

MRO IT: Synergizing the Old with the New

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As the current generation of modern aircraft are delivered and integrated in today's fleets, the aviation MRO (maintenance, repair, and overhaul) industry is now a complex "melting pot" of legacy, proprietary and new systems that must extract and process faster intelligence. The advancements of new aircraft have caused a major gap not only in data, but IT prepared-ness and capabilities as well. With ongoing deliveries of new commercial aircraft, operators and MROs must quickly adapt and adopt innovative ways to progress with the emerging technologies that support the changing fleet.

Challenged with technology evolving at a much faster rate than adoption, operators must seamlessly integrate these new aircraft capabilities to be interoperable with existing systems. Because IT is still considered a cost rather than an investment, it is critical for maintenance operations to innovate their technology integration strategies with minimal cost and disruptions.

Determining approaches on efficiently synergizing legacy and current systems and technologies, and exploring strategies on maximizing technology's continual evolution were the foci of an April 8 Aviation Week Executive Roundtable held at the Phoenix Convention Center in Phoenix, AZ, USA. The goal of the roundtable was to assess benchmarks on adapting to technology's rapid changes, and generate approaches to bridging the gap between legacy and new IT capabilities.

The roundtable was hosted by Jim Sokol, vice president of maintenance operations at Southwest Airlines, and Lee Ann Tegtmeier, Aviation Week's Chief Editor MRO. The meeting was sponsored by The Boeing Company.

This was the sixth MRO IT roundtable and the fourth for the Americas region*. Previous meetings determined that innovation is not just about solving current problems, but also finding solutions to unpredicted future issues. However, to foster support for innovation, there must be a successful IT business case, where business and IT objectives are aligned and all stakeholders are engaged from the beginning.

Organizations participating in the April 8 roundtable were AAR; ABI Composites, Inc.; Acuitant Management Consulting; AerData; AeroTurbine, Inc.; AerReach LLC; AerSale; AIAA (The American Institute of Aeronautics and Astronautics); Air Canada; Air Wisconsin Airlines; Airbus Americas Customer Services, Inc.; Allegiant Air; American Airlines; ATA e-Business Program; BAE Systems; Capgemini; CAVOK Group; CIT Leasing Corporation; Embraer North America; EmpowerMX; FedEx Express; GE Aviation; Gulfstream - Advanced Aircraft Programs; Hawaiian Airlines; Intel Corporation; International Aircraft Associates, Inc.; Jazz Aviation LP; JetBlue Airways; L-3 STRATIS; LATAM Airlines Group; Leading Edge Aviation Services; Lynden Air Cargo; M1 Composites Technology Inc.; Matheson Flight Extenders; Microsoft; Mubadala MRO Aerospace Network; Mxi Technologies; National Air Transportation Association (NATA); Pratt & Whitney; PricewaterhouseCoopers LLP; Rockwell Collins; Rolls Royce; RW Aviation Advisors, LLC; Sanad; Southwest Airlines; Spirit AeroSystems; TAP Maintenance & Engineering; TAP Brazil; TeamSAL; United Airlines; Virgin America; and Volaris.

Roundtable participants divided into seven work groups that were challenged to respond to a set of questions that focused on the following topics:

- Approaches to cultivating innovation, and how it has adapted and evolved in recent years.
- Benchmarks on taking advantage of innovation, and leveraging technology's continual evolution through adoption and implementation.
- How to "bridge the gap" between legacy and current systems and technologies. Based on lessons learned, create approaches to synergize IT projects that support newer aircraft within existing fleets.

The 2014 Aviation Week MRO IT Executive Roundtable participants determined that software innovation needs to be more than just predictive, but become self-learning and self-adapting to end-user habits and utilization. New processes should be sustainable for the future, and not implemented to only address current issues. When integrating

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systems, it is important to invest in the basic foundation to establish alignment for seamless data flow. For a successful collaboration, there must be a good team of innovators and executors that can achieve cooperation among varying work cultures.

KEY FINDINGS:

- Software innovation needs to lead towards self-learning and self-adapting, rather than predictive. As the program is frequently utilized, it adjusts according to end-user habits, usage and environment.
- Don't automate bad processes. Before launching a new process, analyze via value-stream mapping and determine what is best for tomorrow, not today.
- Invest in the foundation – collate, structure, and align the data to support an executable task. Identify commonality among legacy and new aircraft data points.
- Collaborate with the right team of good innovators and executors. Great ideas are readily agreed, but adoption is harder due to different working philosophies.
- Create a “customizable” standardization, where a stable common platform is developed and applications that are personalized for the end-user are added accordingly (ex. mobile devices).
- Leverage current technologies for better data-sharing between customers and suppliers. This continues to be a top priority for the industry.

Details of topical conversations in the work groups follow.

CULTIVATING & ADAPTING TO INNOVATION

- Innovation = Forcing Change!
 - o A catalyst (reason, crisis, leadership change, etc.) is needed to force a big push or re-design.
 - o Force a process to evaluate and solve business cases/problems.
 - Need to have a formal process, such as lean, board reviews, workshops.
 - The better the business case, the higher the chances are that innovation will be funded.
 - o Same basic problems as legacy with new additions.
 - Improve operations (engine/airplane performance monitoring; inventory management; fleet management; reliability; safety; work efficiency).
 - o Pace of creating and adoption has increased. How much change do we want?
 - o Is it bite-sized or enterprise corporation-wide? Drive that investment to where your strategy sees the opportunity. Do not try to do it all. Substantial gating process of ideas.
 - Innovation needs to balance expense, risk, adoption, mindset, trade-offs.
 - o The next generation may be pushing for more, but remember that we have the experience. Newer people tend to like newer systems. Experienced employees are used to legacy systems.
- Innovation starts from understanding customer wants/needs→ should happen at all levels.
 - o Empowering the customer to make decisions (proactive messaging).
- “Customizable” standardization – create a stable common platform and add personalized applications (like mobile phones).
 - o How can you have standardization, but still have customizable without bastardizing the foundation?
- Innovating and creating software to be self-learning and adapting.
 - o Predictive vs. adaptive – adapting according to habits, usage, and environment.
 - o Software engineers/programmers are initially excited about the concept, yet tire after creating about 20%. The rest is built on modifications. Can we get to a point where initial software can adapt to user input and output?
- Crowd innovation sourcing / utilization of available technology→ data utilization→ automation.
- Work with frontline end-users.
- Take a “child” approach or baby steps. Don't overwhelm. More steps can cause overwhelm and frustration.
- Advance training and routine communication.

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TAKING ADVANTAGE OF TECHNOLOGICAL EVOLUTION

- Data sharing between customer and suppliers – need better and more efficient methods, especially leveraging current tools.
- Data quality – validation of reliable AND usable data (eliminating waste or un-pertinent data).
- Technology is meant to be an innovator not an inhibitor. However more often, it is inhibiting. Moving too fast can be disruptive.
 - o Going slow to go fast – aviation does not need to keep up with every generation of technology/IT. We are being pushed too fast, ultimately causing disruption, rather than efficiency.
 - o Instead of continuing to develop software to do more, how can we increase brain power to keep up?
 - o Many of today's consumer software are intuitive. Is aviation software intuitive enough for the front-line AMT? Humans have limited bandwidth.
- Project management culture – do not modify specs just to look to v2.
 - o Keep it simple! Remove and offload approval/delaying steps where possible.
 - o IT cycle plans – have milestones that are held accountable.
- Data consistency – as transparency increases, the system digresses.
 - o Balance between common source and richness of data.
 - o The people have to “own” the data not the IT department.
- Agile development – be prepared to evolve the project.
 - o Provide rapid development in phases.
 - o IT reporting to continuous improvement – lean startup; getting it to the business quickly.
 - o Prioritize projects – kill lower priority ones.
 - o Adapt by going backwards to preclude pain.
- Executive sponsor connected and embedded in the business to lead IT projects.
 - o Business requirements are collected and given to IT. Specification engagement with IT.
 - o Internal selling – capture key opinion leaders to ensure the idea is robust (technical, sales, time).
 - o Operations needs a mandate to be able to absorb change.
- Test through MVP (minimal viable product) – remove features to ensure stability.
- Complete mobility - instruction, status, usage, “paperless”.
 - o Mobile technology and networked devices adding value (i.e. iPad for flight crews; iPhones for flight attendants; Toughbooks for mechanics).
 - o Mobile applications that enable real-time access of data → info → executable task.
- Electronic Data Interchange (EDI) interface to maintenance IT platform/system.
 - o Paper → PDF → intelligent documents.
 - o Customer-focused publishing tool - records management.
- Improve supply chain routing to shops.
 - o Understand part location for best fit movements.
 - o Inventory distribution and logistics automation based on cognitive learning and algorithms.
- Business-driven IT.
 - o Cloud-based – still needs work on effective integration and interfaces.
 - o Sharepoint collaboration.
 - o Business Intelligence cubes and dashboards.
 - o Reliability data collection.
 - o Use of predictive analytics to reduce unplanned outages.
- Leverage OEM documentation and work instruction for the operator. How can we share OEM documentation? What is OEM willing to share without re-inventing the wheel?
- Accelerated deployment of digital/remote health monitoring.
 - o On-board maintenance solutions.
 - o Aircraft health monitoring.
 - o Live remote streaming of GTF data into predictive maintenance.
- Early engagement of regulator so they understand the goal. Limit surprises.
 - o When migrating, what is the validation from the operator that the data is correct and clean?

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APPROACHES TO “BRIDGING THE GAP” BETWEEN LEGACY AND CURRENT SYSTEMS

- Two players to consider – technician and customer. Technology should support the process.
- Do NOT automate bad processes. Apply value-stream mapping before launching new systems.
 - o Determine what is best for tomorrow, and implement that.
 - o Evaluate how much data from the old program is really needed vs. cost.
- Invest in the foundation – collate, structure, and align the data to support an executable task.
 - o New vs. old aircraft – may not be same solution/toolset, but look for common processes to blend legacy and new aircraft data points (i.e. inventory visibility).
 - o There have been infrastructure changes in the few years, but standards have been slow to evolve.
- Leverage legacy functionality with updated technology and user interface tools.
 - o Connect systems to legacy platforms to add value. Add new tools to the legacy ERP if it is too risky to implement new ERP.
 - o Usually legacy is more usable, as newer ones have more bugs and not as customizable.
- Deploy initial functionality but let organic development take hold at the user interface.
- Time-based roadmap that allows you to sequence the steps, while providing the vision/bigger picture.
- When to break with legacy system?
 - o Needs a new interface. It costs more to update or manage legacy system.
 - o “Bridging” may take more cost and time.
- New program – new tool – new budget. Easier to get funding for new programs.
- Contracts that allow you to upgrade without cost.
- Bite-sized implementation.
- Need to build/bridge an industry consortium that agrees to and sets the standard.
 - o What is the core info we all need? Need to look at from a complete system level.
- Work in parallel with the change that is happening.
- Cloud service to pool information and access – pull only needed data in piece parts for pertinent usage.
 - o Secure access – working together with and across all MRO stakeholders.
 - o Level of trust and exchange. Make information so valuable that everyone wants to access and will abide by the rules.
 - o Need effective updates in a secure environment.

* For findings and reports on past meetings, please go to <http://mediakit.aviationweek.com/ExecutiveRoundtable/>

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