

Liebherr-Aerospace sees efficiency take off with a new collaborative design process.

Overview

■ **Business Challenge**

In addition to language and culture, Liebherr-Aerospace's two key plants were separated by a gulf in design processes. With data in the aircraft design process so dynamic and interconnected, it was absolutely essential to make the design process more transparent for Liebherr-Aerospace and its customers.

■ **Solution**

With the help of IBM Global Business Services, Liebherr optimized its key processes across both plants from the bottom up. Complementing its new process foundation is a collaborative design platform that brought unprecedented design efficiency.

■ **Key Benefits**

- *Projected 25 percent reduction in product design cycle time*
- *Improved ability to leverage existing design assets*
- *Projected 30 percent reduction in costs associated with redundant or obsolete designs*



Liebherr-Aerospace supplies aircraft flight control systems, hydraulic systems, landing gear and air management systems to a global customer base that includes Airbus, Boeing, Bombardier Aerospace and Brazil's Embraer. Liebherr's Aerospace and Transportation Systems division employs 3,500 people.

The Liebherr family business was established in 1949 by Hans Liebherr. The great success of his first mobile, easy-to-assemble and affordable tower crane was the foundation on which the company flourished. Today Liebherr (www.liebherr.com) is not only one of the world's leading manufacturers of construction machinery but is also an acknowledged supplier of technically innovative user-oriented products and services in numerous other fields, like, for example, in the maritime cranes, machine tools and material flow technology or aerospace and transportation systems product areas.

“Our project with IBM stands out because it went against convention and overcame the challenges that have hindered cross-border process integration in Europe. We see that willingness – backed up with expertise – as a key measure of IBM's value.”

– André Benhamou, President,
Liebherr-Aerospace Toulouse

Business Benefits

- Projected 25 percent reduction in product design cycle time
- Improved ability to leverage existing design assets
- Projected 30 percent reduction in costs associated with redundant or obsolete designs
- Dramatic improvement in ability to troubleshoot design problems
- Improved ability to meet aircraft manufacturers' stiff delivery requirements
- Improved customer satisfaction

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– André Benhamou

What these businesses have in common, at a high level, are complex supply chains, a high degree of embedded engineering and the need to meet the requirements of a highly demanding, global base of customers. Liebherr's success and market leadership attests to its competency in each of these areas.

A different kind of heavy lifting

But for all the points of commonality across Liebherr's business portfolio, its aerospace unit stands apart. Serving customers that include Airbus, Boeing, Brazil's Embraer and Bombardier Aerospace, Liebherr-Aerospace operates in an environment marked by extremes – of complexity, demands and dynamism – where zero-tolerance is the norm. Aircraft design is in many ways a question of balance, where design changes often produce a ripple effect down to the smallest part. This is especially true for Liebherr, whose systems lie at the heart of aircraft's operation. Its air management systems handle everything from heating and cooling to cabin pressurization to de-icing, while its actuation and hydraulic systems are essential to aircraft flight control. As a basic example of the ripple effect in aircraft design, consider just a few of the likely impacts of a change in the plane's weight specifications. One obvious impact is a change in engine power required, which in turn can impact the volume of high temperature, high pressure air “bled off” from the engine to power the air-conditioning and anti-ice systems. The capacity requirements of landing gear – another Liebherr offering – can also be directly impacted. Both examples show how the intricacies of aircraft engineering create interdependencies between design efforts across the manufacturing chain. Unless a strong collaborative capability exists to bridge these efforts, the risk of inefficiency and divergence is high. Liebherr learned this lesson firsthand.

Some ten years ago, with its relationship with Airbus growing fast, Liebherr made the strategic and logistics-driven decision to acquire a major aircraft parts manufacturing facility in Toulouse, France, one of Airbus's final aircraft assembly hubs. From that point on, the Toulouse plant worked in parallel with the other major aerospace facility in Lindenberg, Germany, with air management systems being the key area of product overlap. Though the products made by both plants were closely related, there was very little overlap in the systems and processes used to design and make them. Both plants operated under the same essential practices they had always employed, the historical gulf between them perpetuated by language differences and a business-as-usual mentality that was hard to break. In cases such as design changes, when engineers needed to share designs and related information between plants, communications flowed through narrow, predefined channels – often in paper format.

This constricted flow led to inefficiency on many other levels. In the basic design process, for instance, it discouraged the sharing and reuse of existing designs for the parts and subassemblies that their products have in common, causing needless and time-consuming duplication. In the case of a system failure during testing, efforts to track down the design problem—by Liebherr engineers, as well as the customer’s—were complicated by the “split” in the design process and the lack of information transparency across both plants.

Reducing drag a must

With aerospace competition intensifying and customer demands rising, Liebherr’s senior management saw this inability to collaborate in the design process as a looming threat. In solving the problem, the need to dislodge entrenched practices and ways of thinking was just the beginning. It also required the right mix of collaborative design tools and redesigned, consolidated processes that would provide a common foundation for sharing designs and engineering information across the aerospace division as a whole. To accomplish the changes it envisioned, Liebherr realized it needed a provider with the right mix of tools, process expertise and industry knowledge. It found this mix in IBM Global Business Services, which led the change initiative, and in ENOVIA® SmarTeam, the IBM Product Lifecycle Management (PLM) solution that provided the platform for a common collaborative design environment.

Underscoring the importance of process change, IBM’s initial action was to bring together teams of process experts from both plants and facilitate constructive dialog between them. In a series of workshops conducted over six months, IBM succeeded in cataloging the two sets of processes prevailing across both plants. Using this as a starting point, the team worked through them to first establish the best “foundation” processes and then, if necessary, to redesign them for optimal efficiency. With the process definitions established, the project’s focus shifted to implementing them within the new PLM and collaborative design platform. The first phase of the implementation was focused on deploying the collaborative tools within the ENOVIA SmarTeam suite, while the second (now underway) is putting in place a common CAD framework across the Lindenberg and Toulouse plants.

Keeping designers on the same page

The best illustration of the new collaborative process is by way of contrast. Where the flow of design information was once linear, slow and paper-based, it is now instant, ubiquitous and realtime. What makes this possible is the solution’s ability to formalize the workflow that underlies the change process such that any design change is instantly replicated throughout the design chain.

Key Components

Software

- IBM Product Lifecycle Management solution
- ENOVIA SmarTeam suite

Services

- IBM Global Business Services PLM Practice

Timeframe

- Process analysis and redesign: 6 months
 - First stage of rollout (collaborative design platform): 12 months
 - Second stage of rollout (CAD integration): In progress
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Why it matters

An unprecedented level of cross-border process integration, backed up by a world-class collaboration platform, enabled Liebherr-Aerospace to make revolutionary improvements to its design process. Tighter collaboration combined with more transparent information across the supply chain has sped up the design process—ensuring that the best quality parts and components are there when customers need them.

The result is that the extended Aerospace organization stays on the same page, averting the kinds of problems that lengthened the design cycle, thwarted troubleshooting efforts and promoted suboptimal resource utilization. Before, if an engineer in one plant changed an existing design, there was a significant chance that engineers in the other would not pick it up – and thus waste time working on a now-obsolete design. The same effect flowed down to the manufacturing shop floor, where undetected changes in part designs often made it necessary to redesign the customized tools used to make the parts. With the communication of design changes now automated and instantaneous, Liebherr now has the means to substantially improve its design efficiency and improve the utilization of all of its resources.

In the end, the ultimate gauge of the impact of the new solution is the degree to which it improves Liebherr's ability to meet its customer's most important demands. Of these, none are more important than the timely availability of the parts and components needed to assemble aircraft, which makes speed to market absolutely essential to Liebherr. The solution's biggest impact on speed to market is that it gives Liebherr's designers an ability to reuse existing designs that they never had before. In the same way software developers can utilize on "components" of code to shorten their development cycle, Liebherr's engineers can leverage design assets created elsewhere in the aerospace division. It's a strong example of how process integration matched with organizational change can produce a quantum change in effectiveness. Another is the increase in service responsiveness the system makes possible by providing transparent access to design information no matter where in the company the design was created. This enables faster diagnosis and resolution of design problems by eliminating the need to waste time and money searching in different corners of the company.

André Benhamou, president of Liebherr-Aerospace Toulouse SAS, sees a big part of the project's success as IBM's ability to "defy the odds" in forging a common set of practices across country borders. "Our project with IBM stands out because it went against convention and overcame the challenges that have hindered cross-border process integration in Europe," says Benhamou. "We see that willingness – backed up with expertise – as a key measure of IBM's value."

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