Fortress Flight Recorders

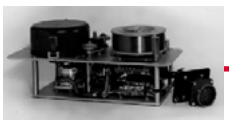
Aircraft often have safety concerns that can, or in many cases must, be addressed with a suitable crash protected recording solution. Flight recorders can meet these needs, but the introduction of new regulations may mean existing solutions no longer meet the requirements. Other aircraft OEMs and operators find they lack a recording solution with the functionality to help address high maintenance costs.

Curtiss-Wright has been designing flight recorders for over 60 years. Fortress, our latest product line, meets all current and anticipated regulations, including ED-112A and 25-hour voice / datalink recording. Additionally, it is a highly flexible platform with the ability to collect and process custom data sets for various applications including maintenance operations.

Fortress features include

+ Standalone or combined voice, data, datalink, and image recording to enhance flexibility and minimize SWaP
+ Custom interface, form factor and data acquisition options to meet aircraft and application requirements
+ Full ED-112A compliance that exceeds 25-hour cockpit voice recorder (CVR) requirements
+ Integrated webserver for fast and free data download
+ 90-day underwater locator beacon (ULB)

2021 - Fortress First ED-112A Recorder



1957 - First magnetic crash recorder in service

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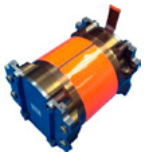
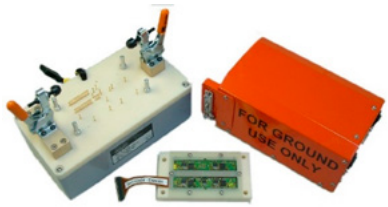
Fortress Models

The Fortress flight recorder family was designed to meet the unique requirements of different aircraft without expensive customization and NRE. All Fortress flight recorders are based on the same core electronics and software, and almost any specific requirements can be met on each model. Find your perfect fit among our selection of field-proven Fortress flight recorders.

	**757**	Off-the-shelf Replacement for Fast Deployment	Standard ED-112A flight recorder. Ideal for replacing ARINC 757 recorders, including MPFRs (form and fit compatible). It provides the longest record duration and highest quality audio of any recorder on the market.
	**CVR-25**	25-Hour Cockpit Voice Recorder	Fortress CVR-25 provides four channels of high-quality cockpit voice recording and one channel of CPDLC datalink recording, each for 25 hours.
	**FDR-25**	25-Hour Flight Data Recorder	ED-112A compliant FDR with leading data recording capacity (210+ hours @ 4,096 wps)
	**DAFR**	Broad Range of Interfaces for Data-Driven Applications	DAFR acquires more data than mandatory using sensor interfaces or off avionics busses such as ARINC 429, ARINC 664, or Ethernet. Can remove the need for a flight data acquisition unit.
	**CPMM**	Crash Protected Memory Module for Custom Developments	Ideal for those without in-house resources to develop flight recorders or protected storage solutions.
	**LITE**	Basic Functionality for Low-Cost Solutions	Ideal for those looking for an inexpensive, basic recorder. Standard ARINC form factor (1/2 ATR).
	**OEM**	Additional Computational and Data Functions for Custom Applications	Ideal for those looking for a custom recorder using some of their own electronics or another Curtiss-Wright module (such as HUMS, encryption, or GADSS solution).
	**CSR**	ARINC 404A Combined CVR/FDR with Removable Memory	Acquires more data than mandatory and has an additional integrated removable media for fast data access.

Flight Recorder Accessories

RIPS: Recorder Independent Power Supply	CCU: Cockpit Control Unit	PGS: Flight Data Replay Software
Supplies continuous power to the CVR for 10 minutes after power is lost.	Control unit for your flight recorder providing an interface for the crew.	Recreates flight in graphical, tabular, aural, and visual format.



CAM: Cockpit Area Microphone	CAC: Cockpit Area Camera	CDRE: Crash Damaged Recovery Equipment
For recording ambient sounds in the cockpit. Interfaces directly with crash recorder.	Color H.264 HD camera with Ethernet interface. Can be mounted anywhere in the cockpit to capture instrument displays and switch settings.	Provides a means of recovering data in the event of damage to a recorder following an accident.

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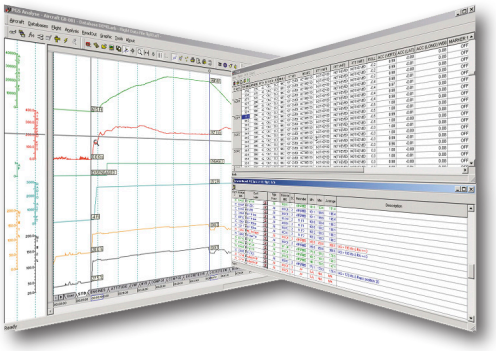
Professional Ground Station (PGS)

Flight Data Applications Software

CURTISSWRIGHTDS.COM



Key Features

- Supports all types of aircraft
- Complete Flight Event Report in seconds
- Powerful visual analysis
- Secure database
- Intuitive implementation
- Animated visualization

Applications

- Crash protected recorder data management
- Aircraft sustainment projects
- Flight data analysis

Overview

Effective Flight Operations Quality Assurance (FOQA) programs are difficult to implement. There is seldom a shortage of flight data but useful interpretation requires superior analysis and viewing tools. The Professional Ground Station (PGS) turnkey software suite of tools enables rapid and clear interpretation of flight data and limits exceeded. Daily replay and analysis enables immediate operational action. The Curtiss-Wright PGS software suite comprises all the necessary editors and tools to simplify every day flight data processing.

A Suite of Purpose Designed Tools

A powerful visual tool is required for rapid detection of abnormal operations and events. A powerful database is required for rapid analysis of each event. This combination delivers exceptional operational information for fleet management and safety programs.

PGS Discovery System (PGS-DS) is designed for single aircraft support and provides basic download and replay for both Quick Access Recorders (QAR) and Cockpit Voice Recorder (CVR) and Flight Data Recorder (FDR) data with a single pre-defined DAU Logical Frame Layout (not included). Flight data is viewable as a graphical plot or tabular list.

PGS Vision System (PGS-VS) is a purposely-designed viewer to simplify QAR and FDR data readout and replay. PGS-VS provides editors and tools that ease every day operation. For example: Multiple Logical Frame Layout support, fleet management, and predefined CVFDR and Quick Access Recorder download procedures. PGS-VS also includes powerful audio decoding algorithms to convert CVR audio encoded data to standard Microsoft® WAV file format and synchronize audio records to the flight data.

PGS Analysis System (PGS-AS) contains all the tools that make daily flight data analysis easy. Building event detection programs, launching automatic analysis programs and reporting detected events becomes simple and practical with PGS-AS. In addition, all detected events are managed into a powerful statistical database.

PGS 3D Replay is an add-on module to PGS-VS and PGS-AS only which provides 3D visualization capability to review animated aircraft operation. 3D Replay provides multiple aircraft support with instrument editor functions which permit the user to replicate aircraft instrument panels.

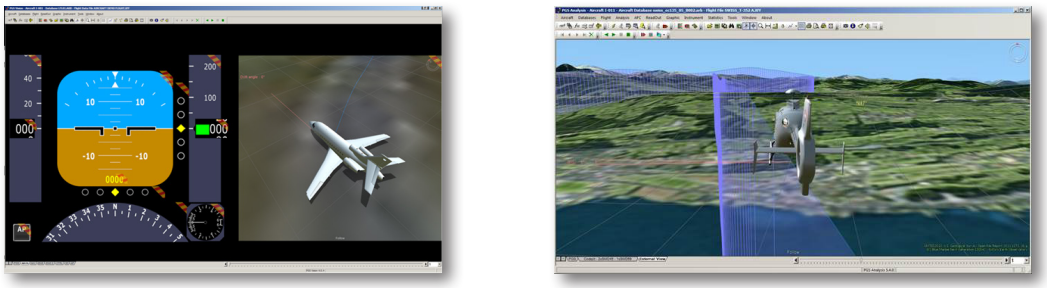


Figure 1: The Flight Data Application Software has optional analysis and data visualization tools

Additional Features

- Supports all types of aircraft (Fixed and Rotary Wing)
- Compatible with the complete range of Curtiss-Wright recorder products, including Fortress™
- Graphical & tabular display of data
- Replay of Airborne Image Recorder (AIR) data
- Replay of Data Link Recorder (DLR) data
- Synchronised FDR, CVR, DLR and AIR displays
- Secure Database
- Fleet Management (PGS-VS and PGS-AS only)
- Parameter Studio (PGS-VS and PGS-AS only)
- Automated event detection (PGS-AS only)
- Flight phase definition (PGS-AS only)
- Complete flight event report in seconds (PGS-AS only)

Specifications

Minimum recommended PC configuration

- Microsoft® Windows™ 7/8/10
- Intel® Core™ i3 / i5
- 4 Gigabytes RAM
- 100 Gigabyte hard drive archival media (more disk space may be required for 3D Replay)
- NVIDIA® or ATI® based graphics card required for 3D Replay (Direct X 9 compatible, min. 1 GB GDDR memory)

Optional requirements

- PCMCIA type II drive
- Magneto optical drive

Number of flight data parameters per aircraft supported

- Up to 16,000 parameter definitions per aircraft including
- ARINC 573/717, ARINC 429 and ARINC 664pt7 standards

Number of monitored events

- Up to 5,000 events may be monitored per aircraft

Number and size of flight data files

- The number of flight files allowed is limited by the hard disk capacity. A one hour file, recorded at 128 words per second, equals approximately 900 Kbytes.

Processing speed - test configuration as follows

- Hardware: PC Pentium II 450 MHz
- Operating System: Windows NT
- Flight file length: 10 hours
- Time required: 2 seconds

Printers and Monitors

- Printers: PGS supports any mono or color printer hosted by the Windows operating system
- Monitors: PGS adapts to any computer screen resolution without loss in quality (up to 1600 x 1200 or higher if available)

Release, Part Numbers, Kits

The software packages are available individually or as a kit which includes the software, an aircraft replay cable and a ground replay cable. Part numbers are shown below:

- PGS Discovery (PGS-DS): W107874
- PGS Vision (PGS-VS): W107828
- PGS Analysis (PGS-AS): W107873
- PGS Visualization 3D Replay: W107926
- PGS Discovery Kit: D51620-2
- PGS Vision Kit: D51620
- PGS Analysis Kit: D51620-1

Note: The D51620-2 kit contains the MPFR aircraft replay cable p/n: SA110919 for use with Sikorsky S-92 only