

The Pennsylvania State University

Penn State helps Boeing Rotorcraft Systems advance engineering collaboration across the supply chain with Adobe® LiveCycle® ES solutions and Adobe Acrobat® 9 Pro Extended

The Pennsylvania State University

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In Partnership With

Boeing Rotorcraft Systems
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Industry

Higher Education
Manufacturing

Challenges

- Accurately communicate design intent to suppliers
- Minimize costs for suppliers
- Automate collaborative workflows for engineering

Solution

- Engineering collaboration
Through an alliance with Penn State University, Boeing Rotorcraft Systems is exploring ways to leverage Adobe Acrobat 9 Pro Extended and LiveCycle ES solutions to improve collaboration among staff and across its supply chain.

Results

- Offered students hands-on training in dealing with real-world business issues
- Uncovered additional strategies for reliably sharing 3D models across project teams and the supply chain
- Integrated technology learning with manufacturing workflows
- Addressed need to safeguard engineering documents through design and manufacturing workflows
- Leveraged student involvement to drive innovation, improve quality, and accelerate time-to-market

When seamless collaboration is key

As a global provider of helicopters and tiltrotor aircraft, Boeing Rotorcraft Systems faces the same challenges as other leading manufacturers today: reliably communicating project details across dispersed development teams and with suppliers, production facilities, and customers worldwide. To improve communication and collaboration, Boeing is transitioning to a 3D model-based definition workflow for sharing designs with staff and supply-chain partners.

Boeing Rotorcraft Systems is supporting its efforts in part through a partnership with the Penn State College of Information Sciences & Technology (IST), where students are actively evaluating technology solutions that Boeing is already using or considering for engineering collaboration. The goal is for Boeing Rotorcraft Systems to leverage the fresh perspective that students bring to help drive innovation, minimize design cycles, reduce costs, and improve quality; all while accelerating product time-to-market.

Currently, Boeing Rotorcraft Systems uses Adobe Acrobat 9 Pro Extended as well as Adobe LiveCycle ES (Enterprise Suite) solutions including LiveCycle Forms ES, LiveCycle Reader® Extensions ES, and LiveCycle PDF Generator 3D ES to support its varied engineering workflows. The company is also looking at Adobe LiveCycle Rights Management ES and Adobe LiveCycle Digital Signatures ES to gain even more control over collaboration processes.

Adobe Acrobat secure PDF packages are used by Boeing Rotorcraft Systems to share all of the different data types needed in the organization's projects, including 2D and 3D models, parts lists, and more. The free Adobe Reader is available worldwide and easy for Boeing's suppliers to use. Adobe LiveCycle ES solutions provide an automated way to generate and extend secure PDF files up and down the supply chain.

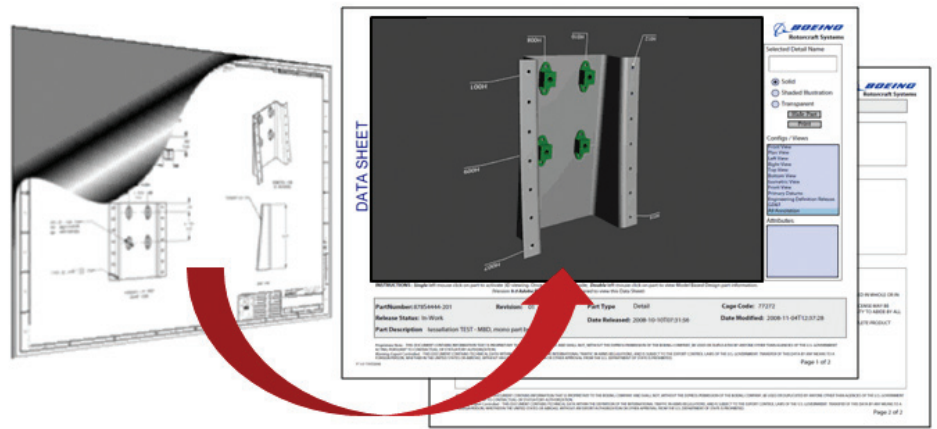
Outlining requirements for success

To design and test solutions for engineering collaboration, Boeing Rotorcraft Systems gave Penn State IST students a requirements document and asked them to apply Adobe solutions to address the challenges.

One of Boeing Rotorcraft Systems' key goals was to support the transition to a full 3D model-based workflow, including supplier communications. Explicitly stated was replacing traditional 2D engineering drawings with 3D models. The move to a 3D process requires packaging multiple types of digital data together including 3D parts and assemblies and providing this to suppliers in a format that can be accessed easily and reliably without costs.

Cost considerations were not limited to software licensing and also included training requirements and IT support for configuration, deployment, and maintenance. In addition, Boeing Rotorcraft Systems highlighted the ability to automatically generate data packages by integrating any solution with its existing Teamcenter product lifecycle management (PLM) environment.

Working with Penn State IST, Boeing Rotorcraft Systems is transitioning to a 3D model-based definition workflow for sharing designs with staff and supply-chain partners. Each time Boeing engineers release a part or assembly design into the PLM system, Adobe LiveCycle PDF Generator 3D ES automatically assembles the appropriate engineering product data into a secure PDF package, which includes project forms, spreadsheets, project documents, and other engineering data.



“Our students get to apply industry-standard solutions to common problems, and Boeing Rotorcraft Systems benefits from tested strategies for enhancing its engineering processes for years to come.”

Brian Cameron,
Professor of practice,
Penn State College of Information
Sciences & Technology

Boeing uses Adobe solutions to convert, package, and distribute all the data types in PDF. Adobe PDF provides a secure and persistent format for collaborating on 3D models with PMI, 2D data, and XML content.

An added advantage of using Adobe solutions is that Adobe LiveCycle Reader Extensions ES software can be used to create Adobe Portable Document Format (PDF) files recipients can mark up and digitally sign using the ubiquitous, free Adobe Reader. For PDF files containing 3D models, recipients can also measure elements, view PMI details, and rotate images for clearer insight into design specifications.

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Gaining real-world experience

According to Penn State IST Professor of Practice Brian Cameron, it has been gratifying for students to examine solutions for Boeing Rotorcraft Systems that will help improve engineering collaboration inside and outside the company. The students have also been impressed by the power of available software solutions.

“Bringing suppliers more into Boeing’s processes and enabling them to bid on projects more efficiently is something we’ve explored with Boeing and Adobe for the past few semesters,” says Cameron. “Our students get to apply industry-standard solutions to common problems, and Boeing Rotorcraft Systems benefits from tested strategies for enhancing its engineering processes for years to come.”

Overcoming roadblocks to 3D collaboration

One issue that Penn State IST students addressed was finding ways to help Boeing Rotorcraft Systems overcome traditional collaboration challenges. For example, not everyone in the supply chain has the appropriate computer-aided design (CAD) software to review 3D models; consequently, suppliers and others must often purchase proprietary and costly CAD viewers. Sharing 3D models and other design documents is also difficult due to large file sizes. Plus, there is the need to safeguard confidential information.

With Adobe LiveCycle ES solutions and Acrobat 9 Pro Extended, Penn State IST students converted engineering drawings and other documents to compact, platform- and application-independent Adobe PDF files that support access controls and digital signatures. They then evaluated different Adobe LiveCycle ES capabilities—digital signatures, process management, and others—so that 3D PDF models could be integrated more fully into Boeing Rotorcraft Systems’ engineering review and approval processes.

Systems At A Glance

- Adobe Acrobat 9 Pro Extended
- Adobe LiveCycle ES (Enterprise Suite). Components used include:
 - Adobe LiveCycle Forms ES
 - Adobe LiveCycle PDF Generator 3D ES
 - Adobe LiveCycle Reader Extensions ES
 - Adobe LiveCycle Digital Signatures ES
 - Adobe LiveCycle Rights Management ES

For More Information

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IST students found it different simply learning how to use a software application versus using it to address business problems. Using the Adobe solutions, students were able to delve deeper into the business challenges and see how to apply technology to solve problems. For instance, with the 3D PDF models, recipients can use the free Adobe Reader to view and measure design details, an essential requirement for supply-chain partners to bid on projects.

From theory to practice

The insights shared by Penn State IST students can make their way into Boeing Rotorcraft Systems processes. The relationship between Penn State IST, Boeing Rotorcraft Systems, and Adobe is useful for students and for the engineers. Boeing regularly uses Adobe solutions. The students look at the challenges and software and provide alternative perspectives that support the quality and efficiency of the project.



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