfect and needs further improvements and changes. I invite all stakeholders to participate in the further development of this program in any available format.

Short description

The user interface is very simple and intuitive. The program has three tabbed window: the charts display, the numerical display and the favorites list in which selected data are displayed. The first three buttons on the program's toolbar that allow to control the flight simulator. They are: start simulation, pause simulation and quit from the program. Also, the toolbar provides quick access to the diagrams. There are seven different kinds of the charts for seven selected flight conditions. Moreover, you can select "Control Window" from the toolbar or menu and drive your aircraft by mouse. Also you can save current chart as a JPEG image from "Charts" menu. I think that anyone will understand the interface of this program without any difficulty.

Top Most Position

It is assumed that you use the flight simulator in "Window Mode" not in "Full Screen Mode". By default, the application window is "**Top Most**" (i.e. the window is places at the top of the Z order). The window at the top of the Z-order overlaps all other windows. However, the size of the FSQAR window is less than the simulator window. Therefore, you can see the simulator window as well as the FSQAR window. If you want, you can turn off "**Top Most**" mode by using "Option Dialog".

Options

All options of the program are available thought "Option Dialog".

By default, this program requests data from the simulator four times per second when your aircraft below 100 feet, once per second when your aircraft below 2000 feet and every four seconds when the aircraft is above this altitude. This is called **'schedule'**. It is useful for analysis of glideslope approach and landing. However, you can set option 'use timer' and write the data four times per second on any altitude.

Charts

The program allows to observe in real time the charts of basics aerodynamics characteristics. Simultaneous **only three values** can be displayed. This is my decision for better visual perception. The values were selected for some flight maneuvers.

These are:

- g-load (isolated chart);
- landing (g-load, vertical speed, angle of attack);
- aerodynamic angles (g-load, angle of attack, sideslip angle);
- pitch (elevator deflection, pitch, angle of attack);
- bank (aileron deflection, bank, sideslip angle);
- heading (rudder deflection, heading, sideslip angle);
- thrust (thrust levers position, angle of attack, indicated airspeed).

Numerical Display

Simulator Variables

The Flight Simulator Quick Access Recorder and Analyzer (FSQAR) can display a large number of simulator variables. Each of these variables is given with short description and units name. More information you can take from Lockheed Martin's "Learning Center" document which is included the standard simulator installation.

Favorites List

You can add seven value to the favorite list. Click right mouse button and select the items which you want to add to the list. The list will be saved and used every session.

Output Files

Where the files which the program writes are placed?

These files are placed in your **'My Documents'** folder in **'Prepar3D v3 Files\QAR'** folder. In this folder subfolders will be created which are named like **Feb_2016**, **May_2016** etc. In these subfolders files will be placed which are named like this: **'day_(hour_minutes) aircraft name'**. Where 'day', 'hour' and 'minutes' are the time when the record was started. To save disk space these files are compressed into form gz-archives and can be extracted by any software supporting gz-archive file format. For example: 7-zip or Gzip for Windows, freeware utilities. The data files have CSV (comma separated values) format and these can be opened in any program like Microsoft Excel.

If you don't want to write file on disk, you can turn off this feature by uncheck the checkbox in "Option Dialog".

Other

My other work which can attract your attention is **AEROLOG** the gauge for Microsoft Flight Simulator X and Flight Simulator 2004. This gauge displays and write into file a lot of flight parameters. Writing frequency can be arbitrarily assigned. Flight data can be analyzed in a spreadsheet application or can be viewed with help of data-plots. It works both in FSX and FS2004. Full set of variables are displayed in the presence of **FSIUPC** not even registered. However, the gauge can work without FSUIPC. This program is freeware. Source code of the gauge may be interested for developers. Especially it is interesting to look at functions for access to AIR-file. Some examples of data plotting and flight analyze are given.

Another my work named: How to correctly use SimConnect in standalone application. This is an article and a demonstration program for programmers. This article describes the correct way to create a Windows application that uses SimConnect functions as C++ classes. "The correct way" involves the creation of a multi-threaded application with the exchange events between the main and working threads and encapsulation of the client thread, functions and structures of the SimConnect library in C++ classes. Paying attention to points of principle, the process of creation client application is described.

Improve the program

Everyone who can change source code can improve this program. This source code is placed in archive. It contains Visual Studio 2013 solution which includes all needed to build the software from the source code.

About the author

I am developer from Russia. There is the Russian localization of the software. In English version, some grammatical mistakes in the documentation may be present.

I would like to see the benefits of my efforts and user reviews about the bugs. I will try to answer all letters that will arrive by e-mail. If you have questions and suggestions, I will make corrections and additions to the program.

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