



Background

Aspire was contracted by the UK Ministry of Defence (MoD) to review and **rationalise existing Technical Instructions (TIs)** for the Tornado aircraft.

The TI review was part of a wider Tornado analysis activity carried out by the MoD Reliability Centred Maintenance Group (RCMG) at RAF Wyton, which also provided the management and QA oversight of Aspire's work.

A TI contains information on a maintenance activity that is to be repeated at defined intervals, usually as part of an Age Exploration process. The instruction usually follows on from an identified fault that may affect airworthiness.

The Tornado aircraft is operational in two different forms: Tornado F3 long-range air defence fighter, and Tornado GR 4. The Tornado entered service in 1980 and ceased production in 1998. The Tornado was manufactured by Panavia, a consortium of BAE SYSTEMS, EADS and Alenia.

Purpose

The purpose of this task was to **minimise the man-hour burden** of TIs, primarily at first line.

A secondary objective was to reduce the overall number of TIs, in order to **lower the administrative effort** required to maintain each instruction.

It was imperative that the recommendations made would **not jeopardise airworthiness or operational efficiency**.

Approach

The study was conducted in two phases. Phase one required collation of TI task titles, task frequency, and man-hour content, followed by an initial analysis in order to generate a focussed and prioritised list of TIs for further review. This ensured only those TIs likely to deliver benefits were subjected to a more intense analysis.

During phase two, only TIs recommended as a result of the first phase were analysed. The RCM methodology was used to focus the review.

RCM is the application of a structured method to establish the optimum Preventative Maintenance for a given platform, system or equipment. It is an effective, proven methodology for rationalising maintenance.

The RCM process concentrated on the Failure Modes addressed by each TI, in order to verify that the work detailed therein provided an effective solution to the Failure Mode identified.

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The task frequencies detailed within each TI were challenged, utilising analysis of available failure data and facilitation with maintenance staff within the Tornado IPT or at user units.

The follow up action detailed in the TI were scrutinised and where relevant, alternative exit strategies were identified.

Results

101 TIs were addressed in Phase 1 and of these 49 justified further analysis. Analysis of these TIs resulted in a recommendation that 23 tasks could be extended, scheduled, or cancelled. Included in these 23 were 7 tasks that could be transferred to second line, and 5 that could be cancelled following amendment to the Aircraft Maintenance Manual (AMM).

The reduction in the overall number of TIs via introduction into the maintenance schedule or cancellation will provide a saving in administrative costs.

The most significant saving in man-hour costs is as a result of the exit strategies developed by the Fleet Manager, predominantly in the form of modification action. RCM has **provided confirmation that these exit strategies are sound.**

In three cases, modification action has been suggested as an alternative solution to continuing Preventive Maintenance. Obviously, cost to embody all the modifications will impact initial savings; however, **Availability will be enhanced.**

Additional cost benefit has been identified through RCM analysis, in the form of recommendations to extend on-condition maintenance task frequencies. One task had an increased inspection frequency recommended. A fleet-wide **saving of 4800 man-hours per annum** was identified.

Conclusion

The TI review has identified considerable **man-hour cost savings** for the Tornado fleet. Extension of some of the scheduled maintenance activities will **release aircraft for operations**, and also **reduce aircraft down-time** at first line.

Effective Modification action will result in **reduced maintenance costs.** Cancellation of TIs and incorporation into the AMMs and Preventive Maintenance Schedules will further reduce costs.

Following the review process, emergent TIs may also be analysed, in order to confirm effectiveness.

The methodology developed for the review of Tornado TIs can be applied with equal success to other aircraft types.

This task provides an excellent example of Aspire's ability to complement and work successfully alongside a customer organisation to define and assembly pragmatic methodologies that will derive real benefit in a realistic time-scale.

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