

# The Engine Data Store for DAME

Vernon Bailey<sup>1</sup>, Simukai Utete<sup>1</sup>, Peter Bannister<sup>1</sup>, Lionel Tarassenko<sup>1</sup>, Georges Honore<sup>2</sup>, Max Ong<sup>3</sup>, Sarfraz Nadeem<sup>2</sup>

<sup>1</sup> Department of Engineering Science, University of Oxford

<sup>2</sup> School of Computing, University of Leeds

<sup>3</sup> Automatic Control & Systems Engineering, University of Sheffield

vernon@robots.ox.ac.uk

**Abstract:** The Engine Data Store (EDS) provides GRID (GT3) enabled facilities for storage and retrieval of jet-engine data to services in the Distributed Aircraft Maintenance Environment (DAME) project. In-flight or test-based vibration and performance data from an engine-mounted monitoring system are uploaded into the EDS which stores the raw data and extracts valuable meta-data into a relational database. DAME services may query the EDS either for meta-data or for the raw data. This poster outlines the design and functionality of these GRID-enabled services.

## Extended Abstract

The Distributed Aircraft Maintenance Environment (DAME) project utilises vibration and performance data recorded by a health monitoring system on jet engines. Whether the data is sourced from test beds or from aircraft flights, the volume of data per engine can easily be numbered in Gigabytes. DAME uses this data to detect in advance possible unscheduled maintenance. This maintenance may then be scheduled into a normal servicing window, thereby reducing costs and disruption to passengers and airlines alike. An alternate use for the data would be to search for interesting signatures across many engines. The function of the Engine Data Store (EDS) is to store, organise, catalogue and give access to the engine data so as to enable DAME to utilise the large volumes of data for its processes and workflows.

The EDS is an envelope term which includes several services, operations and/or software. The data stored consists of two parts: flat-file storage for the raw data and a relational database (RDBMS) implementation (currently MySQL) to store meta-data to permit useful searches on raw data characteristics. Typically meta-data items are flight times, engine ID information and file handles for the raw data. The meta-data is extracted from the raw data by a bespoke Java application which supports plug-ins to allow some degree of flexibility to changes in the DAME RDBMS schema. The EDS supports DAME via GRID-based (GT3) interfaces. Raw data is transferred into the database by GridFTP. Likewise raw data may be extracted via GridFTP. The meta-data in the EDS RDBMS may be queried via a GT3 service. For example, an in-flight event is identified by the health monitoring system, and DAME's AURA-G service (a pattern-matching application produced by the University of York) may be used to carry out a rapid search of the EDS for similar events recorded by other engines.

This poster outlines the design and functionality of the EDS, its associated GRID services and internal software.