



VectorMxSM

Deploying the Best Case Maintenance Scenario

Introduction

VectorMxSM is Intergraph Government Solutions' (IGS) comprehensive tool to transform aircraft (fixed wing and rotorcraft) Scheduled Maintenance Programs (SMP). Executed by a team of military and commercial aviation experts using Intergraph's FleetInsightSM software tools, this end-to-end methodology builds SMPs using the Airlines 4 America's (A4A) best commercial aviation maintenance methodology, Maintenance Steering Group 3 (MSG-3), custom adapted to military aircraft. With over a decade of experience in the U.S. Department of Defense, IGS has applied VectorMx to the USAF C-5 jumbo cargo aircraft, dramatically improving reliability and availability while significantly cutting maintenance costs.

Distinguishing Characteristics and Benefits

MSG-3 is a third-generation commercial "best practice," specifically designed for aviation maintenance. Introduced in 1980 and continuously updated, it is a worldwide proven source for developing comprehensive and accurate SMPs. MSG-3 employs a top-down and task-oriented process that identifies and documents all maintenance requirements for aircraft systems, structures, zones, wiring and more. The result is an SMP that realizes the aircraft's inherent safety and reliability at minimum cost. The VectorMx solution custom adapts MSG-3 to military aircraft while fully complying with the A4A's MSG-3: Operator/ Manufacturer Scheduled Maintenance Development (MSG-3 Doc) and the most current version of FAA Advisory Circular 121-22x. Every VectorMx application is tailored to address variances in aircraft Mission Designation Series (MDS), utilization and operating environment. The outcome is a single, fleet-wide, integrated SMP from preflight to heavy maintenance. It harmonizes depot and field maintenance activities in a way that ensures their respective inspections complement and strengthen each other. All VectorMx SMP tasks are arranged hierarchically ensuring that higher-level inspections fully satisfy all lower-level inspection requirements. This structure bolsters SMP

effectiveness and aircraft reliability, and ensures aircraft returning from depot maintenance to their operational units are mission-ready with no further maintenance inspection requirements.

Building the Foundation

VectorMx starts by forming an Industry Steering Committee (ISC), consisting of all stakeholders of subject aircraft and chaired by the owner/operator. The ISC oversees development of the SMP and serves as its final approval authority. Under ISC oversight, VectorMx establishes working groups purposely formed to conduct specific aspects of the analysis. In general, these working groups consist of engineering, maintenance, supply, OEM, and operator experts for the intended areas of analysis.

Using the most current version of the MSG-3 Doc, VectorMx then develops a Policy and Procedures Handbook (PPH) for ISC approval. The PPH is the foundational document that delineates the customer's expectations for the new SMP and the basic procedures by which it will be built, including ISC and working group roles and responsibilities, SMP goals, field and depot constraints, and instructions for VectorMx execution.

Developing Maintenance Tasks

Working within the framework of the PPH, the Intergraph-led working groups accomplish the VectorMx analysis. The product of the analysis is a comprehensive set of maintenance tasks, from preflight to heavy maintenance, that are fully defensible based upon PPH objectives, and engineering and maintenance requirements. A full systems analysis is performed at the highest manageable level that is generally one level above the component level. A rigorous structures analysis is completed using logic designed specifically for aviation structures. Additionally, a complete zonal program ensures 100 percent of the aircraft is inspected nose to tail, and also includes aged wiring concerns and proximity to combustible sources.

Continuous Analysis through Logic

Following the rigorous logic construct, analysts constantly consider the safety, operational (mission) and economic consequences of failures, and ensure the maintenance tasks are applicable and effective to detect and prevent system/structure degradation. The analysis clearly distinguishes between hidden and evident failures, where hidden logic rules are much more stringent. They address aging aircraft concerns, damage tolerance rules, significant structural items, and enhanced zonal analysis procedures incorporating current FAA recommendations on aging wiring and combustible materials. All analyses are based upon thorough understanding of the aircraft's performance by using Intergraph's InsightDecisionSM, to cleanse and "mine" the aircraft's historical failure data. Moreover, the logic "audit trail" behind all WG analyses is exhaustively documented in Intergraph's InsightAnalysisSM product. The deliverable is a sweeping, lean set of maintenance tasks with all supporting rationale to safely, reliably, and economically sustain the aircraft and actively manage the SMP over the platform's lifecycle.

Delivering Results

With the analysis completed and documented in InsightAnalysisSM, VectorMx finalizes the SMP by consolidating all tasks, eliminating redundancy, and maximizing effectiveness of each inspection interval. Consistent with PPH and individual task requirements, all tasks are logically grouped, adhering to all aircraft safety, operational, and economic requirements; streamlining field and depot maintenance efficiency; and maximizing availability. The completed SMP is now ready to be translated into mechanic-centric tasks using Intergraph's VectorCardSM solution, and sustained over the aircraft's lifecycle with VectorSustainSM.

VectorMx is the centerpiece of smart, fast SMPs. It ensures aircraft safety, maximizes reliability and availability, and minimizes cost. VectorMx seamlessly integrates with Intergraph's other FleetVectorSM solutions and FleetInsight software tools providing a complete set of solutions to meet extensive aircraft maintenance needs.

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