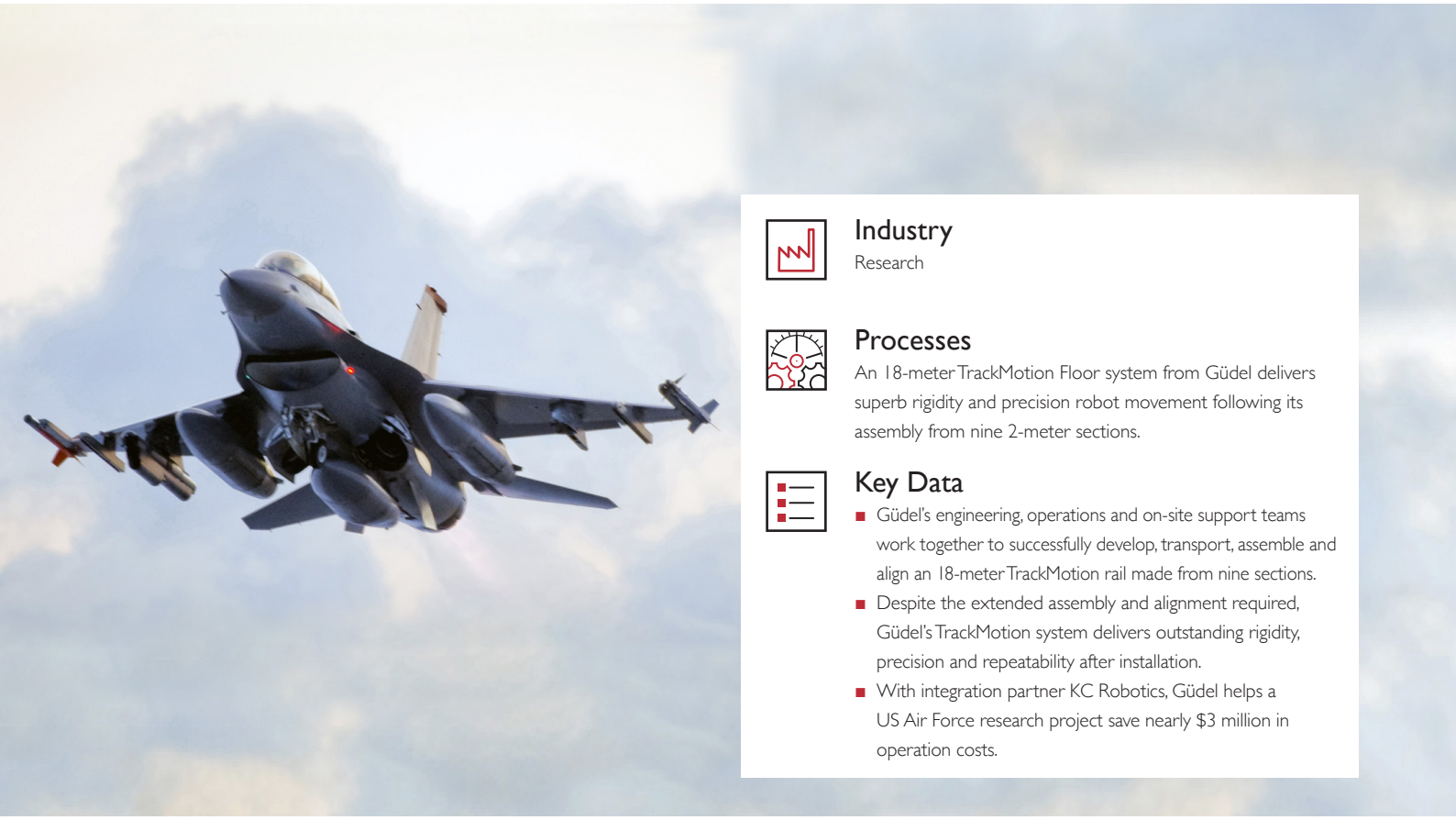
GÜDEL

Combining Portability and Precision

Güdel and KC Robotics save millions in research costs, one step at a time.



Industry

Research

Processes

An 18-meter TrackMotion Floor system from Güdel delivers superb rigidity and precision robot movement following its assembly from nine 2-meter sections.

Key Data

- Güdel's engineering, operations and on-site support teams work together to successfully develop, transport, assemble and align an 18-meter TrackMotion rail made from nine sections.
- Despite the extended assembly and alignment required, Güdel's TrackMotion system delivers outstanding rigidity, precision and repeatability after installation.
- With integration partner KC Robotics, Güdel helps a US Air Force research project save nearly $3 million in operation costs.

Güdel TrackMotion System Saves US Air Force Nearly $3 Million — Some Assembly Required

Many of the cutting-edge research projects undertaken at Wright-Patterson Air Force Base in Ohio require precision tracking, high-performance sensing and, often, the flight of military aircraft. The research is invariably important work. But it must be weighed against flight-time costs, which by some Pentagon estimates can run as much as $29,000 per hour.

To keep one line of research aloft while bringing costs down to earth, the Air Force approached Güdel partner KC Robotics for help in developing a robotic system that could test sensor functionality in the laboratory and reduce reliance on aircraft flight time.

"The intent was to sync the robots so they would occupy very specific points in the lab at precise moments," said Paul Carrier, president and chief operations officer at KC Robotics. "So instead of programming the bots to move from point A to B and from B to C, the system directed each bot to pass through specific points at second marker X. The program required fast acceleration and deceleration and exact synchronization between all robots, which meant they needed to be mounted on tracks and capable of extremely smooth and controllable movement."

After an initial site visit, KC Robotics proposed a solution comprising three KUKA robotic arms mounted on as many Güdel TrackMotion Floor (TMF) rail units. Two robots mounted on 6-meter and 9-meter Güdel TMF-3 model tracks would respectively provide 2.5-meter and 10.5-meter linear strokes. The third bot had a more specialized role, requiring an 18-meter TMF-1 track to give it a 16.2-meter linear stroke. More notably, the third bot and its track needed to operate one floor above the main lab so that it could occasionally extend its arm down through a long gap in the ceiling of the lab below.

This design would have been simple enough except for one additional detail: The only access to the upper floor was through a narrow stairwell, which meant Güdel's 18-meter rail would need to be hand-carried upstairs in nine 2-meter sections.

"If we had a choice, we would have built this track as three 6-meter frames," said Brian Engelking, Northeast sales manager at Güdel. "We're well prepared to fill the occasional request to deliver rails in smaller sections, but that usually doesn't involve two guys carrying

A Güdel TrackMotion Floor unit was engineered as nine sections designed for delivery around tight corners and was reassembled as an 18-meter robotic rail designed for tight tolerances.

each section up a flight of stairs. When you have to explain that to the team, then more questions start to come up: Did they think about the doorway or the hallway or how heavy it's going to be? Will the e-chain fit around the corner or will they need to take that apart?"

The questions extended up Güdel's supply chain, where vendors confronted — and met — the challenge of delivering materials for the nine links while still hitting the company's deadline.

In addition to the delivery of nine 2-meter-long sections, the job was carried out with good old-fashioned muscle work. Yet developing and assembling those sections required Güdel to dig more deeply than usual into its internal resources. With more sections comprising the 18-meter rail, Güdel's engineering department needed to take more care to avoid potential alignment issues. The operations team also made room for the additional resources required for testing and assembly of the rail before delivery. When the sections arrived at Wright-Patterson, they were accompanied by a Güdel field service technician, who supervised assembly and ensured that all nine sections were perfectly aligned.

"I would say the customization was relatively straightforward, but it did take a coordinated effort from all Güdel departments to think about the time, materials and steps to make this application be successful," said Engelking.

Once Güdel's three rails were on-site, the KC Robotics team installed the track and began testing the robotic system in less than a week. With help from Güdel's field technician, assembly of the 18-meter rail and other tracks went smoothly and the system performed as designed.

Güdel's rigid TMF-1 tracks absorbed the dynamic loads of each articulated robot along every axis, allowing a specified acceleration rate of 0.5 m/s^2. More importantly, the Güdel and KC Robotics track system successfully positioned the robots with sufficient accuracy and repeatability to simulate the role of test aircraft in the research project. As a result, the system saved about 100 hours of flight time, or an estimated $2.9 million in project costs.

Güdel Technology

- TrackMotion Technology

About Güdel Inc.

Güdel Inc. is the US subsidiary of Güdel Group, a global manufacturer of robotic automation products, systems and services. Güdel supplies linear-motion modules, robot track motion units, gantry robots and components to OEMs, systems integrators and machine builders serving the automotive, aerospace, logistics, heavy industrial and power-generation industries. Güdel Inc. is located in Ann Arbor, Michigan, in a dedicated 45,000-square-foot facility, providing North American customers with engineering, design, production and support.

Güdel Group was founded in 1954. Headquartered in Langenthal, Switzerland, today Güdel operates in more than 30 locations worldwide.

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