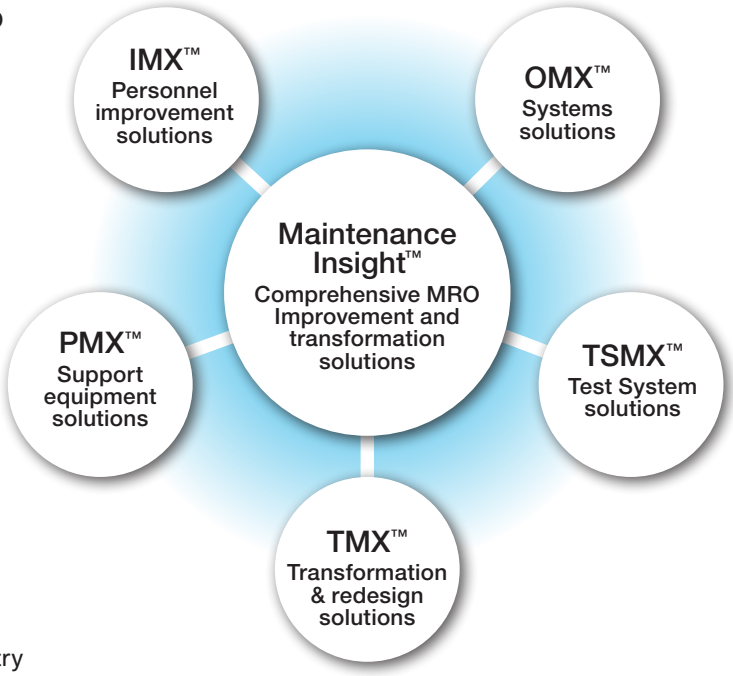
StandardAero Improves Maintenance Through Its Maintenance Insight™ Products: Bringing BI to MRO

Introduction: Intelligent System Approach for Fleet Management

StandardAero has historically emphasized strategic integration of maintenance processes, an approach that has made the company an MRO industry leader.

Today's StandardAero recognizes that improvements in complex data management, often called business intelligence (BI), provide opportunities to take unprecedented control of processes with more complete and capable measures of performance at every level of every task. Using data-driven methods to evaluate maintenance reveals insights that are not apparent using conventional metrics and that lead to unexpectedly novel and effective solutions.



StandardAero's new Maintenance Insight™ program represents a family of effective new MRO solutions derived from decades of industry experience and coupled with full understanding of the latest information technology improvements.

The Problem: Ensuring Optimum Value in MRO Tasks

Aircraft maintenance involves three tasking levels, from simple system tune-ups to component replacements up through full-scale airframe and power plant overhauls. Specialists in one level may not take the other levels into account during task completion. Furthermore, task scheduling or documentation issues may adversely affect system maintenance later in the life cycle, leading to performance problems or extra maintenance expense. Maintenance system coordination is especially important for scheduled upkeep because unaligned tasking may lead to over- or under-maintained components, and both can involve significant unnecessary costs. MRO is not static. Technologies and processes are constantly evolving and lead to new requirements that can be costly or inefficient if not recognized and incorporated. Finally, maintenance, repair and overhaul are human endeavors involving many variables that must be reviewed and evaluated to ensure that performance outcomes meet or exceed effectiveness expectations.

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Required Improvement	Location		
	1st Line	2nd Line	3rd Line
Reduce Labor Hours	X		
Reduce Cost		X	X
Improve Reliability		X	X
Improve Availability	X		
Reduce Turn Time	X	X	X
Increase Throughput		X	X
Reduce Error and Waste	X	X	X

Every aviation maintenance task involves a long list of variables that affect not only the task itself, but the effectiveness of the entire maintenance system. Some assessments are readily apparent. For example, plotting maintenance task frequency against task completion times defines difficulties that can be addressed by Performance Support Systems that reduce task times. Relatively simple reliability models can establish optimal task frequencies. However, meaningful monitoring of all of the variables that affect maintenance tasks is an overwhelming requirement without sophisticated data management architecture. Utilizing BI techniques can discover patterns, trends and implications not easily observed with conventional metrics.

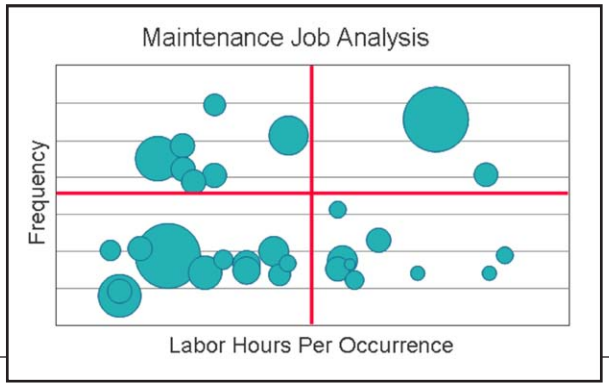
By focusing on system-wide data and utilizing a BI approach that incorporates systems engineering principles, StandardAero's Maintenance Insight™ process permits full evaluation of the entire maintenance system that leads to major new efficiency and effectiveness.

The Solution: StandardAero Maintenance Insight™

Maintenance Insight™ combines data-driven analysis down to component levels with proven systems engineering methods to provide a comprehensive and accurate operational picture to fleet managers. Maintenance Insight™ also yields options for process and performance improvements that generate tangible benefits for fleet operations.

System capabilities begin with robust data gathering. This is more than simple digitization of maintenance logs and reports. Maintenance Insight™ involves collection of voluminous data on a scale far larger than a person or simple analytical program can manage. The sheer size of digital files containing incorrect or incomplete data from multiple locations that also may require incompatible software systems can make conventional data analysis impossible, even though analysis could reveal management solutions to long-standing problems. Maintenance Insight™ uses a proven BI technique known as data mining to extract useful information, even from incomplete records, and StandardAero's uniquely qualified subject matter experts (SME) ensure full system functionality.

Data gathering is only one aspect of Maintenance Insight™'s utility. StandardAero formulates information into a wide variety of intuitive depictions – tables, charts and statistical distributions and plots – enabling managers to evaluate maintenance trends, performance strengths and gaps and alternative approaches that increase system effectiveness. Once data are gathered and analyzed, prospective solutions are identified and evaluated. Through modeling and simulation, performance-based solutions, as opposed to technology-based solutions, are selected. The Maintenance Insight™ set of solutions includes:



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Informed Maintenance (IMX™)

Advanced Interactive Technical Manuals (IETMs), Performance Support Systems (PSS) and e-Learning solutions improve the efficiency of personnel performing maintenance tasks. These solutions are targeted at performance challenges identified from the analysis of customer maintenance data and verified through subject matter expert interviews. These solutions may contain photos, video, 3D models, voice and other media to best convey information in the shortest time possible. The resulting performance improvements are validated through objective field evaluations.

Maintenance Insight™'s real strength is its ability to help fleet managers define problems by revealing issues that are not obvious in conventional data analysis.

Optimized Maintenance (OMX™)

The complexity of modern systems and the high cost of maintaining them presents many challenges for today's managers. For example, workscope determination and fleet management decisions have long-term business implications, making errors unacceptable. Given the long term impact of workscoping and fleet management decisions, statistical and cost-based models have been developed and deployed with success. This family of reliability-based optimization tools allows customers to drive their fleets to the desired operating cost per hour at a prescribed reliability level.

Solution	Accessory Troubleshooting	Process Performance	Test Cell Sustainment	Propeller Leaks	Complex Procedures	Wiring Diagrams	Borescoping	Fleet Forecasting	Aircraft Workscoping	Unscheduled Maintenance	Engine Workscoping
Micro Monitor	X										
Cellular-Lean Redesign Tools		X									
3D Models & Animations				X	X		X				
Embedded IETM Muliti-Media						X					
Performance Support Systems				X			X				
Reliability Models			X					X	X		X
Fleet Models			X					X			
Workscope Optimizers	X							X	X	X	X

To gather the high quality data needed to support these sophisticated models, data collection methods have been perfected. For example, StandardAero has developed the Maintenance Insight™ Micro Monitor, a sensor activated by system vibration that autonomously records usage time or operational cycles on components that are usually not tracked.

Process Maintenance (PMX™)

Data has shown that significant efficiency gains are possible through the deployment of improved, ergonomically designed support equipment. In addition to safety and health benefits, the fielding of equipment that facilitates maintenance can result in significant savings. Maintenance Insight™ includes a family of improved and novel support equipment intended to address specific performance problems experienced by technicians.

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Transformational Maintenance (TMX™)

When data shows that legacy maintenance processes are in need of improvement, the redesign of these processes may be warranted. Available solutions include: training on cellular-lean redesign methods, continuous improvement programs and the enterprise-level redesign of maintenance operations. The Maintenance Insight™ process uses data to tailor the solution to the problem.

Test System Maintenance (TSMX™)

Test systems present their own unique challenges for maintenance professionals. The availability of these systems is often critical to the overall maintenance process. Since test systems are a fusion of software, electronic and mechanical sub-systems, a true systems engineering sustainment strategy is necessary to achieve the desired availability. For this reason, test system health monitoring and supply chain solutions have been developed.

Maintenance Insight™'s real strength is its ability to help fleet managers define problems by revealing issues that are not obvious in conventional data analysis. The system's exceptional data management capacity correlates many variables that analysts would not usually consider in evaluating performance and processes. Maintenance Insight™ determined, for example, that a customer required an unusual labor hour total to handle wiring tasks. Analysts believed that aircraft wires were old and needed replacement, but the system showed maintainers were unable to locate electrical components because they could not read provided wiring diagrams.

The system also permits managers to evaluate options for change by using cost-benefit analysis consistent with operators' strategic goals and objectives. This permits selection of optimal trade-offs that generate rapid returns with minimum disruption of processes.

StandardAero's staff helps operators implement solutions at every appropriate maintenance level. The company involves customers throughout the implementation process to ensure that the new system prototype is complete and that all personnel accept and fully utilize all new tools and processes to institutionalize change quickly and without disruption. Consultation with users continues throughout implementation to make the new system even better and more responsive.

Once Maintenance Insight™ is in place, StandardAero keeps tabs on the system, testing results and monitoring processes to make sure that performance and process improvements are permanent and form a strong foundation for further system progress. The company may review metrics to validate solutions or even call in third-party experts to evaluate effectiveness.

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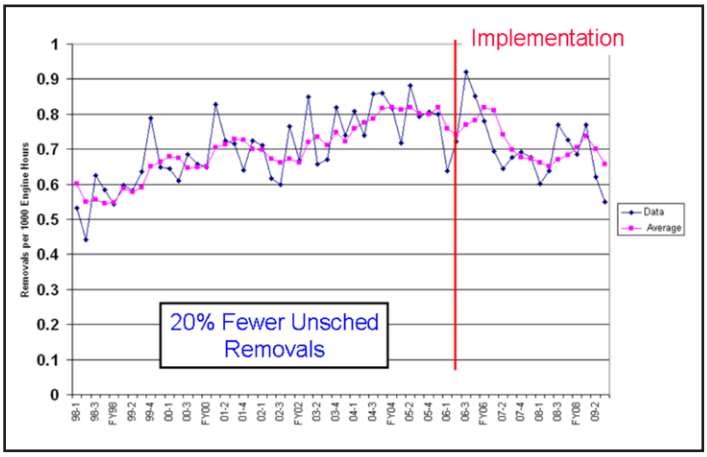
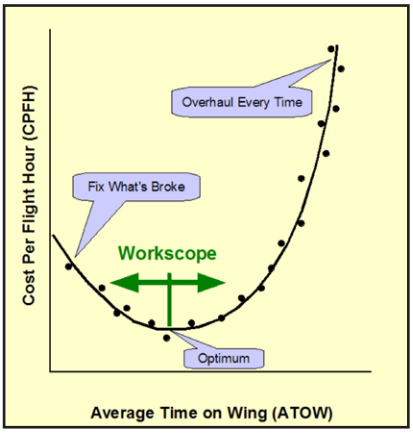
Maintenance Insight™ Creates Systematic Benefits For Customers

Maintenance Insight™ results are as substantial as the system's capabilities. Deployment of the system's OMX™ workscope optimization tools reduced unscheduled maintenance events by 20%. After comprehensive analysis showed that including photos of parts in a customer's electronics manuals eliminated more than half of the time required to find aircraft electrical components. A similar innovation, addition of IMX™ three-dimensional animations of procedures in computerized maintenance instructions, reduced times for complex, error-prone tasks by 20%. At the maintenance depot level, where major overhauls are completed, another customer cut lengthy turn times in half by implementing a TMX™ process redesign that Maintenance Insight™ suggested. Finally, newly trained technicians outperformed seasoned experts, completing engine borescope tasks faster and with fewer errors than senior maintainers after implementing a Maintenance Insight™ IMX™ Performance Support System.These examples demonstrate that StandardAero's strategic maintenance management, relying on systematic implementation of BI tools and processes, pays off quickly with exceptional cost reductions and process improvements. Maintenance Insight™ clearly demonstrates the power of data-driven, strategic management, statistical modeling and rigorous systematic analysis of processes to define problems and apply solutions.



BI and Fleet Management: Ahead of the Curve

Data generation and reliance on databases are growing exponentially, and incorporation of BI capabilities will be essential for MRO operations and fleet managers to remain competitive and positioned for future growth in an increasingly fast-paced global marketplace. StandardAero is now ready to assist aviation operators with systems implementation that utilizes new techniques and processes that will meet more complex and difficult requirements as they arise. The company's management approach is unique and will give users a clear advantage over competitors in providing comprehensive MRO support services.



With Maintenance Insight™ and other system-based maintenance techniques, StandardAero will help to create continued growth and progress for fleet and maintenance operators, helping to define a profitable and productive future for aerospace and aerospace services.

For More Information, Contact

Jim Henry
VP Engineering Services
StandardAero
210-334-6161
jhenry@standardaero.com