

Digital Content Management in Commercial Aviation - a view by AeroSoft

Civil and commercial aviation maintenance is a very complex process bound by regulatory, OEM and financial constraints with the ultimate focus being passenger safety. Therefore, maintenance management is a critical function at airlines and this is accomplished through the implementation of software which resembles MRP or ERP (manufacturing or enterprise resource planning) but has a unique focus on the aviation maintenance business process. While traditionally the emphasis has been in managing parts, aircraft configuration, regulatory compliance, maintenance execution/progress, 'snags', and cost analysis, an essential element has been missed by all these 'MRO point solutions': parts alone do not enable maintenance tasks – an essential ingredient of 'work instructions' must accompany each and every job performed on an aircraft.

Traditionally information on how to maintain an aircraft had been structured in technical manuals and distributed in paper form – this meant literally over 100,000 pages per revision – ideally re-issued every 90 days! A 'paper standard' called ATA-100 was established in 1956 which organized these manuals according to 'systems' or 'chapters' (interiors, avionics, landing gear, engines...etc) and then further subdivided the various chapters into sections, subject and tasks, subtasks, illustrations, cautions/warnings, description and operation, installation, removal, etc. A numeric scheme called the AMTOSS (Aircraft Maintenance Task Oriented Support System) codes was created according to this standard that allowed the detailed 'homing in' of each activity based on the numeric coding of a task. For example 32-51-00-860-801 means "Landing Gear, Nose, Steering," and the Task is "Put the Landing Gear on Greased Surface for Steering Test" – for the Airbus 340 July 2009 Revision.

Managing this volume of paper in terms of distributed copies, faxed pages etc. and having it available in the correct work packages along with the parts and work schedule to perform the maintenance became an unwieldy task especially in large, multiple aircraft fleet airlines. With the evolution of computing and telecommunications technology paper gave way to digital documentation – however the early implementations involved unique and proprietary formats from each OEM or software supplier or aircraft type which did not meet the promised benefits of eliminating paper nor did it enable re-use of the information in any effective manner.

Starting in 1990 the ATA/EMMC/TICC (the Air Transport Association and its executive levels) established another group to develop digital 'open systems' standards for aircraft maintenance from which initially the iSPEC2100 was created. This was then blended in the ATA-100 spec and became iSPEC2200 - the digital content standard for commercial aircraft, built using SGML and CGM (Structured Generalized Markup Language and Computer Graphics Metafile). To manage digital documents, something other than libraries with rooms of bookshelves are required!

Digital documents arrive on 'media' and again have full revisions or temporary revisions and must be managed in

terms of the 'current / official version', any locally added content or locally derived documents (such as task cards) and it must be distributed on demand to the points where it will be used by the engineers/mechanics in either planning/preparing or executing the maintenance tasks.

AeroSoft Systems Inc is in a unique position as a software supplier established in 1997 in Toronto, Canada, to deliver complete solutions in this domain. When founded, AeroSoft developed 'point solutions around digital document' issues (automatic generation of job cards) then proceeded in adding its first product DigiMAINT (a parts/configuration oriented maintenance and engineering point solution). This was based on proven business processes and became the first Web Browser/Web Server implemented solution in M&E for commercial aviation in 2001.

Subsequently in 2003/4, AeroSoft acquired another 'M&E' system which had again a robust customer base and business process wealth and migrated it to Windows and now to WebPMI. In parallel however, AeroSoft did not give up the 'digital document roots' of the company: It added digital document attachments to DigiMAINT and an electronic library management system and also the Desktop Job Card Manager module to WebPMI. The AeroSoft vision was completed in 2008/09 when, through a commercial and technical licensing agreement, it acquired an established digital content management solution and launched it as DigiDOC.

It has all the key elements for digital content management: the XML (Extensible Markup Language) repository, the 'parsing engines', differencing engine for validating and transforming iSPEC2200 content and then applying effectivity resolution and formatting rules for the methods of presentation through an online connection and a browser or publishing on a CD/DVD for maintenance bases that have unreliable communications links. The applications under DigiDOC include 'Interactive Electronic Technical Manual' with links across document types (AMM to IPC to Job Cards), Local Content / Customer Originated Change Management (as in locally authored / derived documents), Job Card generation (from MPD and AMM) and Maintenance Requirements Management / MPD revision management / impact analysis.

The entire technology is based on Java, Virtual Machine, XML, SGML, CGM and can accept both iSPEC2200 or S1000D digital content while it serves it to the end user in real-time conversion to HTML through XML/XSL transformations. The technology has been implemented in various integration solutions at major OEM's and airlines globally before it was licensed to AeroSoft. Companies such as SAS, British Airways, Lufthansa Technik, Condor Cargo, Singapore Airlines, Rolls-Royce and Bombardier Aerospace have components / applications implemented.

What makes AeroSoft unique is that having products in both the parts/aircraft domain (DigiMAINT, WebPMI) and in the digital content domain (DigiDOC) it is able to truly integrate both to deliver the essential solution to

the customers. More importantly, DigiDOC is essentially one of four or five solutions recognized globally as 'digital content management for commercial aviation' and it can be implemented as an addition to existing part-oriented MRO software or it can be integrated with solutions provided by AeroSoft competitors, in addition to complementing AeroSoft's own MRO product suite.

AeroSoft has participated regularly in key industry events (MRO Data Management- Aviation Week, MRO/IT – Aircraft Commerce, ATA e-Business forum) and has been invited to deliver papers in such events. CEO Thanos Kaponeridis was a member of ATA/EMMC/TICC Text Working Group starting in 1994 and later also participated in the Flight Operations Working Group in the development of iSPEC2200 and SPEC2300 respectively.

One question remains: iSPEC2200 or S1000D - which is 'better'? While there is no doubt that S1000D will become the digital information delivery and storage standard (and it is not based at all on a 'document paradigm') the reality is that today the only aircraft which are being manufactured according to S1000D are the B787 and the A350. Even the A380 is iSPEC2200 based and the B777 is the only aircraft by Boeing that has a complete iSPEC2200 SGML document suite – all other programs have some SGML and some .PDF or proprietary digital data services. The complete current base of about 20,000 commercial aircraft flying today have various revisions of iSPEC2200 based digital documents available from the OEMs. More importantly the OEMs have vowed openly that legacy aircraft (everything prior to the B787 and A350) will not be converted from iSPEC2200 to S1000D because the costs are very high, the ROI is not obvious and the process cannot be completely automated and requires continuous manual intervention which is prone to errors.

OEMs are able to offer operators a complete managed service with seamless collaboration of core asset data. This is essential for providing Continued Airworthiness Management Organization (CAMO) services and managing an operator's EASA Part M and/or Part 145 services.

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