

Background

Aspire was contracted by the UK Ministry of Defence (MoD) to review the maintenance requirements of the Aircraft Assisted Escape System (AAES) for the Hawk aircraft.

This review was the last of a series of similar studies also carried out by Aspire on the Tornado, Tucano and Harrier aircraft. The MoD Reliability Centred Maintenance (RCM) Group at RAF Wyton provided the management and QA oversight of Aspire's work.

The AAES for the Hawk aircraft includes all aspects of the escape path, including canopy fracture and command ejection and a range of survival aids including harnesses, main and drogue parachutes, life rafts etc.

The scope of the review encompassed all aspects of Preventative Maintenance covering both flight line activities through to periodic bay activities.

Purpose

The purpose of this task was to **reduce the level of maintenance**, primarily at periodic bay maintenance periods.

A secondary objective was to **reduce** the overall number of times the ejection seat and safety equipment had to be removed from the aircraft for **bay maintenance** to be accomplished.

Aircraft

The Hawk aircraft entered service with the Royal Air Force in 1976 and currently forms the backbone of the fast jet pilot training requirement.

The Hawk aircraft has been made famous by the Red Arrows Aerobatic Team. The Hawk is manufactured by BAE SYSTEMS.



Approach

The study was conducted using a MoD recognised RCM standard, with the results being populated in a database specifically designed to mirror the stated methodology. In this case, the methodology used addressed airworthiness considerations and produced workable task instructions.

It was essential that the recommendations did not jeopardise airworthiness or operational efficiency thus retaining the confidence of the aircrew who fly this aircraft and who could ultimately rely on this equipment for escape in emergency situations.

RCM is the application of a structured method to establish the optimum Preventative Maintenance requirements. It is a proven methodology for rationalising maintenance.

The methodology identifies the functionality and performance required from equipment in its operating context, identifies the way in which the equipment fails and the plausible causes of failure and then details the effects and consequences of failure.

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Aspire

RCM allows an assessment to be made of the criticality of the failure. Where significant safety, operational or cost consequences are identified RCM assists in the selection of an appropriate maintenance task that addresses the identified Failure Mode.

The RCM process concentrated on each mission phase of the equipment, in order to identify equipment Functions and Failure Modes at an appropriate level.

In the case of the Hawk aircraft a partial Template approach was taken, based on the similarities between the Tornado and Tucano systems. A 'clean sheet' approach was taken where equipment or functionality differed. Tasks to address identified plausible Failure Modes were established.

Engineering judgement was used throughout and the task frequencies recommended reflected the characteristics of failure coupled with extensive user knowledge.

The use of a fully facilitated Aspire approach, involving specialist technicians from each line of maintenance, resulted in a focused and detailed analysis.



Results

The results of this study indicated that **significant cost savings**, through the optimisation of the Preventive Maintenance requirements, are achievable.

A recommendation has been made which will **reduce** the frequency of **bay maintenance** activities by approximately **30%** with **significant savings** being achieved.

This cost saving has been realised by a reduction in the necessity to remove the ejection seat for scheduled maintenance and as a consequence **reduced invasive maintenance**.

A **significant reduction** in the use of **consumable spares** associated with invasive maintenance has also been made.

Conclusion

The RCM analysis of the AAES for the Hawk aircraft has identified considerable **man-hour cost savings** for the Hawk fleet.

Extension of some of the scheduled maintenance activities will **release aircraft for operations**, and also **reduce aircraft down time**.

The results from the application of RCM confirm that it could be applied with equal success to other systems and on other Platform types.

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