

Managing Jet Engine Maintenance and Configuration

RAMS in Support of Aero Engines



Problem

Jet engines, when utilised in the rugged environment of military operations, have major air worthiness implications. Planning the maintenance programme for engines with a life expectancy of 30 years or more becomes more and more difficult as numerous updates and modifications are applied. The modification state of each engine and its constituent modules must be carefully tracked and recorded to ensure safe and effective aircraft operations.

Solution

To manage the maintenance of jet engines requires the establishment of an accurate, up to date record of engine configuration, and the aircraft to which they are fitted. For this purpose LSC Group developed Repairable Asset Management System (RAMS).

As engines move through their maintenance cycle, details of the configuration and usage of the engine and its components are entered into RAMS. As each engine component will have a scheduled maintenance period defined by its usage, RAMS can calculate future maintenance requirements.

Where maintenance of a component requires removal of the engine as a

whole, the time for this will be dictated by the shortest life remaining of all the components.

In addition to maintenance requirements RAMS maintains complete records of the configuration of each engine in the system, ensuring its correct operational use.

Implementation

Initially developed to manage the engines fitted to the RAF Tornado, use of RAMS was subsequently expanded to include the Harrier, Jaguar, Hawk and Hercules fleets.

A further version of RAMS was developed to support the RB199 and Adour engines fitted to the Tornado and Hawk aircraft operated by the Royal Saudi Air Force (RSAF).

The overall logistic operation is managed from a Headquarters site and the network has separate implementations of the RAMS database at each Main Operating Base, providing a local management facility for those assets at Unit level. As aircraft usage is entered into the system, the usage to be applied to each component is calculated, and life remaining indicated, .i.e. when scheduled maintenance is due.

The Challenge

To manage the complex maintenance and configuration programmes of jet aircraft engines.

Solution

LSC Group developed RAMS to monitor and report upon every stage of the maintenance cycle, ensuring correct operational use and efficient spares management.

Customer Benefits

Improved operational performance of aircraft fleet through;

- improved engine availability
- full visibility of engineering records
- real-time information on engine location/status

All scheduled and unscheduled maintenance activities are recorded, thus maintaining the configuration of the engine. As a result of recording changes to the configuration, a history of the fitment of the asset is maintained, noting the usage of the asset and the parent to which it is fitted at both fitment and removal.

Where modifications are required, these are detailed in the system to record the nature of the modification, its applicability and its date of embodiment. Where the modification produces a change to the part number of the component or engine, this is also recorded, thus maintaining the configuration record. All changes are retained in a history for the engine, enabling production of an engine record card when required, e.g. on return to the manufacturer.

Whenever an engine or component is moved from one location or another, the dispatch from the originating location and receipt at the destination location are recorded, thus achieving asset tracking. The system therefore provides real-time information of the location of an asset.

Unit users are connected to the database via a LAN, which allows access to only the specific assets and configurations that they require. Each unit is networked to the headquarters site, which enables the system administrator to gather fleet wide data and to support and maintain the various databases from one point.

LSC Group provides two levels of support for this operation; firstly, direct telephone and email contact with the in-country operators for 1st line support and query handling and, secondly, an annual support visit for software enhancements / upgrades, thus ensuring a high level of continuous customer support.

Benefits

For the operating units, automatic calculation of usage and life remaining significantly improves the efficiency of the engineering function, thus ensuring greater productivity, and minimising errors. Availability of the assets is also improved, potentially enabling reduction of the holding of spares.

At the headquarters level, asset and fleet managers have near real-time information, enabling the team to make more informed decisions. This is reflected in improved operational performance of the aircraft fleets.

RAMS in Use

Although the RAF now use LITS (which was developed using LSC Group expertise) to manage their jet engines, the RSAF programme has recently been extended to at least 2013.

RAMS is also in use on the Typhoon radar programme, and by BAE Systems for their Contracting for Availability programme on the Tornado.