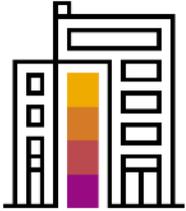


SAP Innovation Awards 2021 Entry Pitch Deck

“Smart-K” Digital Innovation of KAIZEN for Aerospace Manufacturing

Kawasaki Heavy Industries, Ltd.

PUBLIC



Company Information

Headquarters	Tokyo Head Office (Minato-ku, Tokyo, Japan) , Kobe Head Office (Kobe, Hyogo, Japan)
Industry	Mobility (Aerospace, Rail, Marine), Energy, Industrial Equipment, Leisure
Web site	https://global.kawasaki.com/

Kawasaki Heavy Industries (KHI) is part of the Kawasaki Group, a global technology leader with diverse integrated strengths. Together with over 100 group companies in Japan and overseas, Kawasaki Heavy Industries oversees the formation of a "technology corporate group." Our technological capabilities, polished over a history that exceeds a century, send diverse products into wide-ranging fields that go beyond land, sea, and air, extending from the ocean depths to space.

As one of Japan's premier aerospace companies, Kawasaki's aerospace division is active in products ranging from aircraft to satellites. Our aircraft engine business produces helicopter engines and international joint development of jet engines for commercial aircraft. We develop and manufacture various aircraft and space systems, including the P-1 and C-2 aircraft, joint development and production programs such as the Boeing 787, and the payload fairings for H-IIA and H-IIB rockets. Kawasaki is also the leading Japanese manufacturer of helicopters, including the top selling BK117 twin-engine helicopter.

“Smart-K” Digital Innovation of KAIZEN for Aerospace Manufacturing

Kawasaki Heavy Industries, Ltd.



The competitive advantage of our production process is its sustainable “KAIZEN” *.

We are confident that our “Smart-K” digital innovation of KAIZEN, which includes configuration and change management--crucial in aircraft manufacturing--will be more strictly controlled and will allow KHI to advance and sustain KAIZEN more effectively.

Hiroyoshi Shimokawa

Managing Executive Officer
President
Aerospace Systems
Company

* “KAIZEN” is a concept referring to business activities that continuously improve all functions and involve all employees from the CEO to the assembly line workers. “KAIZEN” is the Japanese word for “improvement”.

Challenge

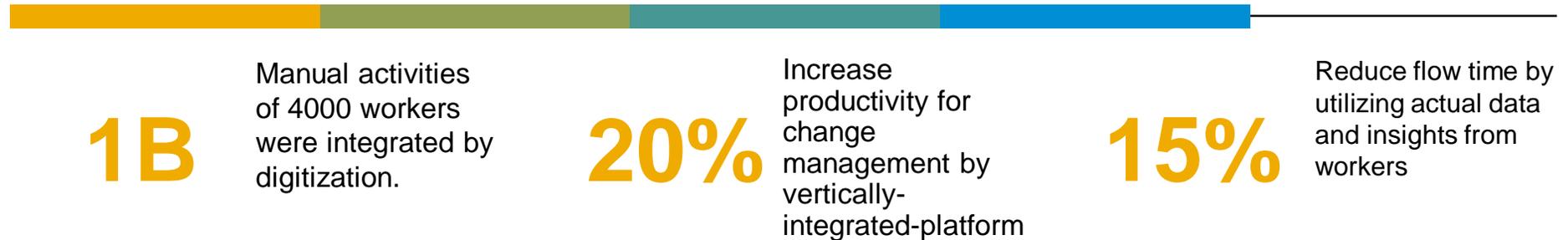
Manufacturing of aerospace and defense systems is a labor-intensive industry. It is crucial to link engineering, which must maintain tight control of configuration and change, to the shop floor, with the need for continuous improvement on a daily basis.

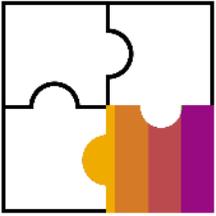
Solution

Using SAP S4/HANA Manufacturing for production engineering and operation to establish a consistent digital link between Production Engineering and Production Execution and ensure both frequent changes and change management control. The accumulated data will also help streamline business processes and improve productivity.

Outcome

KHI created a new vertically integrated digital platform for Production Engineering and Manufacturing, making it easy to balance strict change management with frequent improvements (i.e. “KAIZEN”), our competitive advantage. Collected digital data reduces flow time and leads to cultural change and data-driven business.





Participating Partner Information

Fujitsu Limited Systems Implementation Partner

Fujitsu is a technology-based global ICT (Information and Communication Technology) company. We provide a wide range of products, services and solutions, and our approximately 129,600 employees support our customers in 180 countries around the world. With our experience and the power of ICT, we aim to realize a prosperous and dreamy future together with our customers. Fujitsu is leading KHI's SAP S/4HANA Manufacturing for PEO implementation project. Fujitsu is also helping to further SAP Manufacturing for PEO development by acting as the liaison between KHI and SAP Manufacturing for PEO global development teams.

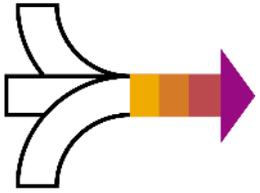


“This project is a great example of how Fujitsu and SAP have collaborated on a global digital supply chain to help organizations become agile, resilient and innovative. However, things weren't always easy, we did encounter several challenges along the way. The key to overcome these challenges was the power of our partnership. Fujitsu industry expertise was key to complimenting SAP technology and driving greater value for Kawasaki Heavy Industries, Ltd.”

Mikihito Saito
Head of EBAS* business unit
Fujitsu Limited



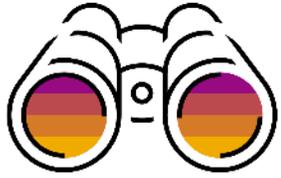
*EBAS : Enterprise business application service



Business Challenges and Objectives

- Aircraft manufacturers must ensure thorough manufacturing process traceability, including production and inspection records. Additionally, we must ensure technical requirements are transmitted accurately and completely to the shop floor and changes must be strictly controlled. Kawasaki's current manual, paper-based systems are time-consuming, error-prone and costly.
- KAIZEN, a business philosophy to eliminate redundancy and optimize productivity, allows KHI to concentrate effort on more important work. Workers at all levels play a central role. KHI standardizes the procedures of over 4,000 workers, monitors the status of each worker's daily activity, collects and analyzes defects and insights to improve standard procedures. Historically this has been performed manually with paper and is time-consuming, error-prone and costly.
- In analyzing all activities, it is very difficult to optimize overall productivity because the enormous amount of data from workers is divided into various systems and requires analysis from various viewpoints.

-
- Strict digital change management
 - Technical requests must be transmitted accurately and completely to manufacturing sites even if sudden design changes arise. This prevents production delays and the need for design rework and enabling products to be quickly brought to market.
 - Build digital KAIZEN platform to leverage actual data of individual workers
 - Detailed activity results and insights of individual workers are stored digitally in the system and correlated with operational data. To ensure the system is useful for workers, KHI adopted a simple and easy UX design. Centralizing individual worker's activity leverages new insights to optimize productivity with multiple perspectives.



Project or Use Case Details

- Streamline configuration and change management processes by centralizing design and manufacturing Bill of Materials (BOMs) and Routing for aircraft with SAP S4/HANA Manufacturing for production engineering and operation.
- Provide digital production order and work instruction, and record actual data on tablets at manufacturing sites, eliminating paper with SAP S4/HANA Manufacturing for production engineering and operation, reducing errors and improving rapid information flow.
- Leverage SAP Fiori to deliver UX Design and easy-to-use custom applications for workers who are the main heroes in KAIZEN.
- Integration between centralized actual data including “Lessons, Learns & Expertise” from shop floor and ERP data from SAP ERP Central Component (ECC) 6.0 by SAP BusinessObjects, then visualize and analyze with BI tools to improve productivity.
- KHI, Fujitsu and SAP SE jointly innovated and analyzed complex manufacturing process incorporating KAIZEN, and SAP enabled adoption of these requirements as standard functions.



Benefits and Outcomes

Business or Social

- More tightly controlled configuration management and change management in digital format
- Increase productivity for change management by 20%
- Reduce flow time by 15%, leveraging an integrated process and centralized data
- Capture and leverage “Lessons, Learns & Expertise” on the shop floor

IT (optional)

By consolidating various hosts and open systems into the SAP S4/HANA architecture:

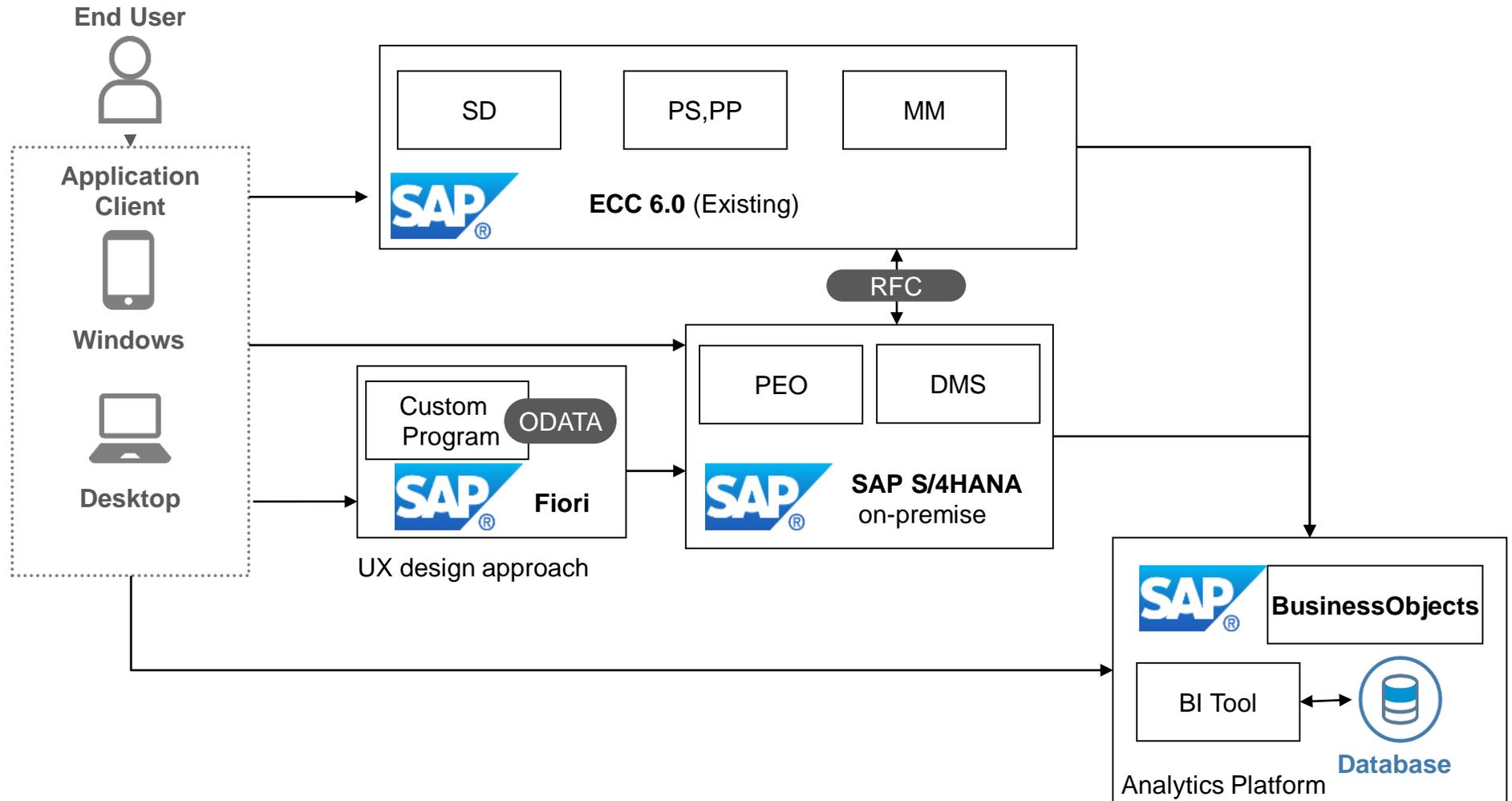
- Reduce hardware maintenance costs by 10%
- Ability to respond quickly to feature changes
- IT staff workloads were reduced (integrate skills)

Human Empowerment

- Significantly improve productivity by abolishing manual and paper process
- Leverage modern applications, designed with a UX approach; allows workers to easily access and record data
- Sharing various data removed boundaries between design, manufacturing, and partners and accelerated collaboration
- Transformation to a data-driven corporate culture



Architecture





Deployment

Deployment status Live

Date Sept, 2020

Number of users 4000

SAP® technologies used:

	SAP product	Deployment status (live or proof of concept [POC])	Contribution to project
1	SAP S/4HANA Manufacturing for production engineering and operations	Live	Main application for production engineering and MES
2	SAP Fiori	Live	Simple and productive UI
3	SAP BusinessObjects Business Intelligence	PoC	Analyze Actual data
4	SAP Analytics Cloud	PoC	Analyze Actual data

If you have used one or more of the services or support offerings from SAP Services and Support during the implementation or deployment phase, please indicate which one(s) below with an

SAP MaxAttention™

SAP ActiveAttention™

SAP Advanced Deployment

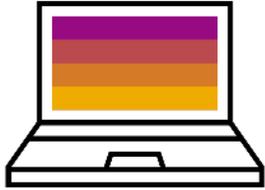
SAP Value Assurance

SAP Model Company

Others: Customer Engagement Initiative
SAP PEO Early Adopter Customer Group

SAP Innovation Services

SAP Innovative Business Solutions



Advanced Technologies (1 of 2)

The following **advanced technologies** were part of the project.

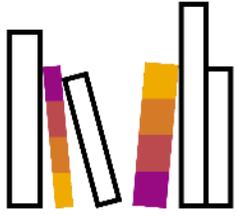
Technology or use case	Product used*	Contribution to project and how product used integrates with SAP products
1 Machine learning or artificial intelligence Robotic process automation, conversational AI, AI-based knowledge graph		
2 Intelligent data management Multi-cloud, data virtualization and governance, smart data tiering, persistent memory, data privacy	SAP 3D Visual Enterprise	Realize Model-based enterprise (Digital twin). Extend the 3D virtual model to encompass all downstream processes, this simplifies decision-making and processes for Manufacturing engineering, shop floor operation and quality assurance through intuitive visualization.
3 Advanced and augmented analytics <ul style="list-style-type: none">Real-time and streaming analytics, spatial analyticsNatural language query and generationAutoML to identify trends, patterns, outliersPredictive analytics (time series analysis and forecasting, regression, classification)		
4 Data and analytics solutions in the cloud <ul style="list-style-type: none">Unified data and analytics cloud platforms by SAPModern/self-service data to analytics		



Advanced Technologies (2 of 2)

The following **advanced technologies** were part of the project.

Technology or use case	Product used*	Contribution to project and how product used integrates with SAP products
5 Advanced cloud integration <ul style="list-style-type: none">• API economy (monetization and API marketplaces)• AI-based or crowdsourced integration• High throughput, low-latency digital integration hub		
6 Industry cloud platform		
7 Blockchain		
8 Internet of Things		
9 3D printing		



Additional Information

Our digital journey, “Smart-K,” is planning to expand from digital transformation of manufacturing sites to various directions

- https://www.youtube.com/watch?v=Cp52evuJ_4Y&feature=youtu.be
- By migrating existing SAP ECC 6.0 to SAP S4/HANA, all business processes are consolidated into a single instance; digitizing these and many others transforms it into an Intelligent Enterprise that makes decisions based on centralized data
- Help shop floor continuously improve leveraging digital information
- From production preparation to customer support, all information on production activities is centralized, and the same information is shared from workers to top management to derive new insights
- We digitally connect people across functional groups and leverage new collaborations from a variety of ideas and insights; we call this Digital Collaboration

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