

## Aviation Performance Measuring System (APMS)

Thomas R. Chidester

The Aviation Performance Measurement System (APMS) implemented several key tools for interpreting and analyzing aircraft performance data in cooperation with an airline partner and commercialized two of them. The APMS Program is developing the next generation of tools for flight data analysis and interpretation. Airlines, military units, corporate operators, and others have begun the process of analyzing aircraft flight data to identify contributing factors and corrective actions for situations in which aircraft performance parameters exceed normal limits for a phase of flight. These programs are referred to as Flight Operational Quality Assurance (FOQA, or MOQA in the military). But this process uses only a portion of the data. It scans large quantities of data to extract and understand a small number of pre-defined events. There is far more potential information in these data sets which could help operators understand and enhance the safety, reliability, and economics of their flight operations. The challenge is finding and understanding key information from the mass of data generated by aircraft systems and collected by data recorders. Scanning, analyzing, and reporting must be automated to produce meaningful information for the human analyst to act upon.

APMS implemented several key tools for this process in FY2000 and FOQA vendors commercialized two of these tools. With its first airline partner, Alaska Airlines, APMS implemented five new analysis tools:

- *Special Event Processing System* assists the FOQA analyst in analyzing, decision-making, decision-tracking, reporting, communicating, and recording for future reference information related to flight exceedances.
- *Report Generator* assists FOQA managers in charting counts and rates of exceedances or special events through automated generation of uniform, high-quality, graphical reports of flight data trends.
- *Graphics Viewer* assists the FOQA analyst in interpreting and verifying exceedances or special events by displaying the data traces of a specific flight in great detail for a period of minutes surrounding the event as depicted
- *Routine-Events* presents the distribution of flight parameters around "check points" that occur within each flight and are tied to standard operating procedures. This allows the FOQA analyst an immediate and obvious point of comparison of performance observed in line operations to the standards specified in operator procedures.
- *Pattern Search* enables the FOQA analyst to search any portion of the database for any specified pattern of flight parameters. This allows exploratory analysis of flight parameters that may be associated with precursors of exceedances or special events.

FOQA vendors implemented two of these tools in their commercially available software packages in accordance with the terms of Space Act Agreements with their organizations. The Flight Data Company Ltd. (now Spirent-Heathrow) implemented the Report Generator in its Ground Replay and Analysis Facility. Teledyne Controls implemented Routine Events in its Flight Data Replay and Analysis System (FLDRAS).