National Aeronautics and Space Administration

technology opportunity

Utility Processes Time History Data Files for Display and Analysis

Stand-alone tool is ideal for small-scale independent data file processing

Innovators at NASA's Armstrong Flight Research Center have developed a software tool that processes time history data files for plotting or further analysis. The DthData utility program converts time history files from a compressed format to any format suitable for displaying or plotting. The tool supports a wide variety of data types and formats and features excellent compression capability. This stand-alone utility is ideal for small-scale independent data file processing in the aerospace, manufacturing, and scientific research industries. It is part of a software suite that offers a low-cost alternative to expensive, multiple-component data processing and plotting systems.

Benefits

- **Powerful:** Processes large amounts of data and allows users to convert data files from one format to another
- **Efficient:** Time-tags data files, enabling the time-range processing of a selected parameter or set of parameters
- **Metadata:** Eases data sharing with other users via a metadata capability that identifies parameter names, data rates, and formats in the head of each file
- **Economical:** Does not require additional software, computers, or back-end databases

Applications

- Flight testing and simulation projects
- Manufacturing processes
- Scientific research
- Earth climate modeling and simulation
- Retail transaction and delivery analysis
- Economic market modeling

Technology Details

Aircraft flight test projects often generate large amounts of data. A single flight of a complex vehicle typically generates several hundred megabytes of data. A single flight project could involve several hundred flights, and a dozen active flight projects could be in progress at a major flight test research center, leading to a total data volume on the order of a terabyte of data to be managed. NASA Armstrong has developed a program that manages several operations for data that specify time-varying values, so-called time history data. This stand-alone utility also offers benefits for non-aerospace applications.

How It Works

The most fundamental capability of Armstrong's DthData utility program is extracting selected signals and time segments from input files and writing the selected data to output files. Other capabilities include converting file formats, merging data from multiple input files, time skewing, interpolating to common output frame times, renaming signals, and generating calculated output signals as functions of the input signals.

This stand-alone utility program converts time history files from a compressed format to any format suitable for displaying or plotting using external tools such as the MATLAB® software package, Microsoft Excel® spreadsheet software, and NASA Armstrong QuickPlot.

A command line-driven program, DthData works with a separate pre-processing utility (DthDiff) and plotting software (QuickPlot) to read, write, plot, and validate various data types. Development is underway for a new version based on Java® software that combines all three utilities into a single graphical user interface (GUI), operating on three tabs.

Why It Is Better

The majority of the vast amounts of computer data generated in aircraft testing and simulation projects are time history data. Conventional data pre-processing utilities require complex back-end databases to provide data mining of large data sets, along with additional software and computers.

NASA Armstrong's DthData is a stand-alone utility that compresses then decompresses data sets as needed to process data for plotting or further analysis. Metadata in the data files provides a self-describing method of identifying time history data sets, and parameter identification simplifies plotting, analysis, and sharing of data with other users. The program is ideal for users in the aerospace, manufacturing, and scientific research industries.

Licensing and Partnering Opportunities

This technology is part of NASA's Technology Transfer Program, which ensures that technologies developed for missions in exploration and discovery are broadly available to the public, maximizing the benefit to the Nation. The DthData Time History Software Utility (DRC-012-024) is available through a software usage agreement for commercial applications.

For more information about this technology, please contact:

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