Cre8tive
TECHNOLOGY AND DESIGN

E-BOOK

REDUCING DEVELOPMENT TIME IN AEROSPACE & DEFENSE

FLYING INTO THE FOURTH INDUSTRIAL REVOLUTION

INTRODUCTION

There are many terms you could apply to the aerospace industry right now -
dynamic, disruptive, uncertain, unparalleled. The common factor underlying all of
these descriptors is change. The industry is overdue for new ideas, changing approaches,
and the novel products that follow.

A recent report from Deloitte puts the scope of this change into perspective. Their research suggests
up to 50% of all aerospace companies have stuck with "traditional business models" despite widespread
industry changes over the last 20-30 years. By their estimates, up to 60% of revenue at the largest aerospace companies comes from business units that no longer align with market needs. Aerospace manufacturers must make sweeping changes or risk sinking into solvency.

One of the biggest reasons aerospace manufacturers must embrace change is to meet a new wave of demand – not just for newer models and components, but for fundamentally better ones. Concurrently, manufacturers are facing mounting pressure for lighter parts and higher-performing equipment. Together, these forces create a perfect storm that is redefining what it means to survive and thrive in the aerospace industry.

Producers will need to meet quotas, shorter timelines, higher quality standards, and stricter compliance concerns. In short, manufacturers need to improve the development cycle in every way possible.

Cutting development costs is a priority for everyone in the industry, in large part because costs have doubled over the last 20 years. The average en
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completed faster than anything that preceded it.

Developing new revenue streams in aerospace manufacturing takes a tremendous amount of time and resources and is subject to strict compliance standards along the way. Building aerospace parts and equipment is an intensive process, so anything that can speed up timeliness, lower costs, and ensure consistency is a huge asset to manufacturers. Not surprisingly, 62% of all aerospace manufacturers had a smart factory initiative in the works as of 2017.

In this e-book, we explain how aerospace manufacturers can leverage a robust ERP solution to shorten their development cycles in the following ways:

- **Soaring Higher Using Data**
- **Gaining a Top-Down Perspective Over the Supply Chain**
- **Leveraging VR for Simulated Design**
- **Introducing Additive Manufacturing (AM)**
- **Getting (and Keeping) Everyone on the Same Page**

Now is the time to embrace fresh ways of thinking and next-generation technologies in order to deliver on the increasing demands of the industry. If you're eager to remain relevant and competitive, read on.

SOARING HIGHER USING DATA

Data is the foundation of Industry 4.0 and the future of aerospace manufacturing. It's also the great equalizer.

Remaining competitive is not about having the largest fleet of robots or a fully-integrated factory before anyone else. Rather, it's about making the best use of data – an asset that every manufacturer, large and small, has access to. The companies that learn to capture, store, and leverage more of their data will have the most success in the years to come.

The aerospace industry spent almost $3 billion investing in big data in 2018, and that number is projected to rise rapidly in coming years. The smart use of data enables manufacturers to:

- Lower costs
- Improve efficiency
- Maximize productivity
- Minimize waste

You can leverage data to create transparency, track performance, encourage collaboration, and foster innovation. Data reveals truths that could not have been known or seen without technology, allowing aerospace manufacturers to solve problems and refine processes with more accuracy. The key to gathering and deriving meaningful insights from data is your Enterprise Resource Planning (ERP) system.

ERP software provides a platform for integrating data across teams

purchase history, and more. With real-time data at your fingertips, your shop can make data-driven decisions to cut unnecessary steps in your design process, predict and quickly respond to changes in your supply chain, and optimize your development cycle.

ERP technology can be applied to every aspect of production and administration, empowering manufacturers to eliminate obstacles in the development cycle and accentuate existing strengths in their production process. In practice, ERP helps manufacturers get product to market faster and stay ahead of the wave of change. It not only takes your development process to new heights, but your ERP solution also provides the foundation you need to support more advanced Industry 4.0 technologies that can further reduce development time.

The greatest power of ERP is its ability to turn your data into your competitive advantage.

GAINING A TOP-DOWN PERSPECTIVE OVER THE SUPPLY CHAIN

Delays, roadblocks, and miscommunications in the supply chain can significantly lengthen development cycles. In 2016 Airbus had over 6,800 undelivered orders, largely because of unmanageable supply chain problems.

Even a minor supply chain issue can cause development to grind to a halt. When critical parts and resources are unavailable there is often no option but to wait – unless these issues were predictable in advance.

ERP allows aerospace manufacturers and their suppliers to communicate and share data in real time. This gives manufacturers full visibility over their entire supply chain, including insight into delivery schedules, material availability, and more. If supply chain issues arise, all affected parties know as soon as possible, instead of after a truck has failed to show up. With enough lead time, you can successfully find alternate sources of material or adapt your production schedules. ERP facilitates smooth communication between clients and other stakeholders, so you can keep key members in the loop regarding any important changes in the cycle.

The top-down perspective provided by ERP allows you to identify the most common supply chain setbacks for your organization. Over time, you can weed out unreliable suppliers in favor of more efficient and consistent alternatives.

LEVERAGING VR FOR SIMULATED DESIGN

A standard Boeing 737 aircraft contains 367,000 individual parts. Each one of those parts must be specifically designed to serve a purpose, work with the parts around it, and integrate into the whole. Given the scale and all the consequences of defective parts, designing any aspect of an aircraft is a huge undertaking.

Virtual reality (VR) and other forms of immersive simulations promise to speed up development significantly. The Airbus A350 mentioned earlier illustrates the practical applications of VR. Engineers designed the project using simulators that allowed them to accurately model how parts worked within systems. As a result, nothing was actually prototyped until it had already been extensively tested.

VR promises to revolutionize development and to accomplish this, it needs a data management tool like ERP. Not surprisingly, virtual simulators require massive amounts of data – modeling one wing can require seven terabytes of data. Plus, they produce equal amounts of data as testing results come in. An ERP platform makes this data manageable and accessible. ERP allows manufacturers to use data as a raw material, to model a real airplane in all its depths and detail.

The combination of ERP and VR allows manufacturers to use data as a raw material, for prototyping, modeling, and design.

INTRODUCING ADDITIVE MANUFACTURING

Additive Manufacturing (AM) is the technical term for 3D printing, something that can now be done with a variety of plastic polymers and metal alloys. Printing tools and parts in-house from the ground up represents a radical new way to approach aerospace manufacturing.

First and foremost, AM reduces your reliance on your supply chain by enabling your company to produce more of your own constituent parts. This is a particularly strong advantage during development, when engineers are often working through various rounds of prototyping.

AM can be automated and is ideally suited for small runs of parts. Printed parts create more opportunities for innovation because they are lighter-weight, higher-strength, and made up of fewer parts. In fact, using AM to print one part for Airbus reduced the number of components by 98%, the weight by 48%, and the cost by 30% while preserving the same performance.

Since AM automates so much of the production process, it needs a foundation of data to guide it. ERP is a prerequisite of AM. Without it there is no way to produce parts as quickly, precisely, or consistently as manufacturers require.

AM is driven by data – and ERP is the engine that propels it forward.

SYNTHESIZING EFFORTS: GETTING (AND KEEPING) EVERYONE ON THE SAME PAGE

As highly-organized as aerospace manufacturing may be, problems can arise simply because of miscommunication and a lack of coordination. There are so many stakeholders involved in the development process and supply chain that one missed connection can cause a project to stumble.

ERP is not only a platform for data; it's also a platform for communication and collaboration. It offers a single source of truth that collaborators can consult to find the most complete, accurate, and up-to-date information available. During development when there are so many moving parts, it can be difficult to keep everyone on the same page regarding key decisions, schedules, changes in the development process, and more. ERP serves as that page, by acting as your centralized platform that makes relevant data accessible to each stakeholder who needs access to it – eliminating confusion, errors, omissions, and redundancies.

Airbus put a premium on collaboration when building the A350. Up to 4,000 people were involved with the design and manufacturing process, both in-house and throughout the supply chain, were connected on the same platform. With a centralized platform for sharing information and ideas, they became a sum greater than its parts.

ERP: THE ENGINE BEHIND INDUSTRY 4.0 DEVELOPMENT CYCLES

ERP is a critical asset for entering and thriving in Industry 4.0. In fact, it may be the most critical asset, as without an ERP system, it's nearly impossible to implement any other Industry 4.0 technology successfully. Aerospace manufacturers with a robust ERP solution can leverage their most valuable resource – data – to expedite development, preserve a competitive advantage, and engineer future growth. Manufacturers who lack a modern ERP system will struggle to implement Industry 4.0 technologies and to keep their ever-expanding data volumes organized and actionable.

If your aerospace manufacturing firm is ready to embrace the opportunities of the future, ERP is your first step. Whether you are looking to implement your first solution, or upgrade your existing system to better support Industry 4.0 advancements, Cre8tive Technology & Design can help. We've guided successful ERP implementations for A&D manufacturers to help our clients improve efficiency, leverage predictive analytics, reduce development cycles, and thrive in the Industry 4.0 landscape.

Contact our expert team to find out how we can help your shop remain competitive in Industry 4.0.

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