INTEGRATING CORTONA3D SOLO AND CORENA PINPOINT

TO SUPPORT AVIATION MAINTENANCE TEAMS
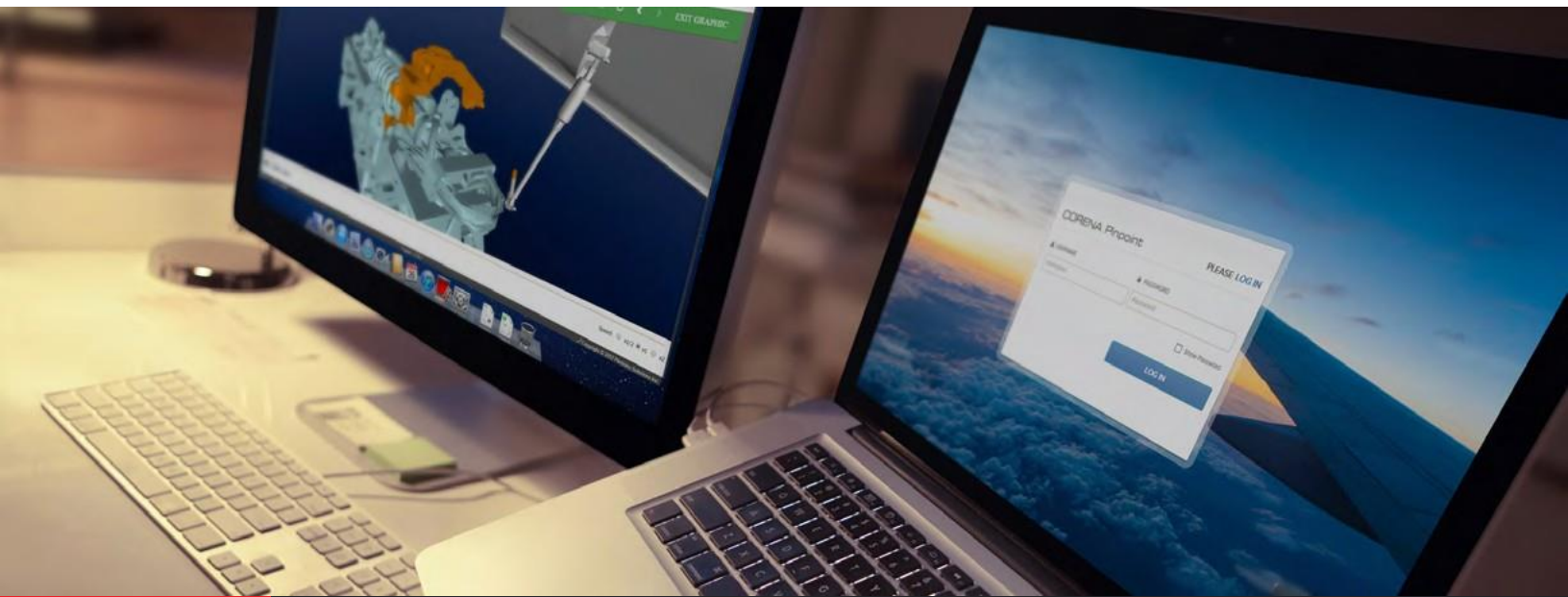
THE INTERACTIVE INFORMATION CHALLENGE

INTERACTIVE 3D-ENRICHED INFORMATION

ENHANCED TRAINING AND OPERATIONAL EFFICIENCY

FLATIRONS | Cortona3D

Integrating Cortona3D Solo and CORENA Pinpoint

INTRODUCTION & PARTNER PROFILES

Aviation maintenance and repair, whether performed by airline operators or by Maintenance, Repair and Overhaul (MRO) organization, is one of the most demanding operational environments to be found anywhere. The stringent safety, regulatory, and efficiency requirements require technology and innovation investment levels found in few other industries.

One of the areas in aviation maintenance receiving the most attention today is the Interactive Electronic Publication (IETP) viewer, which has the potential to transform the way aircraft maintenance technicians perform their work. This white paper highlights one of the most exciting areas of IETP development, the fusion of 3D models, structured XML content, and mobility –and potential rewards associated with adopting them.
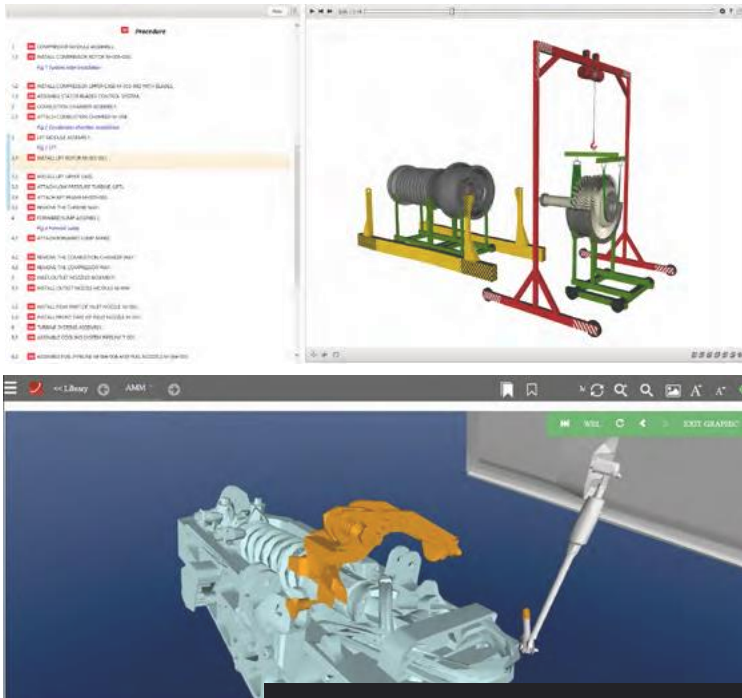
Flatirons Solutions® provides solutions for aviation and defense content lifecycle management. For more than 20 years, it has helped airlines, MROs, manufacturers, and military forces maintain and operate complex assets more effectively. Its software and service solutions help organizations to deliver the right information, at the right time, to the right people — Turning Content into Knowledge®.

Cortona3D provides effective solutions for transforming engineering data into highly interactive 3D/2D parts catalogs, work instructions, and product maintenance materials. Visually intuitive and lightweight documentation can be easily accessed by technicians on site or in the field, strengthening service and customer satisfaction.

Cortona3D and Flatirons Solutions® work together to support this mission-critical work through the integration of Cortona 3D Solo technology and Flatirons' CORENA Pinpoint viewer. CORENA Pinpoint is an Original Equipment Manufacturer (OEM)-independent Interactive Electronic Technical Publication (IETP) viewer used by some of the world's largest airlines and OEMs to access information needed to maintain or repair aircraft. Cortona3D Solo technologies allow the users of CORENA Pinpoint to interact with animated 3D models in order to make technical information publications more immersive visual, with strong benefits to productivity and efficiency as a result.

The Interactive Information **Challenge**

Ever-evolving challenges are always a part of any complex and safety-driven environment such as aviation. While the industry has never been safer or more efficient than it is today, it faces emerging challenges that it must confront through more sophisticated information management and delivery, including:

Growing Worker and Skills Shortage

Aviation maintenance organizations face an acute shortage of qualified workers thanks to factors that include:

- Mature worker retirements, as a generation of professionals trained in high-touch military and vocational settings take valuable knowledge out of circulation, creating an experience and skills gap that is unprecedented in recent years.
- High expectations from new generation workers with regard to information interactivity and accessibility. Where mature workers were content with traditional books, new generation would prefer a mobile app.
- Lack of qualified candidates in many regions, creating training challenges that are not well-addressed by traditional paradigms and present an obstacle to adding new entrants to the maintenance workforce.
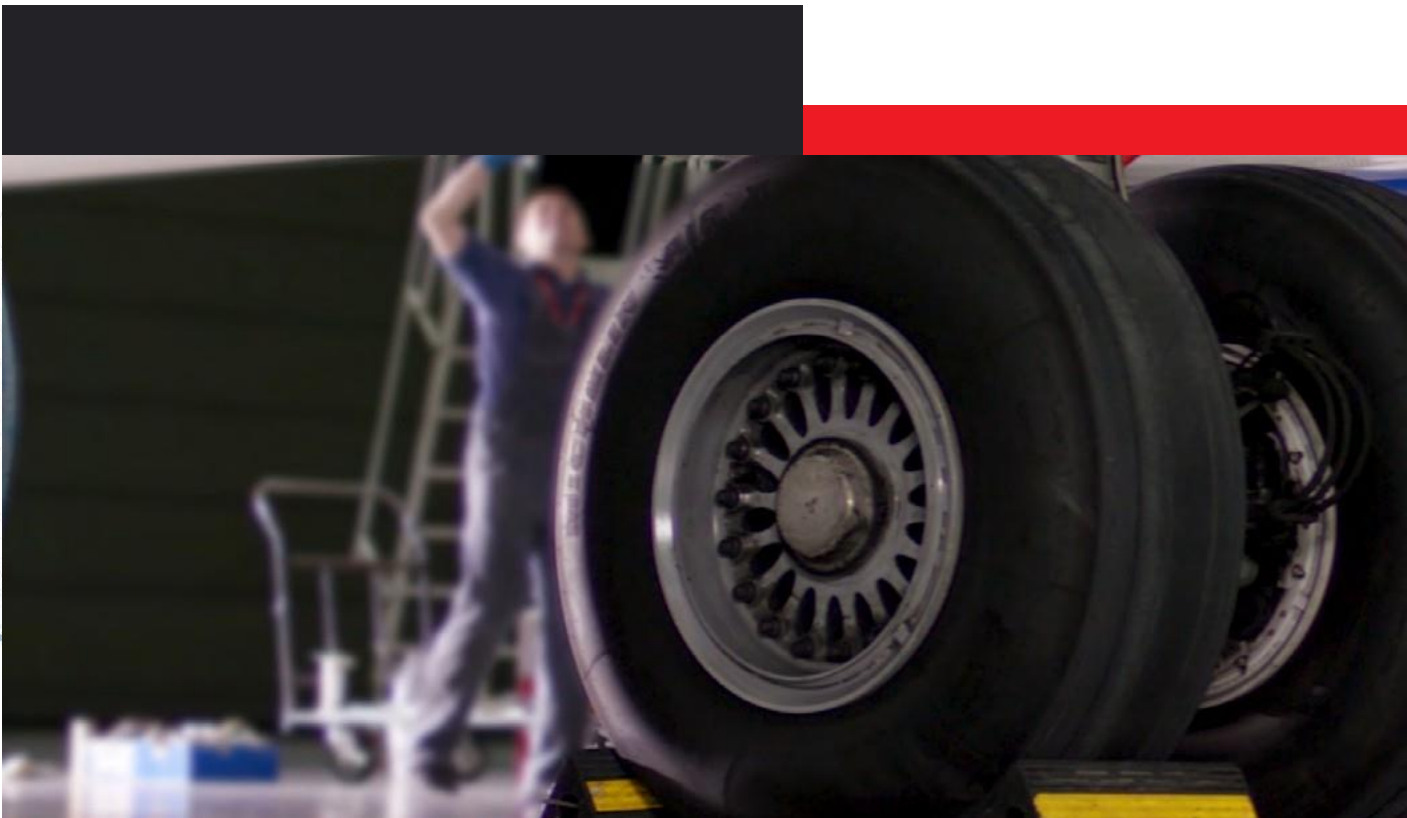
Growing Competitive Pressures

Competition from operators and MROs for maintenance dollars is increasing, with more low-cost labor centers coming on-line. These market dynamics are driving the need for increased efficiency by maintainers in all regions, including in areas like:

- Quicker, more accurate maintenance and repair and return to service of aircraft thanks to procedures that are explained more clearly, concisely, and accurately than most current systems and processes can allow.
- Higher asset utilization rates for technicians though anywhere access to technical information needed to do their work, and reduced time between procedural review and hands-on task performance.
- Better productivity to compete with low cost centers through a reduction in time needed to access required information or confirm that work was performed to specification. Workers paid higher rates must be more productive to compete successfully with low-cost centers.

Increasingly Complex Maintenance Environment

The last decade has seen a transformation in the nature of commercial and defense aircraft, with greater complexity in both pure hardware terms, and in the degree to which today's assets are increasingly eEnabled. IoT makes modern aircraft systems more efficient, but can also make them significantly more complex to maintain, diagnose, and repair since the line between hardware and software related diagnosis is increasingly blurred.

The aviation industry has grown progressively safer and more efficient through smart investment in technology and process improvement. By leading the world in areas like content personalization (using structured content mediums like SGML and XML), 3D model adoption and mobility, the aviation industry can advance the state of the art in terms of empowering task performers like aircraft maintenance technicians (AMTs), pilots, and flight crews to do their jobs more safely and efficiently and meet these challenges.

THE SOLUTION
Interactive, Relevant, 3D-Enriched Information

In the face of these technology and business challenges, Flatirons and Cortona3D have partnered to deliver a compelling response – an OEM-independent IETP viewer fully integrated with Cortona3D Solo technology. The combined offer provides airlines, MROs, and OEM after-market service teams with a powerful solution for supercharging aircraft maintenance technician efficiency, with features that include on-demand assembly / disassembly animations, navigation of procedures via 3D models (in place of traditional tables of contents or searching), as well as linkage between 3D model components.

Airlines do not need to create new 3D models to take advantage of this solution. 3D models often created by OEMs using Computer Aided Design / Computer Aided Manufacturing solutions like AutoCAD, Solid Edge, or CATIA are converted into light-weight 3D models and published alongside the S1000D XML as part of technical content supplied to airlines as part of new generation aircraft like the Airbus A350, Boeing 787, and others.

As part of this integrated solution, CORENA Pinpoint and CORENA Pinpoint Mobile applications and the underlying XML content they display have been modified to allow actions in the 3D model to trigger context shifting with related content, and actions within the content to trigger context shifting within the 3D model. Thus, an IETP end-user selecting a part from an illustrated Parts Database can display of the relevant 3D model for the assembly. Navigating to the underlying BOM for that parts assembly then triggers a relevant disassembled view showing the part within the assembly. Likewise selecting a part within the assembly from the 3D model will navigate to the relevant entry with the accompany BOM or related technical publication.

The solution enables 3D enhanced procedures by using authored elements in the XML maintenance manual content to link to animation steps in the 3D models. This integration uses the multimedia object and parameter tagging (per animation step) features of the S1000D schema, using internal Ref linking with the procedural steps being aligned with the XML parameters.

Flatirons has worked actively as part of S1000D and ATA iSpec 2200 standards bodies for more than two decades, and is currently working with S1000D working the MBET task team to formalize this type of advanced 3D functionality as part of an upcoming issue of the S1000D specification.

Cortona3D provides advanced support for industry standards as well. Its authoring tools contain highly adjustable templates that allow for quick and convenient production of content compatible with S1000D, ATA and other industry standards.
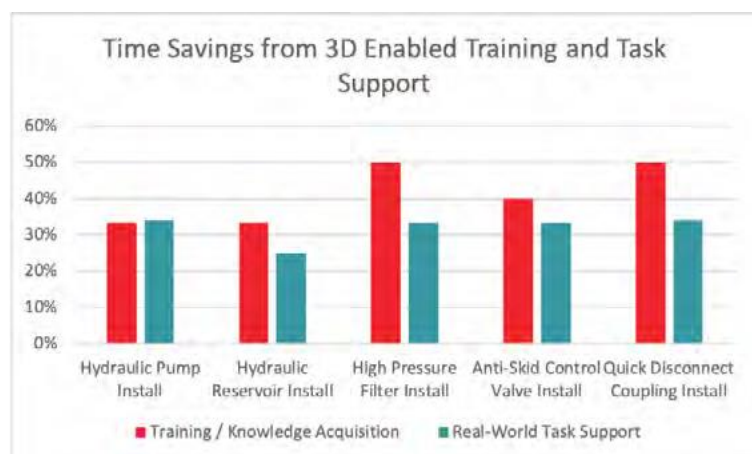
The Results: Enhanced Training and Operational Efficiency

Incorporating 3D models fully into XML-powered content for delivery in an OEM-independent IETP like CORENA Pinpoint or CORENA Pinpoint Mobile brings tremendous benefits to maintainers in two main areas – initial training on complex tasks, and in real-time task performance support.

- **Training Results Improvement:** Training a new aircraft maintainer is a complex and costly process. Many tasks involve working with engines and components that carry per unit costs in the millions or tens of millions of dollars. Learning to perform a diagnostic procedure on a modern jet turbine, for instance, may involve the insertion of borescopes or other tools into a finely machined product that is intolerant to even a small scratch that may come as the result of an inexperienced maintainer. Training that is augmented by the use of 3D models lowers the potential "cost of failure" for trainees, allowing them many virtual repetitions of assembly, disassembly, or inspection before doing the real thing.

Perhaps even more importantly, the use of 3D models in procedural training speeds knowledge acquisition. For visual learners who make up an increasingly large percentage of the incoming "digital native" workforce, the use of 3D models in technical information delivery serves to make complex information more accessible, reducing the time to competency dramatically. Studies focused on aviation, defense, and other large asset industries that share similar training and regulatory requirements show compelling metrics for the time to competency improvements seen through the use of 3D models, animations, and mobility:

TRAINING WITH INTERACTIVE 3D COMPUTER SIMULATION PRODUCES A USER RETENTION RATE OF 90% COMPARED TO TRAINING ON A PHYSICAL MOCK-UP.

Source: Baboo, Santhosh, and Nikhil Lobo. "Improving Effectiveness Of E-Learning In Maintenance Using Interactive-3D."

In addition to training use cases, interaction with 3D allows the aircraft maintenance technician to better visualize his or her task, resulting in more effective preparation virtually prior to getting "hands-on."

- **Task Support Result Improvement:** Navigating complex procedures in a worksite as potentially inhospitable as that of the aircraft maintainer is a tricky proposition. Much of the maintenance and repair of aircraft does not occur in the hangar. Work may be performed on the tarmac or at the gate, oftentimes in poor weather and without adequate lighting. Providing a mobile IETP with serial number applicable procedural information that is enriched with 3D models provides quicker navigation, speeding the completion and improving the accuracy of maintenance and repair tasks.

## 30 PERCENT REDUCTION IN TIME SPENT ON MAINTENANCE!
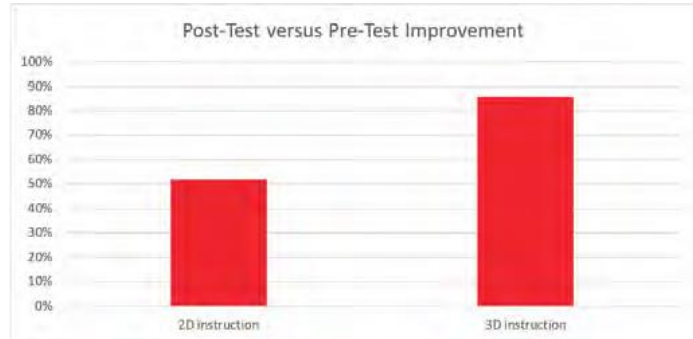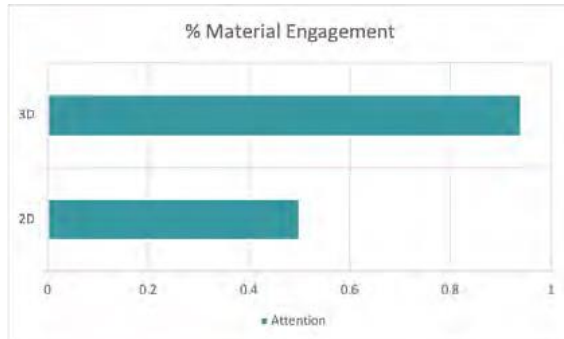
Source: Bamford, Anne. "LiFE: Learning in Future Education: Evaluation of Innovations in Emerging Learning Technologies." 2001.

Flatirons and Cortona3D have more than 50 years of combined service to the aviation industry, pushing the boundaries of what is possible in technical information management. With the fusion of Cortona3D and CORENA Pinpoint technologies, both companies have once more pushed the boundaries of innovation in the industry, creating an OEM-independent viewer that provides access to multi-vendor airframe, engine, and component data that fully integrates procedural information with supporting 3D models for better knowledge uptake and task performance support.

To learn more about CORENA Pinpoint, the de facto standard OEM-independent IETP for airline operators and OEMs, see https://www.flatironssolutions.com/corena-pinpoint-mobile/ or https://www.flatironssolutions.com/corena-pinpoint/.

To learn more about Cortona3D and its best of breeds technologies for 3D-enriched Interactive Electronic Technical Manuals (IETMs), see http://www.cortona3d.com/en/cortona3d-solo.
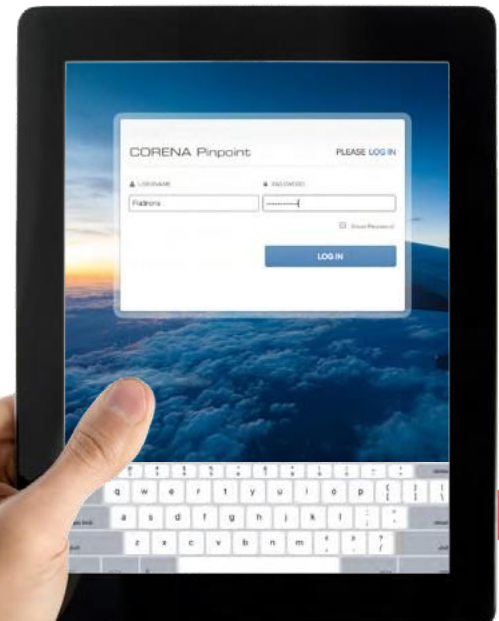
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