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## **K Fischer Manager in the AMT group at Rockwell Collins comments it experience of STEP**

Kevin Fischer is the PDES, Inc. Technical Advisory Committee representative for Rockwell Collins. He is a manager in the Advanced Manufacturing Technology (AMT) group at Rockwell Collins.

This group is the engineering organization within Rockwell Collins Operations responsible for proactive development of needed processes and technologies to support product introduction into the manufacturing environment. AMT identifies, develops and matures technologies and processes to support cost effective, high quality, problem-free manufacturing of Rockwell Collins products. Kevin's focus is to engage external leverage opportunities through joint development projects with industrial partners, universities, and research laboratories. This includes our significant work through PDES, Inc. on the development and application of ISO 10303, STEP standards.

We asked him to comment the experience he got with STEP within Rockwell Collins. Here is his detailed answer. We thank him very much for his comments.

For over 70 years, Rockwell Collins (NYSE: COL) has been recognized as a leader in the design, production, and support of communication and aviation electronics for customers worldwide. Our business is almost equally split between government and commercial sales. The company's unique balance of commercial and government customers helps it to maintain stability in a volatile marketplace. Leveraging developments across both markets enables Rockwell Collins to reduce costs, extend product viability, and enhance the capabilities of its systems.

Many businesses are dealing with disparate systems today, whether it's within their own company or across the supply chain. At Rockwell Collins, our focus has been to deal with the interoperability between systems through the use of robust data standards. The product model standard flagship ISO 10303-203 (STEP AP203) is being used successfully by many companies, including Rockwell Collins and partners in our supply chain.

At Rockwell Collins part of our growth strategy is accomplished through acquisitions. AP203 helps us ease problems associated with different legacy design toolsets that result from executing that strategy. AP203 provides a way to integrate part models from disparate MCAD systems of our acquired businesses as we develop our next generation products.

STEP provides a set of product model standards (engineering domain specific computer languages) for software developers to use to interoperate and communicate between software applications. STEP compliant software is used by a number of the commercial and aerospace companies to easily move information between CAD/CAM systems. We often receive data describing portions of vehicles, aircraft cabins, cockpits, and even aircraft fuselage from our customers to aid in product development. It is very convenient to receive that data in an AP203 file. For each MCAD product model created today at Rockwell Collins, an AP203 file is generated and stored in our PDM system alongside the native CAD product model file.

Many companies support AP203 as a standard technical data interface. We provide information to them as part of our supply chain process. We give our suppliers a couple of options for sharing data but we really like to have them use AP203 for fabricated mechanical parts. We provide over 150 AP203 files each month to suppliers. The AP203 file from our PDM system is used in our receiving inspection CMM system to generate the inspection program that verifies the part. As the use of embedded GD&T matures in STEP protocols almost all tolerance information can be

included in the model. At Rockwell Collins this will streamline the design and manufacturing process even more, ultimately eliminating the need for a drawing.

It's very important in electronics design and manufacturing to have interoperability between mechanical and electrical tools. We've adopted STEP to deal with some of our manufacturing modeling and simulation efforts. Our approach uses data in a standard model form to drive many different tools. AP210 is used today to drive several productivity tools at Rockwell Collins, including design for manufacturing and design for test. We are also investigating its use for design to cost input and for warpage analysis. The ability to quickly combine mechanical and electrical design models into a virtual reality environment for early product visualization is of significant interest to Rockwell Collins. AP203 and AP210 are important to our efforts in this area. AP203 and AP210 include several shared engineering languages, readily enabling interoperability in electronics.

The availability of STEP standard engineering domain languages like AP203 and AP210 reduce the need for duplicative tools because industry no longer needs to rely only on native CAD formats. Some primary aerospace companies have created the position that basically says suppliers have to be STEP-compliant if they are going to do business with them. Likewise, if you're not STEP-compliant your ability to bid on DoD programs is at risk. We are also seeing the testing of STEP protocols as a solution to long-term data retention and archival by the National Archives and Records Administration and the National Nuclear Security Administration.

A recent study by the U. S. National Institute of Standards and Technology reports that use of STEP standards could save the automobile, aerospace, and shipbuilding industries more than \$900 million a year by reducing software interoperability problems. Hopefully some of the savings are already being accrued as a result of the headway made on interoperability through the use of STEP applications today in companies such as Rockwell Collins.

From the standpoint of effectiveness and efficiency, the ability for multiple systems to utilize a standard language is essential. For example, as data is moved between MCAD and CAM there are often model changes to make, which can introduce errors that require extra work in the downstream process. It is fairly easy to develop metrics that are associated with improved performance as a result of not needing to re-create models. Rockwell Collins pays close attention to the cost of non-conformance. Through the use of STEP standards we achieve a more seamless transition for data throughout the product lifecycle, directly reducing our cost of non-conformance.

PDES, Inc. is a consortium with a goal to develop mature product-model standards, for which it's done a pretty good job. Rockwell Collins is committed to its participation in efforts that not only develop standards but also enable the implementation and utilization of the standards. We call it the digital enterprise and we are working to demonstrate the tools, integration, and the ability to interoperate. The CAX-Implementor Forum provides a way to test STEP output, the quality of that output, and accelerate the development of STEP translators. Much CAX-IF focus has been placed on AP203. Now we're interested in expanding the testing and implementation to deal with domains beyond AP203 as well – enabling a truly digital enterprise.

More about PDES, inc : <http://pdesinc.aticorp.org/>

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