

Electronic Standards Access in Aviation: Real Time Savings

By Jeff Hill, Phormion Sales Tools, Inc.

As Woody Allen put it: "I took a speed-reading course and read *War & Peace* in twenty minutes. It involves Russia." It's a great line, but unfortunately, the engineers, compliance officers, mechanics, and other professionals who access FAA regulations, maintenance manuals, rule changes, air worthiness directives and other critical information don't have the luxury of applying speed reading techniques to reduce the time they spend extracting the information they need from the countless pages generated annually by the FAA. To assist with the effort, companies like IHS have developed technologies that enable aviation professionals to significantly speed up these daily searches. More importantly, they can also be assured that the most recent information is included in the searched material. What follows is a discussion of how the proliferation of electronic access to standards has significantly saved the aviation industry time and money.

Compliance Cost Defiance

A certifications manager at a leading aviation electronics manufacturer knows the importance and cost of compliance. Her group maintains more than 10,000 TSOs (Technical Standard Orders) as well as many other approvals, processing almost 50 new equipment approvals annually.

In nineteen years, this manufacturer has experienced only one non-compliance notice. This impressive record is made even more notable when one considers that the size of their compliance group has decreased while the volume of new equipment approvals has doubled from approximately 25 approvals to 50 new approvals annually.

This efficiency improvement is due in no small part to this manufacturer's use of IHS' AV-DATA® solution. The certifications manager recently commented, "Searches are much faster with IHS... I have nothing but good things to say about the product."

Although this manufacturer's experience highlights the value of electronic access in the equipment design and manufacturing compliance segment of the aviation marketplace, the efficiency of aviation operations compliance departments have been similarly enhanced.

The Flight Operations Supervisor in the Compliance Department at a leading transport company, reports comparable cost savings in his flight operations compliance area.

This supervisor's group is responsible for assuring that their flight operations comply with all FAA rules and regulations. He considers IHS "an invaluable resource that has saved me untold hours of research time over the years...dramatic time savings." In fact, he confidently estimates that his four-person compliance team would need to add "at least two more people" if the IHS service were not available. In the case of this company, it was much more cost effective to purchase an IHS subscription than increase their compliance staff by 50%.

Violation of an FAA FAR (Federal Aviation Regulation) might result in a relatively insignificant fine of only \$1,000 or \$2,000, but as IHS' customer Jeff King of Duncan Aviation's Avionics Quality Assurance Department points out, multiple compliance violations are certainly the death knell for an aviation company. Think of it in the same way that a health department violation damages the reputation of the targeted restaurant much more than the nominal cleanliness fine would impact the bottom line. Indeed, Duncan Aviation has never incurred a single compliance fine.

"IHS has proven to be an invaluable resource that has saved me untold hours of research over the years."

Flight Operations Supervisor

The value of electronic documentation services does not lie merely in its ability to aid aviation companies in maintaining compliance. These companies have no choice but to guarantee compliance or they will cease to exist. Electronic documentation services, like those provided by IHS, enable users to assure their compliance more efficiently and cost effectively; the same compulsory, essential objective accomplished with fewer people and potentially higher quality.

A Day Late and a Dollar Short. . . Or a Day Early and a Dollar to Spare

In the aviation maintenance and compliance arenas, timing is everything, and today's electronic technical documentation services are all about timing.

As Gary Clinton, Specialist Air Worthiness Engineer at Goodrich Actuation Systems in the UK comments: "The principal benefit of the IHS service is having up-to-date information... things are constantly changing."

In the case of Goodrich, these "things" are airworthiness requirements critical in the certification of their new flight controls. IHS' AV-DATA service is the tool used to assure they have the latest information.¹

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How important is the timely availability of FAA directives, updated standards, and other aviation information?

Jeff King, Avionics Quality Assurance Manager at Duncan Aviation's Nebraska facility, provided some insight into the potential "cost of bad timing" when relating the following hypothetical scenario:

Our customers want all scheduled and required work done while the plane is with us [i.e. taken out of service for scheduled maintenance] to keep that aircraft flying. What happens if the airplane just left our facility and that day we receive an updated regulation from the FAA in the mail? That aircraft would have to return for further work, removing it from service again and certainly not pleasing the customer. The currency of IHS' information prevents that from happening.²

Given that it may cost hundreds (or even thousands) of dollars each hour to remove a revenue-generating aircraft from service, a late-arriving directive from the FAA could pose substantial costs to the customers of companies like Duncan Aviation and may even cost Duncan Aviation a valuable customer.

Timing is critical when the FAA is considering new rule changes and solicits commentary from the industry.

The flight operations supervisor, previously quoted, emphasizes the value of IHS' daily updates on proposed rule making, enabling his company to influence potential rules with multi-million dollar ramifications before they are set. For example, recent efforts by the FAA to extend ETOPS (extended range twin engine operations) restrictions to three- and four-engine aircraft was successfully challenged by the company, saving them millions of dollars had the rule been adopted.

In another example, the value of timely notification is highlighted when the company successfully obtained a critical waiver with a firm deadline:

After 9/11, cockpit access rules were proposed frequently. We received notification of those proposed rules immediately through our IHS service, giving us time to apply for appropriate waivers... For many of the rules, if you didn't submit the waiver request by a certain date, it was summarily denied and you could be forced to implement a costly aircraft modification that otherwise would have qualified for a waiver.

In a cruel twist on the old adage: "a day late and a dollar short," finding yourself a day late in the world of the FAA may mean your company finds itself a day late and a million dollars short.

Designing Away Cost

So far our discussion has centered on the use of electronic documentation and standards services on the operational side of the aviation fence, yet current and easily accessible electronic information may offer the most financial leverage in the design phase of aviation products. Some estimate that almost 90% of the costs for the development of an aviation system are committed via design decisions made in the first 10% of the development period.³

"the IHS service saves a lot of time. . . We don't have to call anybody. . .we don't have to wait."

David Elazar,
Manager, Technical Information Center
Israel Aircraft Industries (IAI)

The aviation electronics manufacturer's certification manager knows this better than most:

If you're in the design phase and a key rule comes out that impacts design, it could be a huge cost for a re-design or re-make... IHS is consistently ahead of its competitors in notifying us of rule changes.

As the design process is further automated and more rapidly completed, the need for timely information is amplified. The certifications manager reports that the typical development time at her company has decreased from two years to just eight months over the past decade. Electronic documentation services have not only been a key mechanism needed to react to this compression of the design cycle, but may in fact, have contributed to it.

David Elazar, who manages the Technical Information Center at Israel Aircraft Industries (IAI), reports that for IAI engineers, the IHS service "saves a lot of time... We don't have to call anybody...we don't have to wait" for critical standards and other information when designing new aviation components.⁴

At one of the aviation industry's leading airframe manufacturers, a manager of structural damage technology, agrees that the availability of readily accessible electronic information speeds the design process. His group is part of the company's Structures Engineering Department; providing structural analysis services and troubleshooting expertise for both new airframe designs and operational aircraft. He comments that "just finding the data quickly on a messy desk is a challenge."



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He knows that the "immediacy [of the IHS information] is a great help... We used to make a request to the library and a few weeks later it would finally show up." Urgent design considerations were made while critical information was still on its way, so decisions were typically based on a less-than-optimal data set. Access to electronic data now prevents the re-creation of data that already exists; for example, materials property data already developed by another group. Overall, this manager estimates that electronic data access services' combination of search time savings, better design decisions based on information currency, and the elimination of "wheel re-invention" has combined to reduce their overall design and engineering time by 5% to 10%.

This example highlights the value of re-using and not re-inventing materials property testing data. Electronic services has enabled his team to quickly find the data they previously would have re-created. Re-inventing the wheel, however, is not merely limited to test data, and eliminating such efforts in other areas of design can yield considerable time and cost savings.

Ray Woodson, Supervisor of Advanced Aerodynamic Design at Cessna, knows exactly how costly it can be to spend time solving aviation engineering problems others have already tackled. His team has recently subscribed to ESDU, IHS' validated engineering design methodologies on-line service, and has seen a reduction in the time necessary to design airframe surface features of up to 50%.

Begun more than sixty years ago by the British Royal Aeronautical Society, IHS' ESDU service combines the design knowledge and methodologies of countless aviation experts and design engineers into a single, searchable, on-line database. Thus, an engineer at Cessna confronted with an airfoil design challenge would not be required to spend precious time deriving the necessary equations to complete the design effort; those equations or methodologies, as well as wind tunnel and other data germane to the problem, are likely already available in ESDU.

Woodson is understandably enthused about this new tool at his design team's disposal. "On average, we have reduced the amount of time required to design aerodynamic surfaces by 50% compared to the traditional approach. The answers that we obtain using the ESDU methods also tend to be more accurate because they are based on a combination of theory and validated data, rather than theory alone."⁵

Kevin Runge, Product Engineer at Orbital Sciences, understands that simply finding a properly-rated part can be a time consuming challenge when designing and building aviation or aerospace systems. Runge is responsible for the design of power conditioning electronics for Orbital Sciences spacecraft, subsystems that often comprise 500 space-rated parts and electronic components. Given the unique environment in which spacecraft operate, and underscored by the reality that once in orbit, repair is virtually impossible, components must be appropriately designed, tested and rated. For this reason, Runge attempts to re-use as many components as possible from previous spacecraft designs, but typically has to identify approximately 50 new components for each new system. At one time this task consumed more than three weeks of dedicated paper-catalog manual searching.

"CatalogXpress® frees me up to spend considerably more time on my other responsibilities."

Kevin Runge
Orbital Sciences Product Engineer

Thanks to IHS' CatalogXpress®, the new electronics parts database service deployed by Orbital, Runge's more than three week parts specification effort has been reduced by two-thirds.

"Specifying components used to occupy a large portion of the time required to validate space-qualified parts... The time saved by CatalogXpress frees me up to spend considerably more time on my other responsibilities."⁶

Maintaining the Bottom Line

From 1991 to 2000, the number of pages in the Code of Federal Regulations (CFR) increased by nearly a third; in fact, the CFR grew by 3,300 pages from 1999 to 2000.⁷ That is a total of 275 pages per day in 1999, or the equivalent of a brand new book of regulations written in every 8-hour shift. The CFR covers all federal regulatory agencies, not just the FAA, but we have clearly been witness to a regulation explosion over the past decade.

Despite an ever increasing number of rules governing aircraft operations, the number of mechanics per aircraft departure has decreased by 8% over that same period (1991 to 2000).⁸ This improvement in operational efficiency can be partially explained by the introduction of better equipment that requires less maintenance, among various other factors, but it would be irresponsible to ignore the explosion in computers and electronic document access that occurred from the beginning of that decade, an explosion that was clearly not ignored by the aircraft maintenance industry.

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However, there is no need for simple speculation. Examples of time and cost savings directly attributable to the availability of critical aviation documentation in electronic form abound.

A line maintenance manager for Air France attributes substantial maintenance time-savings to the availability of electronic maintenance manuals for the new Airbus A330/A340:

Thanks to the replacement of paper manuals with CD-ROMs, we spend less time looking for the cause of a breakdown... Electronic documentation, such as the troubleshooting manual, allows us to save 20% more time compared to what we do on older-generation aircraft such as the A300/A310.⁹

The time and cost savings extends to component maintenance as well. Jeff King, at Duncan Aviation, attributes a significant portion of his team's increased throughput to the immediate electronic availability of the latest FAA directives and easily searches federal regulations provided by his IHS service. Eliminating the need to search paper manuals or wait for the latest FAA release to be delivered in the mail, technicians no longer need to leave their desks to access information critical to their job functions.

The Duncan avionics team has been using IHS solutions for almost four years. Over that period, their daily avionics system throughput has improved from approximately 80 units to 95 units, without any increase in personnel.

King attributes at least 15% of this improvement in his group's efficiency to the IHS service. That translates into an additional monthly revenue stream of tens of thousands of dollars, and all without the need for additional manpower or equipment.¹⁰

It is not only isolated airlines or aircraft maintenance companies realizing strong returns on their investments in electronic documentation services.

Robert Peel of the Air Transport Association confirmed that the positive financial impact of services like those IHS offers is an industry-wide trend. In a recent interview, ATA's Senior Director of Technical Data Standards summarized the electronic documents trend in the maintenance arena:

To get a clear picture of the benefits-to-cost ratio, we conducted surveys in both 1999 and 2001 within the airline community. We wanted to find out first whether they had applied digital data within their maintenance environment, and if so what the effect was. The results of both surveys were very positive. The number of airlines using digital data is rapidly rising, and those airlines that had utilized digital data saw better data accuracy and timeliness, reduced timelines, cost reduction, and improvement in overall maintenance support efficiency.

Conclusion

Saving time and money is at the top of the list of business objectives in any industry, but in the aviation world, assuring that the job is done right and in line with standards is even more vital. Providing critical information to key personnel to ensure that all regulations are observed without question, and doing so in a way that saves time and money is what electronic access to technical information services, like IHS, is all about. The aviation industry is rapidly coming to realize the bottom line value of such services, and many people agree that it's about time.

1 Interview with Gary Clinton, Goodrich Actuation Systems, January 12, 2004.

2 Interview with Jeff King, Duncan Aviation Quality Assurance.

3 "Aerospace Within the European Research Area" European Association of Aerospace Industries, 2001.

4 Interview with David Elazar, Israel Aircraft Industries, December 4, 2003.

5 IHS case study: <http://www.ihs.com/litcenter/133-11.pdf>.

6 IHS case study: <http://www.ihs.com/engineering/case-studies/orbital.html>.

7 Cato Institute Paper.

8 ATA Reports.

9 "Airbus Vs. Boeing: Modern Aircraft Maintenance". Aviation Today, June 1, 2003.

10 Interview with Jeff King, Duncan Aviation, November 20, 2003.