



News from the Hill

BY JASON DICKSTEIN
AEA GENERAL COUNSEL

This summer, I was privileged to be invited to speak at the FAA/NASA software and complex electronic hardware conference. One thing I learned is that there are a lot of exciting FAA developments just over the horizon!

The FAA's Aircraft Certification Service announced its FY 2006-2010 five year plan for software and complex electronic hardware at the Conference. While the FAA's main goal is always to support safety, there are two factors that play a heavy role in shaping the current five year plan: standardization across Aircraft Certification Service and meeting the needs of both FAA field offices and industry in a timely manner.

Integrated Modular Avionics

One item that will be interesting to AEA members is the new guidance on Integrated Modular Avionics (IMA). The FAA plans to issue an advisory circular on IMA to recognize the work done jointly by the RTCA Special Committee SC-200 and their European counterpart, EUROCAE WG 60. RTCA's SC-200 was chartered in early 2002 to develop a guidance document for the design, development and certification of integrated modular avionics—EUROCAE WG 60 was commissioned to pursue the same goals from the European approach. They have been working toward the creation of

common guidance that will be useable in Europe, the United States and Canada. The ultimate purpose of this joint work has been to develop guidance to:

- Support certification of all classes of aircraft implementing IMA;
- Define the key characteristics of IMA;
- Propose and document means for the stand-alone approval of modular avionics separate from the installation/applications (analogous to TSOA for TSOed components);
- Permit manufacturers to “transfer certification credit” and easily reuse IMA components and systems in other certification projects; and
- Coordinate with other groups on resolutions to IMA issues that the industry is facing.

IMA is very exciting, because the theory is that a government entity can issue an approval for components in one configuration (e.g. an STC for a new avionics suite) and can then explicitly use this approval as the basis for subsequent certifications and approvals. The underlying idea is that the IMA will consist of a shared set of flexible, reusable and interoperable hardware and software resources that create a platform that provides services, designed and verified to a defined set of safety and performance requirements. Part of the idea of interoperability encompassed within IMA should eliminate some of the concerns that the FAA has about complex installations,

where there is an acknowledgement that individually approved components still need to be STCed together because the complexity of their concatenation provides the potential for unforeseen hazards (e.g., where a grouping of individually-approved equipment threatens to overload the bus when installed together).

The concepts underlying IMA are not new—IMA shares a common conceptual background with the idea of a follow-on field approval, in that “Acceptance” or approval of modules and applications enables a subsequent project to rely on that past approval without having to revalidate those issues in the subsequent project—thus, acceptance/approval efforts do not need to be repeated where unnecessary. But the RTCA-EUROCAE guidance will formalize the process associated with this sort of reliance.

This sets an exciting precedent for the maintenance community. In too many cases, we have seen AEA members being forced to reinvent the wheel and obtain approval for data that has already been approved, even though there are no changes in configuration or physical characteristics that would seem to dictate a re-approval of the relevant data. Hopefully the formality of processes associated with the IMA document will permit manufacturers to better support repair stations seeking follow-on field approval by more clearly delineating the categories of

data for which appropriate approval has been issued and for which no additional approval is necessary.

The IMA project is well on its way. As of the beginning of August, the FAA expected to see a draft IMA advisory circular in September 2005, with final guidance being issued by September 2006. AEA members looking for more information on IMA should contact John Lewis at John.Lewis@faa.gov.

Object Oriented Technology

In FY 2004, the FAA published a Handbook on Object-Oriented Technology (OOT) in Aviation. This handbook is available on the FAA's website.

One reason for its publication was the fact that an increasing number of software developers were using or considering the use of OOT in aviation applications. The problem was that it was unclear how OOT fit into the context of RTCA/DO-178B Software Considerations in Airborne Systems and Equipment Certification. The FAA therefore set about to identify and document safety and certification concerns about using OOT in compliance with DO-178B. To meet this objective, the FAA and NASA asked the aviation software community to submit technical concerns about safe use and certification of OOT to an issue list, and to attend and participate in public workshops in 2002 and 2003 to debate the concerns and to recommend best practices.

The continuing interest in OOT following the issuance of the 2004 guidance was demonstrated in a recent FAA survey of aircraft OEMs (Europe and US represented), avionics suppliers (U.S. and Canadian suppliers represented), consulting DERs and third-party development and verifica-

tion organizations. The results of the survey were that 69 percent of the respondents reported that they were using object oriented languages in their programming, and another 9 percent reported that they plan to begin using object oriented programming languages in the future. Well over half of the respondents are using C++. The second-most popular language, used by about one in six respondents, was ADA.

The FAA is now seeking to develop OOT training and guidance materials. Part of this training will be based on the feedback that Headquarters has received from the field on this issue in the wake of the publication of the handbook.

Software Considerations in Airborne Systems

In October 2004, FAA requested that RTCA form a special committee, dedicated to aeronautical software, whose purpose would be to modify DO-178B and 1) develop supplements to document technology—or method-specific guidance, 2) develop guidelines to explain and assist in application of software assurance, and 3) develop rationale for each objective.

The committee, known as RTCA SC-205, is performing its work jointly with its European counterpart, EUROCAE WG-71. They held their first joint meeting in March of this year and have developed a work plan that anticipates a December 2008 completion date. The final anticipated work product is expected to be an advisory circular to implement DO-178C. For more information on this, you can contact Barbara Lingberg at barbara.lingberg@faa.gov.

Training

One area that the FAA discussed was the plans for training. The FAA would like to provide its employees with more training in software and complex electronic hardware issues. Classes that the FAA anticipates providing include the following (parentheticals indicate projected class availability date):

- Software Fundamentals (Jan 06)
- Object Oriented Software (July 06)
- Software Job Functions (Aug 06)
- Software Job Functions for CNS Personnel (FY07)
- Real Time Software (FY07)

The FAA has also identified several class topics for future consideration:

- Complex Electronic Hardware (for FAA Engineers and DERs)
- OO Basics IVT
- SC-200 DO-XXX (IMA) IVT
- Databus AC IVT
- Manufacturing Software course

While these classes are primarily designed for FAA employees and designated engineering representatives (DERs), the public is usually welcome to attend any class on a space-available basis.

One way that AEA members can help is by making the AEA training available to your local FAA offices. Be sure to invite your principal avionics inspector to the next AEA regional meeting, but don't forget the aircraft certification personnel: be sure to invite the local aircraft certification engineers to an AEA function as well, so they can see how their certification ideas are put into practice in the real world. Full details on AEA's Regional Meetings and other training opportunities are available on the AEA website at www.aea.net. □