

The digitized paper chase

DOCUMENTS AND INFORMATION EXCHANGE is a vital capability for the engineers who design, manufacture, assemble, and maintain aerospace and defense systems. The burden of transferring such information is enormous. It is often said that for each aircraft built, the weight of the documents that follow is equal to the weight of the aircraft itself.

A major challenge in the aerospace and defense industry is the “paper chase,” the requirement to manage, author, quality assure, view, and publish information in a readable and usable form. More important today, though, is that those five elements be integrated with each component. This streamlines communications within interdepartmental groups, simplifies processes, enhances the quality of information, and brings about new efficiencies that help to save time and money.

Only with an integrated information/document management solution can eff-

ective rules and processes be established and implemented—from start-up through authoring to final delivery—and changes made later in the document life cycle. Managing documents, quality reports, maintenance procedures, training material, and video content is enormously complex. One product that accomplishes this is the S1000D Publishing Suite from Inmedius. Understanding the various modules of this product makes it easier to understand what makes documents and information so difficult to manage, and how important it is to have an effective online management tool.

S1000D Publishing Suite

The S1000D Publishing Suite consists of seven modules: Manager, Author, Review, Impact, Transition, Interact, and Instruct. There is also an overriding component that allows a department or company to specify configuration rules

only once, thus extending or even amending those automatically defined by the S1000D product itself.

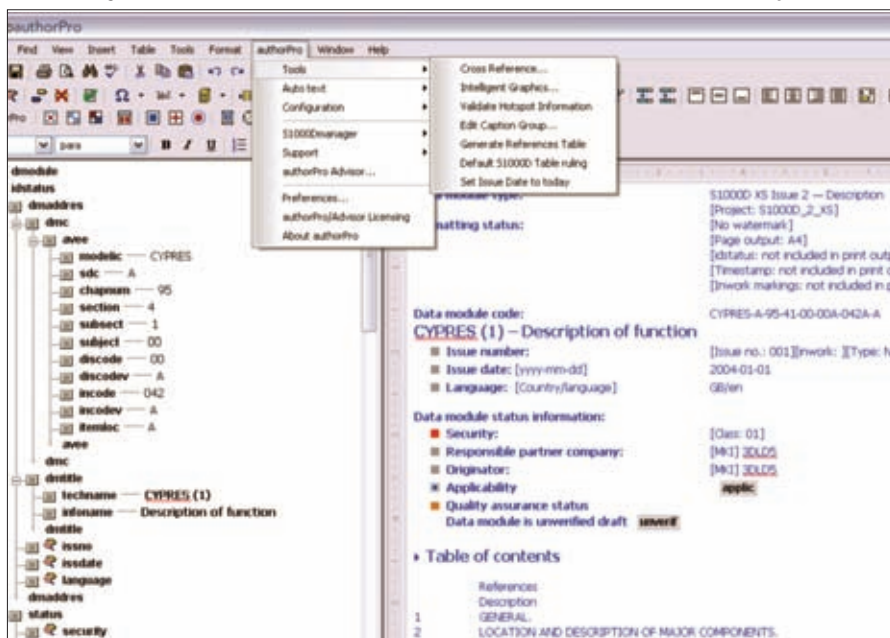
Once those project rules are established (detailed in the Common Source Database), the rules are automatically managed throughout the process (and all seven modules)—controlling what content the author can or cannot see or amend, addressing both the security labeling and the extent of information that appears for different classes of users. The suite even provides precise control over documentation delivered in alternative formats such as PDF files and printed manuals.

•**Manager** provides a structure to create the overall processes and then to manage, access, and manipulate the information and allow it to become a usable library. The library system lets users access and organize information based on custom requirements, while supporting full version control. With quantitative metrics, the centralized Inmedius Dashboard allows users to comprehend the contents of the database/library.

The structure and templates initially provided are a starting point for setting up a department or company’s content. Integration with Microsoft Project and Excel gives users insight into the key components of S1000D documentation development. Schedules are defined and maintained within the system. Costs are examined and analyzed through custom, user-defined spreadsheets. With built-in workflow capabilities, audit trails, and reporting capabilities, project managers can be assured that S1000D requirements and unique organizational rules are being enforced throughout the product life cycle.

•**Author** gives individuals who provide or modify content to documents guidelines and a checking system. Ultimately, authors are able to concentrate on technical content development in-

An authoring screen indicates document content in both hierarchical and natural viewable form.



stead of the final formatted and published outputs.

The Business Rules Verification Tool allows the author to carry out a quick desktop quality assessment before releasing a Data Module or document into the Common Source Database.

•**Review** streamlines the quality assurance process for the publication of documents. The module collects comments and facilitates approvals, while adding workflow, discipline, and closure to the review cycle. All data and information are held in conjunction with the Common Source Database to reauthor or revise the affected data or document. It facilitates the maintenance of a complete electronic history of documents, centralizing administration and security. The overall product can be used via the Internet or intranet. Users can review the comment history at a future date, even if the quality assurance and review cycle for a particular technical document has ended. It also helps to place the comments in context and clarify ambiguity in a reviewer's comments.

•**Impact** facilitates a direct link between LSAR (Logistics Support Analysis Record) data and the Core Source Database to review and manage engineering changes. The LSAR, which is associated with MIL-STD-1388/2B and/or DEF-STD-060, is a logistics engineering tool and is populated with various logistical documents and data. The logistical information includes all of the data associated with both corrective and preventative maintenance tasks. The items required to support each maintenance task also are identified. This usually includes spare parts, tools, and support equipment (standard and special) and personnel.

•**Transition** transfers all of the power stored in a document's specifications into its logical equivalents in other formats, including PDF, print, and a variety of commercial and military specifications. The software features quite robust LooseLeaf Publishing capabilities, including Effectivity Processing, Change Page Management, Dual Column Language, and Multi-Volume Publishing. This module manages updates and addi-



A basic library screen indicates the status of the data modules or documents that have been entered in the system.

tions to a document during its life cycle, only producing output for pages that have changed. It also generates point pages and paragraph breaks and stores a list of data modules and documents that reflect this hierarchy as chapters, sections, and subsections.

•**Interact** is a browser-based system that lets users view S1000D-compliant documentation on a standalone basis or while connected to a server over an organization's intranet or the Internet. The module provides a publishing capability that lets the user see the same format on screen as on paper or PDF, ensuring a familiar look throughout the viewing process. It is the tool for viewing all the information that has been compiled from the Common Source Database into the proper composite form. The module organizes and simplifies massive amounts of technical documentation.

•**Instruct** unlocks the S1000D data within a data module, reorganizes and transforms it into SCORM (sharable content object reference model) e-learning material. Courseware is customized to meet training requirements, ensuring consistency with technical publications.

Developers author training content from S1000D data, publish SCORM-compliant output, and manage both in a generic content repository. The seamless transformation solution also supports incorporation of movies, audio, Flash animations, and other trainer-authored content. (SCORM is a set of technical standards for e-learning software products. It tells programmers how to write code so that it can "play well" with

other e-learning software. Specifically, SCORM governs how online learning content and learning management systems communicate with each other.)

Inmedius: The company

Headquartered in Pittsburgh, Pa., with offices in Canada, the U.K., Germany, Australia, and India, Inmedius delivers performance-oriented applications and services that capture, create, manage, and deploy technical information assets.

Inmedius was incorporated in 1995 by technologists at Carnegie Mellon University. The company has worked extensively with international enterprises on global authoring, publishing, and content management systems. Inmedius has demonstrated its technical capabilities and domain knowledge by providing advanced logistics support and technical publications tools to aircraft technicians maintaining the Navy's F/A-18 E/F Super Hornet.

Aerospace examples

TRI-COR Industries, an information technology support services firm headquartered in Lanham, Md., uses the Inmedius software package that includes maintenance, onsite training, and consulting services to support production of both electronic and paper-based documentation for its government and commercial clients.

S1000D was used to satisfy the company's need for continuous life cycle management requirements for technical data. The software package's capabilities meet ASD S1000D specifications—

jointly produced by the Aerospace and Defense Industries Association of Europe and the Aerospace Industries Association of America—for the procurement and production of technical publications for aerospace, defense, and capital-intensive equipment application. These are specification-based publishing requirements for government customers.

Dimension4 (D4) is using Inmedius to develop and publish interactive electronic technical manuals (IETMs) to support the FAA Air Route Surveillance Radar Model 4 (ARSR-4). The IETMs improve the operations, maintenance, and training support of a critical radar

system. The ARSR-4 long-range 3D radar is a joint FAA/DOD program to provide aircraft position information to the FAA, Air Force, Navy, and Customs Service, as well as weather data to the FAA and National Weather Service. A key air traffic control system, the ARSR-4 provides a significant component of the future transportation infrastructure.

Systems Engineering Associates (Sea Corp), a firm whose core business is providing services to the Navy, chiefly for submarine nonpropulsion electronic systems (NPES), also selected the S1000D product. Its multiuser contract includes onsite training and ongoing

maintenance in support of the Navy's digital data policies and the development and conversion of Navy technical data. The data conversion project is the first Navy submarine program implementing the S1000D specifications. The project's goal is to demonstrate that naval submarine programs can share technical data across NPES subsystems and ultimately provide overall cost savings with the technical data development and training areas. The technical data that Sea Corp has developed is truly shareable across platforms.

John D. Binder

jbinteraero@via-s.com

NOTED IN BRIEF

Dassault Systèmes (Paris, France, and Providence, R.I.) [<http://www.simulia.com>] announced the availability of **CZone for Abaqus**, from the DS SIMULIA brand, for simulating crushing of composite materials. This new product, an add-on for Abaqus FEA software, allows engineers to accelerate the design and evaluation of energy-absorbing composite components and assemblies. Based on technology from U.K.-based Engenuity, CZone for Abaqus enables studies aimed at protecting people and cargo from shock or injury during severe impact in helicopters, aircraft, and other vehicles comprising composites. Energy-absorbing composite structures can offer increased safety at lower cost for both initial manufacture and repair—for example, through modular, replaceable assemblies. The technology includes direct implementation of crush-based element force generation and failure for defined "crush zones," typically located at the forward edges of a product. CZone for Abaqus determines the extent of composite material crushing as well as other modes of potential failure—such as composite delamination, fracture, and buckling.

Wolfram Research (Champaign, Ill.) [<http://www.wolfram.com>] announced the release of **Mathematica Player 7**, a free download that allows anyone anywhere to interact with dynamic documents and applications using new Mathematica technology. Unlike read-only programs such as Acrobat Reader or thin runtime tools such as Flash Player, Mathematica Player has the full Mathematica engine embedded in the application. Player 7 reads and prints any Mathematica notebook, viewing text, graphics, typeset math, and animations. In addition, it can rotate, scale, and zoom 3D graphics in real time.

Cognex (Natick, Mass.) [<http://www.cognex.com>] announced the release of **3.2**, software that expands the decoding capabilities of **DataMan 100** vision-based ID readers and provides additional code support for all models in the DataMan product family. With 3.2, DataMan 100 fixed-mount ID readers can simultaneously read up to 128 codes in a single field of view, opening up many new application possibilities. Many manufacturers continue to use a traditional 1D barcode label for the product ID, but have added a direct-marked 2D

to store the serial number, batch number, and date and lot code. This release allows them to read both codes simultaneously for tracking products through their manufacturing process. Other organizations want to read codes on multiple products that appear in the same field of view because of their small size, such as components on a printed circuit board or medical vials in a tray. DataMan 100 can now read all of them at once.

MapleSoft (Waterloo, Canada) [<http://www.maplesoft.com>] announced the availability of the **MapleSim Connectivity Toolbox**, which enables users to export MapleSim models into Simulink, thus taking advantage of the multidomain physical modeling environment of MapleSim as part of the MathWorks environment. With this toolbox, high-fidelity MapleSim models are automatically converted to S-Function blocks for inclusion in Simulink diagrams. MapleSim's symbolic preprocessing and optimized code generation make models created this way highly efficient. For many systems, using MapleSim to create the original model is the only way to create a simulation that is fast enough for use in real-time applications. In addition, engineers can understand their models better and reuse them more easily with the help of MapleSim's analysis tools and design documentation abilities.

Aonix (San Diego, Calif.) [<http://www.aonix.com>] announced the release of **ObjectAda 8.4 for Windows**, targeting PowerPC embedded and real-time systems running the Wind River VxWorks 6.6 real-time operating system. This is the first ObjectAda release supporting full Ada tasking atop VxWorks 6.6 via real-time processes. ObjectAda for VxWorks leverages Wind River Workbench, an Eclipse-based development environment offering developers access to the broad range of tools available through the Eclipse framework. With support for multiple operating systems, architectures, and programming languages, ObjectAda for VxWorks provides the flexibility to standardize on a single development framework. Users also can utilize ObjectAda's standard graphical or command-line interface. The ObjectAda compilation system consists of an integrated language-sensitive editor, a source-code browser, a compiler with industry-leading compilation speed, a debugger, and a full library manager.