PACE AEROSPACE

From Catalog to Customized – Taking Flight with New Approaches to Custom Cabin Design

PACE Aerospace Engineering and Information Technology GmbH utilizes Aras as Configuration Management Backbone

Given that passenger aircraft are fairly generic in design, the interior and service levels in the cabin play a big role in shaping the brand image of an airline. The variety in cabin design possibilities leads to complexity and rising production costs.

Pacelab Cabin software, from PACE Aerospace Engineering and Information Technology GmbH, supports the development of the complex cabin configuration by automating the modeling and positioning of cabin items while simultaneously verifying the layout's compliance with design-relevant rules. The software is used in all Airbus programs and in larger airlines such as the United Arab Emirates' Etihad.

The technical drawings and 3D renderings generated with Pacelab are vital to aircraft manufacturers for communicating with their customers and are usually included in the sales contracts. To reduce costs and timing, manufacturers such as Airbus and Boeing have started relying on modular concepts that provide highly flexible yet standardized design options. These modular concepts are presented by Pacelab in a catalog-like style user interface, with pre-specified options that contain thousands of configuration possibilities per aircraft type. With an optional product module for centralized data and configuration management, the current version of the Pacelab Cabin configurator builds on this trend, based on the PLM solution Aras Innovator®.

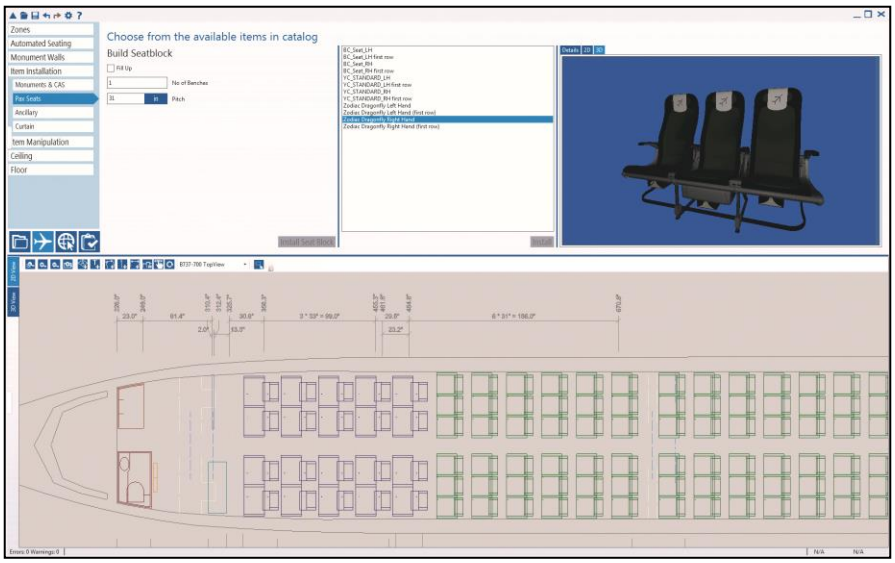

Figure 1: Pacelab Cabin

Requirements for Complex Cabin Configuration

The catalog used for cabin configuration is constantly being extended with new types of seats, fittings and systems, such as in-flight entertainment and lighting systems. After the approval of new versions of the catalog, aircraft manufacturers typically provide their customers with updates in paper format. At this stage the Pacelab catalog needs to be updated and the details of the cabin elements integrated into a single process.

In addition to the multiple versions of the catalog and sales offers, information on lifecycle management needs to be updated. A sophisticated configuration system is needed to manage all of these requirements. The catalog not only contains all the data on cabin components and the related 2D and 3D visualization files, but also all the configuration regulations from the aviation safety authorities.

Based on sketched examples of cabin applications, the catalogs are set up in the Pacelab data management system where all documents and data can be aggregated and versioned. Pacelab Cabin users can download the shared catalog from the central data management system. Download time is minimized as only the items which are not already in the local databank are transferred. Once a cabin layout has been finalized, Pacelab Cabin users can organize the project data, Meta information, additional reports and drawings into the central data management system. The cabin layouts in the Pacelab data management system can be immediately found and viewed in Pacelab Cabin. With Pacelab data management, user rights, access to catalog data, defined cabin layouts, project actions can all be administered.

PLM / PDM Options & Make vs. Buy Decisions

There are many different applications of Pacelab Cabin data management that could be implemented in-house with a database driven solution. Based on experience with previous PACE developments, those involved in projects were aware of the significant effort needed to implement solutions. As a result, the company added a “buy” scenario to the existing “make” scenario. This “buy” scenario would use a commercially available platform for data management. A significant portion of the required functions would be provided on this commercially available platform.

A PLM / PDM system was top of mind as it provides many of the functions needed for catalog management. PACE evaluated many solutions, focusing on comparing the data modelling functions. Early on in the process, Aras Innovator’s PLM platform demonstrated that with its flexibility, it could meet all of PACE’s requirements. Figure 2 shows the results of the basic functionality needed for the Pacelab Cabin data management (data modeling, document management, versioning, and configuration management, user management, rights management) covered by Aras Innovator (in red).

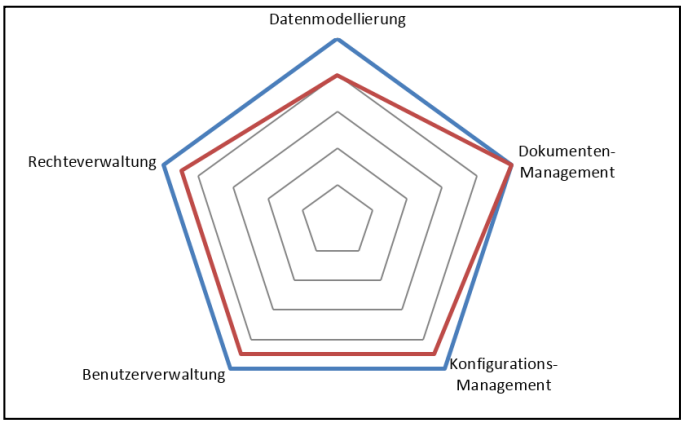

Figure 2: Coverage of the basic functionality of the Pacelab Cabin data management (in blue) by Aras (in red)

Advantages of Aras Innovator

Aras Innovator is delivered with numerous standard solutions that support processes such as quality control and project management, and configuration and updates management. What was particularly interesting for PACE is that Aras Innovator offers a complete and efficient data and configuration management framework, which is flexible to different applications. This framework delivers all the functions needed by Pacelab Cabin. As a result, the PACE data management platform can be developed on the Aras framework without needing to use the additional applications. This results in a clear user interface with no unnecessary complications.

If needed, each project can be individualized with branding on the Web interface. In addition, the Aras solution has a clear methodology, which is taught in Aras training.

A particular highlight of Aras Innovator is the Adaptive Markup Language (AML) language used. AML is an XML-based language for communication with the Aras Innovator server. This facilitates functions such as complex data searches or data updates (making changes or deleting data). For the writing and development of the AML-code, AML Studio (http://amlstudio.codeplex.com) can be accessed for free (see Figure 3).

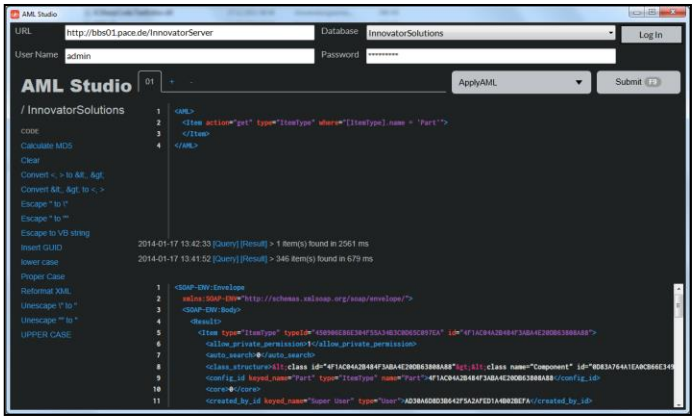

Figure 3: AML Studio

AML offers even more: the data model of each data management solution is fully implemented in AML and can be generated by pressing a button in Pacelab Cabin. Clearly, each Aras solution is written in AML.

Figure 4 provides an overview of the Aras Innovator Architecture: different types of clients communicate with the server in AML. In addition to the browser based Aras Innovator web client, other applications such as Microsoft Office and CAD, or individually programmed applications can communicate with the server using AML based interfaces. On the server side, the SQL Server database is used for saving the data and file-vault, and filing the relevant data. Based on this framework, the dedicated server is available for the previously listed PDM functions. In addition, the framework's functions include workflow management, metadata searches and federation services with continuous data synchronization between Aras Innovator and external systems such as databases or PDM and ERP systems.

Based on this framework, the Aras standard solution covers all PLM functions as well as solutions developed by partners, for example, the integration of CAD systems. Also, many companies using Aras Innovator usually implement company-specific extensions to the data model or special features to support operational processes. Each solution has multiple features, some of which are: the extensions of the data model, the associated user groups and access rights, lifecycles and the extensions to the user interface.

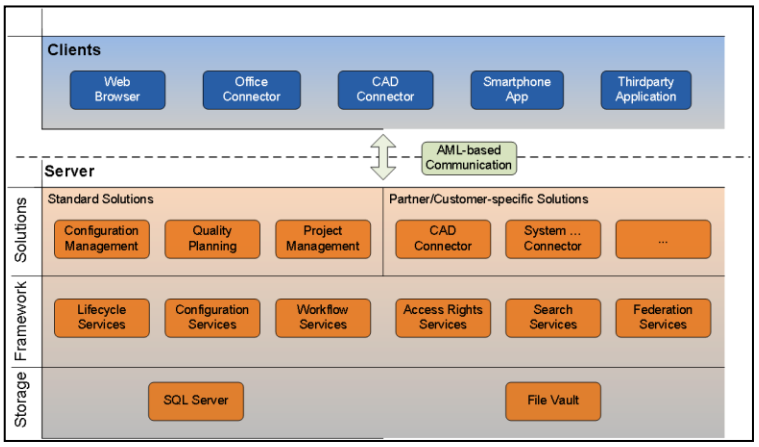

Figure 4: Aras Innovator Architecture

Aras Innovator as a Configuration Management Backbone

Once all those involved in the project had decided on Aras Innovator, a partner contract between PACE and Aras was signed. As part of the partnership, several programmers from PACE were trained by Aras. In addition, experienced consultants from Aras were available to validate and refine the solution concepts.

Figure 5 demonstrates the architecture of the Pacelab Cabin solution: customized user interfaces are provided for the different users. As the user administrator of Aras Innovator works in the web client, the users of Pacelab Cabin have an interface to Aras Innovator. For users who want occasional access to existing cabin layouts, a special web interface has been developed. The user can search through completed projects using metadata and statistical values, and get access to relevant reports and drawings. On the server side, the data management solution consists of three packages: in the first package, additional options have been added to manage the actions developed in Pacelab Cabin and to synchronize users of Aras Innovator with the Active Directory. The other two solution packages contain the data models for the catalog and the cabin layout.

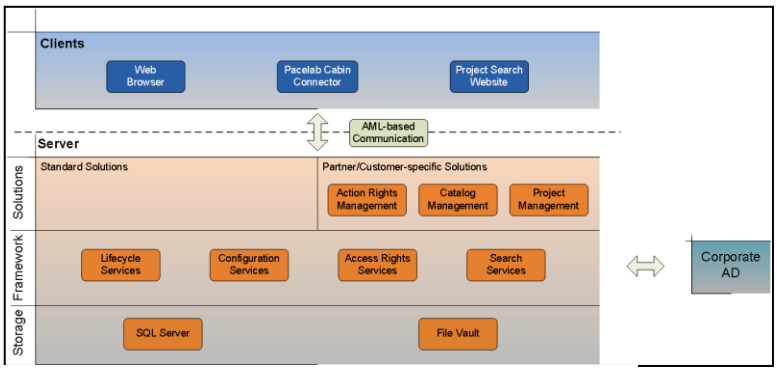

Figure 5: Pacelab Cabin data management architecture

Conclusion

For PACE, the use of the Aras Innovator framework has proven very useful. The developers were able to create a complex data model with a highly flexible and open solution very quickly. Through AML based communication it was possible to connect different clients with Aras Innovator. The options of extending and customizing the Pacelab Cabin configuration data management solution were more than satisfactory, as was Aras's efficient and extendable access rights management system.

Through Aras Innovator's capability of using components from the Microsoft Infrastructure, such as SQL-Server and Internet Information Server, which are employed by many users of Pacelab Cabin, PACE gained greater client acceptance. To implement solutions, the PACE developer relies on the .NET framework as a tool in his daily work. The expertise acquired by IT experts in the training and development of Pacelab Cabin can be quickly reapplied for similar situations.

The interesting question is for what types of projects does the described use of Aras Innovator framework make sense? The best use of the framework is its automatic functionality. For those who need maximum flexibility in application development, then perhaps an in-house developed database-driven solution is best. The key to the decision making process is the trade off, on the one hand, between a high level of automatic functionality with a shorter project time and maximum flexibility on the other hand.

For those who need to implement a complex, data-driven project in an engineering context in a short time, using the standard software from Aras Innovator is a recommended solution. The time invested in training the developer pays for itself quickly in subsequent projects.

About Aras

Innovation is moving faster than ever, driving unprecedented complexity in both products and processes. For global enterprises innovating the products and systems of tomorrow, we offer the next generation of PLM.

Our modern, advanced PLM platform technology makes Aras more scalable, flexible and secure for the world's largest organizations, and a full set of applications provides complete functionality for companies of all sizes.

We invite you to learn more and find out why global leaders including GE, GETRAG, Hitachi, Honda, Motorola, TEVA Pharmaceuticals, Textron and XEROX trust Aras.

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