



Building Large Tooling with Tight Tolerances

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Superior Inspection Technology Aids the Growth of Manufacturing Superstar

The company serves the world's largest and most technologically advanced aerospace OEMs and Tier 1 suppliers. Due to corporate policies they did not wish to be specifically identified in this user story. For this case study, the company name has been changed to "the Company", and the user's name has been changed to "the Customer" or "Metrology Supervisor". The Company's clients include Boeing, Airbus, Lockheed Martin, Northrop Grumman, BAE, Embraer, Spirit AeroSystems, Triumph, and Bombardier. It has facilities in the United States, Canada, and Europe. Boasting multimillion-dollar contracts and multiple supplier awards from prestigious aerospace OEMs, the Company is a manufacturing superstar.

Requirements for Business Excellence

The Company takes a classic approach to excellence by combining customer satisfaction, innovation, and utter dedication to quality. The Company seeks to work with customers to turn the impossible into the possible.

The Company's leadership understands that achieving extraordinary levels of repeatable quality requires tools and technology that allow them to consistently manufacture within a few thousandths of an inch. They can't do it building "shimmable" parts. They must invest in the means to deliver "the impossible" and to do so "within limited time intervals."

"When you have a laser tracker collecting data at each step of the process, you don't even have rework later. Doing inspection with a tracker helped our business by speeding up the process of getting tools we are building through each department, as well as reducing rework by roughly 75 percent."

Metrology Supervisor

The Impossible

Sometimes the impossible takes the form of sensitive work for government entities that require ultra-secure, self-contained manufacturing facilities within facilities.

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More often though, the Company must continually innovate to design and build large tooling with tight tolerances.

“At our particular facility, we do ninety percent one-offs,” says the Customer, a Metrology Supervisor. “Some tooling we make are just one-time-use tools, R&D parts, but here and there, we’ll have a small run of two to five units. However, no two jobs are ever the same here, so we have to keep up with engineering.”

The tooling the Company manufactures poses multiple challenges. For the most part, each piece produced is unique, large, and complex. Moreover, they must get it all done in a time frame that satisfies their customers and turns a profit.

Made Possible

Typical manufacturing scenarios often see a part built of several components and then verified to specifications at the end of the process. The Company identified serious efficiency shortcomings in those processes.

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Metrology Supervisor

“We do something here a lot different than a lot of people,” reveals the Metrology Supervisor. “In our bond tool manufacturing process, we use FARO® Vantage Laser Trackers every step of the way. From fab to machining, and final and build, and then all the way until the job is packaged up and shipped out the door. We put a laser tracker measurement on the project pretty much 100 percent of the time, all the way through.”

“So, on a bond tool for instance, after we prep the data, the fabricators will assemble the bond tool and just tack it together and then we’ll go in with a laser tracker and shoot the whole tool to



make sure it’s square and straight in parallel, and good to weld,” explains the Customer. “When it’s done being welded, we’ll shoot it again to make sure it’s still within tolerance. Then we’ll tack on the face sheet and measure the face with the laser tracker again. As long as everything is still within tolerance, they’ll weld that on and then it’ll go out to heat-treat. When it comes back, we’ll measure it again with the tracker. We then mill the face sheet, and when it comes out of the mill, we’ll measure it again with the tracker. Next it goes into a bench phase; we’ll measure it with the tracker after bench, and then it’s pretty much ship it to the customer.”

Although adding multiple inspection points may seem counterintuitive to increasing throughput, the Company has seen the light.

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Metrology Supervisor

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“We have a tool that’s in machining right now for which we used two laser trackers, one on each side,” explains the Customer. “We’re literally doing on-machine inspection of the tool as it’s cutting. We’re in and out a lot quicker doing it this way.”



Within Limited Time Constraints

“Doing inspection this way has affected our business by speeding up the process of getting tools we are building through each department, as well as reducing rework by roughly 75 percent,” says the Customer. “When you have a laser tracker collecting data at each step of the process, you don’t even have rework later. Let’s just make it right, right now. Rework always involves additional money spent, and stopping for rework doesn’t help get the job out the door on time either.”

When it comes to customer satisfaction, delivering products in a timely manner is second only to quality. To aid in delivering world-class quality as rapidly as possible, the company also employs several FARO ScanArms.

It’s all about increasing throughput.

“It’s just quicker, faster, and easier to do inspections with a FARO ScanArm rather than to keep using a CMM (coordinate measuring machine),” admits the Metrology Supervisor. “There were three CMMs in use when I started working here, but between the software and the FARO arms, Our inspection time is at least 30 to 40 percent faster.”

On occasions when time restraints are even more of a concern than usual, the team assigns multiple operators and ScanArms to one piece with multiple inspections going on simultaneously. In those cases, the team utilizes one Vantage Tracker with multiple ScanArms scanning into a single coordinate system.

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Metrology Supervisor

“When we have a super-tight deadline, sometimes we combine the tracker with more than one arm,” explains the Customer. “With that setup, we can reach as many critical areas as we need to as we keep moving forward.”

FARO refers to this configuration as the Super 6DoF TrackArm, which provides high-accuracy 3D scans, even for large components. It can be used to measure complete cars, car bodies, bodies in white, tools, fittings, fixtures, parts and components, cubings, and master jigs for pilot and production phases. Super 6DoF is ideally suited for applications with parts that are not only large, but also extremely detailed and complex. This advantage makes it an ideal solution for industries such as automotive, heavy machinery, and aerospace.

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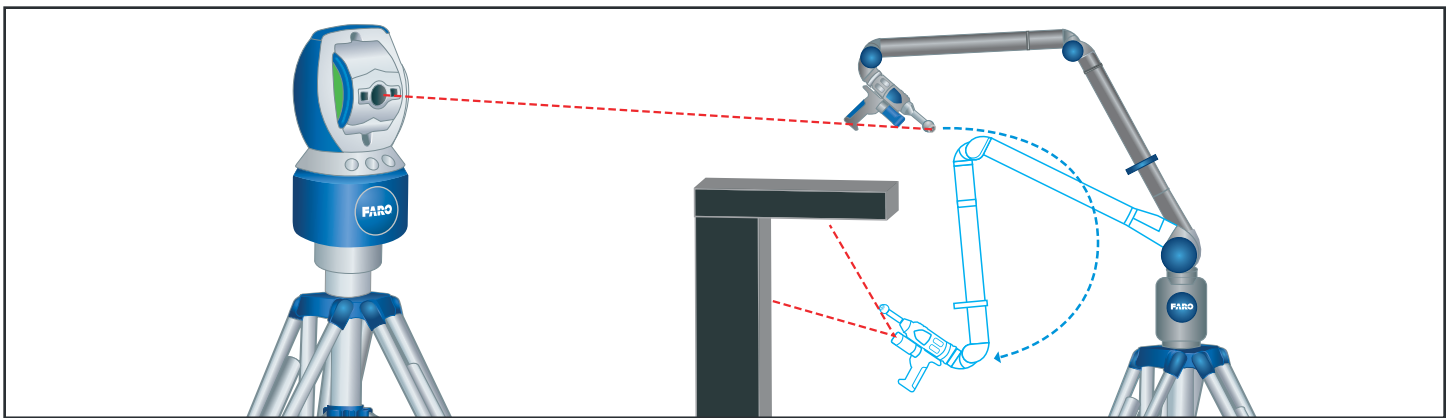
Growth Through Investment

Although the Company already employs numerous FARO products, it continues to invest in the future.

“Actually, I just got a price quote today for three more Vantage Laser Trackers,” says the Customer. “The accuracy and repeatability of FARO equipment factors into our growth due to the fact that we’re outputting quality tools to the customers.”

The Customer sums up his assessment of the FARO equipment. “The accuracy and repeatability of the FARO products are superb. Our operators like how easy it is to hook them up and get going.”

“Another thing with FARO is the customer support team,” he adds. “When you need help, they’ll talk you through everything you need to know. You send them an email and they will call you back and walk you through the steps.”



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