

Electronic Standards Access in Aviation: Real Time Savings

By 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 Evelyn Wood speed reading techniques to reduce the time they spend extracting only the information they need from the countless pages generated annually by the FAA. However, companies like IHS have developed systems and 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. In the pages that follow, we'll discuss not only how the advent of electronic access to standards has saved the aviation industry time and money, but more importantly, how much.

Compliance Cost Defiance

Elizabeth Ray, the Certifications Manager at aviation electronics manufacturer Rockwell-Collins, knows the importance - and the cost - of compliance. Elizabeth's group maintains more than 10,000 TSOs (Technical Standard Orders) among many other approvals, and processes almost 50 new equipment approvals annually.

In 19 years, the company has experienced only one non-compliance notice. This impressive record is made even more notable when one considers that the size of Elizabeth's compliance group has decreased while the volume of new equipment approvals has increased (from 25-30 new approvals to 50 approvals each year.)

This efficiency improvement is due in no small part to Rockwell's use of IHS' AV-DATA solution. "Searches are much faster with IHS...I have nothing but good things to say about AV-DATA," Elizabeth said recently.¹

Although Elizabeth'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.

Dan Brunmeier, Flight Operations Supervisor in the Compliance Department at UPS, reports comparable cost savings in his flight operations compliance area.

Dan's group is responsible for assuring that UPS flight operations comply with all FAA rules and regulations. Dan considers IHS "an invaluable resource that has saved

me untold hours of research time over the years... dramatic time savings." In fact, Dan confidently estimates that his four-person compliance team would need to add "at least two more people" if the IHS system were not available.

So, would you rather purchase an IHS subscription or increase your compliance staff by 50%?

IHS Value Highlight

Company:
Rockwell-Collins

IHS Product:
AV-DATA

Bottom Line:
Compliance Staff Size
Decreases as Number of
Approvals Have Increased

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 pointed out, multiple compliance violations are certainly the death knell for an aviation company. Think of this 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."

Dan Brunmeier
Flight Operations Supervisor

The value of electronic documentation systems 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 systems, 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.

IHS Value Highlight

Company:
UPS

IHS Product:
AV-DATA

Bottom Line:
Operations Compliance Staff
Reduction of 50%

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 systems are all about timing.

As Gary Clinton, Specialist Air Worthiness Engineer at the UK's Goodrich Actuation

Systems said: "The principle benefit of the IHS system is having up-to-date information. ... Things are constantly changing."

In Gary's case, these "things" are airworthiness directives critical in the certification of Goodrich's new flight controls. IHS' AV-DATA service is the tool Gary uses to assure he has the latest information.²

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

Jeff King of Duncan Aviation 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.³

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 might even in the long run cost Duncan Aviation a valuable customer.

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

Dan Brunmeier at UPS emphasizes the value of the IHS system's daily notices on proposed rule making, enabling UPS to influence potential rules with multi-million dollar ramifications before they are set in concrete. For example, a recent effort by the FAA to extend ETOPS (extended range twin engine operations) restrictions to three- and four-engine aircraft was successfully challenged by UPS, saving them millions of dollars if the rule had been adopted.

In another example, the value of timely notification is highlighted when UPS 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 system, 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 could have qualified for a waiver.⁴

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 systems 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.⁵

Elizabeth Ray, the Certifications Manager at Rockwell-Collins 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.⁶

"IHS is consistently ahead of its competitors in notifying us of rule changes. I have nothing but good things to say about AV-DATA."

Elizabeth Ray
Certifications Manager

As the design process is further automated and more rapidly completed, the need for timely information is amplified. Elizabeth reports that the typical development time at

Rockwell-Collins has decreased from two years to just six to eight months over the past decade. Electronic documentation systems 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 manages the Technical Information Center at Israeli Aircraft Industries (IAI). He reports that for IAI engineers, the IHS system "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.⁷

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

IHS Value Highlight

Company:
Major Aviation Airframe

IHS Product:
ESDU

Bottom Line:
5% - 10% Design & Engineering Time Reduction



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Matt knows that the "immediacy [of the IHS system] 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, Matt estimates that electronic data access systems' combination of search time savings, better design decisions based on information currency, and the elimination of "wheel re-invention" combines to reduce overall design and engineering time by 5% to 10%.⁸

Matt's example highlights the value of re-using - and not re-inventing - materials property testing data. Electronic systems enable 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, the Supervisor of Advanced Aerodynamic Design at Cessna knows exactly how costly it can be to spend time solving aviation engineering problems others have tackled. Ray's team has recently subscribed to IHS' ESDU on-line validated engineering design methodologies service and has seen a reduction in the time necessary to design airframe surface features of up to 50%.

Begun more than 60 years ago by the British Royal Aeronautical Society, the IHS EDSU 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 via ESDU.

Ray 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."⁹

Kevin Runge, Product Engineer at the spacecraft development company Orbital Sciences understands that simply finding a properly-rated part can be a time consuming challenge when designing and building aviation or aerospace systems. Kevin 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, Kevin 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.

"The IHS system saves us a lot of time."

David Elazar
Technical Information Center

Thanks to IHS' CatalogXpress^{®10} the new electronics parts database system deployed by Orbital, Kevin'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."¹¹

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 just 1999 to 2000.¹² That's 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.

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

Kevin Runge
Product Engineer Orbital Sciences

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).¹³ 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.

IHS Value Highlight

Company:
Cessna

IHS Product:
ESDU

Bottom Line:
50% Airframe Surface
Design Time Savings

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However, there's 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/A310.¹⁴

The time and cost savings extends to component maintenance as well. Jeff King, Avionics Quality Assurance Manager at Duncan Aviation's Lincoln, Nebraska facility, attributes a non-trivial portion of his team's increased throughput to the immediate electronic availability of the latest FAA directives and easily searchable federal regulations provided by his IHS system. 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 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.

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

It's not only isolated airlines or aircraft maintenance companies realizing strong returns on their investments in electronic documentation systems.

Robert Peel of the Air Transport Association confirmed that the positive financial impact of systems 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.¹⁶

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 the 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 technical information access systems

like IHS are all about. The aviation industry is rapidly coming to realize the bottom line value of such systems, and many people agree that it's about time.

IHS Value Highlight

Company:
Orbital Sciences

IHS Product:
CatalogXpress

Bottom Line:
Parts Identification
Time Cut by 66%

IHS Value Highlight

Company:
Duncan Aviation

IHS Product:
AV-DATA

Bottom Line:
Avionics Throughput
Improvement of 15%

¹ Interview with Elizabeth Ray, Rockwell-Collins, December 1, 2003.

² Interview with Gary Clinton, Goodrich Actuation Systems, January 12, 2004.

³ Interview with Jeff King, Duncan Aviation.

⁴ Interview with Dan Brunmeier, UPS.

⁵ "Aerospace Within the European Research Area." European Association of Aerospace Industries. 2001.

⁶ Interview with Elizabeth Ray, Rockwell-Collins.

⁷ Interview with David Elazar, Israeli Aircraft Industries, December 4, 2003.

⁸ Interview with Matt Miller, Airframe Manufacturer, December 5, 2003.

⁹ IHS case study: <http://www.ihs.com/litcenter/133-11.pdf>.

¹⁰ CatalogXpress® is a comprehensive collection of electronics component information sources that allows engineers to find information on products and components in a single search. The product contains information on the parts produced by 16,000 of the world's top manufacturers. Model numbers and industrial and military specification numbers are also indexed, making it easy to find manufacturers who conform to necessary standards.

¹¹ IHS case study: <http://www.ihs.com/engineering/case-studies/orbital.html>

¹² Cato Institute Paper.

¹³ ATA Reports.

¹⁴ "Airbus Vs. Boeing: Modern Aircraft Maintenance". Aviation Today, June 1, 2003.

¹⁵ Interview with Jeff King, Duncan Aviation Quality Assurance, November 20, 2003.

¹⁶ Robert Peel interview.