LK METROLOGY CASE STUDY
FUTURE-PROOFING AN APPLICATION

Leading CMM Innovator Partners with Spatial for Future-Ready Solutions

Market
Metrology/CMM

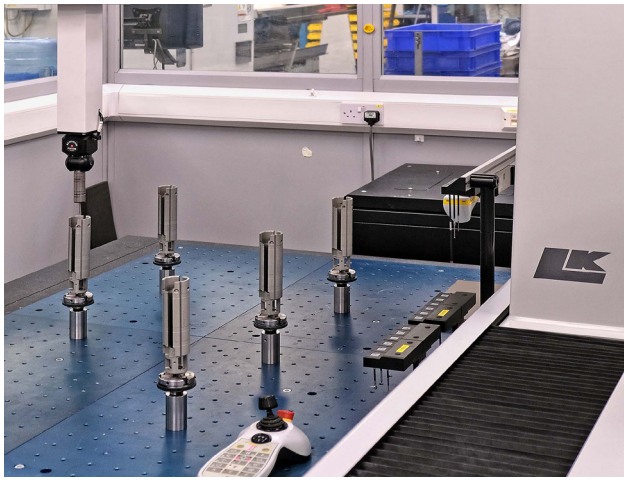
Product & Services
3D ACIS Modeler, 3D InterOp, HOOPS Visualize & Spatial Assessment Program

THE QUEST FOR PRECISION

LK Metrology was on a quest to maintain precision for their Coordinate Measuring Machines. They improved core application functionality through a development partnership with Spatial.

SUMMARY

When LK Metrology, a leader in the Coordinate Measuring Machine (CMM) industry, sought to future-proof and develop robustness in the code and overall offering of their CAMIO software application for programming CMMs, they returned to Spatial's industry-proven solutions and programs. LK Metrology added 3D InterOp and HOOPS Visualize to round out their use of 3D ACIS Modeler and engaged in the Assessment Program. The Spatial Assessment Program enabled LK Metrology to implement the next generation of PMI/MBD technology capabilities thereby extending the lifespan of CAMIO while also benefiting from expert code review and answers to developer questions.



THE COMPANY

Founded in England in 1963, LK Metrology is the oldest Coordinate Measuring Machines (CMM) manufacturer in the world and creator of the CAMIO software application. They are renowned for their innovative metrology solutions and services, and their products, including CMMs, new sensor technology such as laser scanners, surface finish, etc. and metrology software, which are used worldwide to control and improve the quality of manufactured components. Their precision technology underpins the process chain from design, development, production, and assembly through to quality assurance in global industries such as automotive, aerospace, defense, motorsport, energy, medical, and contract inspection. LK Metrology focuses on their products remaining as accurate as possible—a customer benefit of which they are proud. With an impressive volumetric accuracy as small as 2.1 microns, their ceramic technology CMMs set the bar high for the rest of the industry.

Not only can LK Metrology customize a CMM size exactly to their customer's specifications, but their software application, CAMIO, enables precise end-product production measurement. CAMIO has in-depth programming, analysis, and reporting capabilities for various CMM applications, enabling metrology in any industry. LK Metrology's customers manufacture parts requiring inspection for dimensional accuracy and process stability. This attention to detail for customer requirements provides end users with an incomparable product built for their unique needs. Indeed, CAMIO's robust functionality comes from specific features that LK Metrology identified as key for their customers and then built into their application.

> "Working closely together with Spatial, not only strengthened our knowledge of PMI and our CAMIO software but also provided very valuable feedback to Spatial which helped to improve the Uconnect product, thereby making our product better in the end.."
>
> **– Eric Hayes, Director - Metrology Solutions**

LK Metrology Milestones

1963
Norman Key, a former Rolls-Royce engineer, founded LK Metrology.

1997
LK Metrology released CAMIO software with full DMIS support, based on Spatial's 3D ACIS Modeler.

1999
Introduced a new machine range with a horizontal arm.

2002
CAMIO Studio Inspect release: introducing a new user-friendly interface with advanced programming, setting the stage for future LK Metrology inspection software.

2003
Supplied fourteen car body machines for Land Rover's Discovery model quality control.

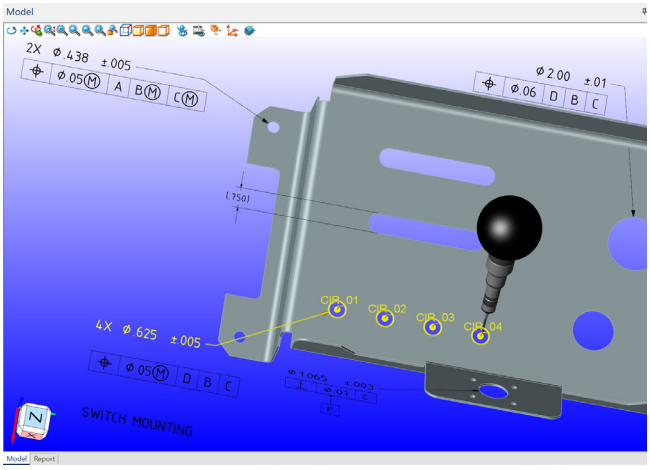
2005
Entered the automotive powertrain market.

2008
Supplied the widest-ever CMM, spanning six meters.

2015
LK Altera CMM machines were chosen for turbine blade inspection by an American aircraft engine manufacturer.

2020
Launched 3D articulating arm metrology systems.

2022
- Introduced a high-accuracy, high-resolution blue Laser CMM scanner.
- Engage with Spatial Assessment
- Exchange file versions are updated to the latest release of Spatial's 3D InterOp, with added PMI capabilities. Program for CAMIO application.



Implementing PMI: Precision measurement on an LK Metrology

CHALLENGE

A Quest to Maintain Precision for Coordinate Measuring Machines

When computer modeling first hit the market, LK Metrology decided to integrate this new technology into their metrology hardware and applications thus revolutionizing their offering and the market. After more than two decades of success implementing this process, LK Metrology decided to improve their process by refining their practices and workflows. They wanted to upgrade to the best CAD engine and interoperability software possible while receiving implementation expertise. The LK Metrology team challenged themselves to find a way to expand their application and make the end-user workflows more efficient and effective. Part of this would involve precise Product Manufacturing Information (PMI) and Model-Based Definition (MBD). Overall, LK Metrology sought a solution that would extend CAMIO functionality and make their code more robust.

SOLUTION

Improving Core Application Functionality Through Development Partnership

As a long-time Spatial customer, LK Metrology already had Spatial 3D components embedded in their CAMIO application and were familiar with the quality and functionality these components provide. For example, in the 1990s, Spatial's 3D ACIS Modeler kernel was incorporated into CAMIO to allow native CAD data to develop and prove 3D inspection programs, both online and offline.

In addition to ACIS, LK Metrology licensed HOOPS Visualize and 3D InterOp to round out CAMIO. 3D InterOp enables users to import, interact with, share, and export 3D data across different CMM platforms, while HOOPS Visualize enhances the performance and visual display of CAMIO. With high-performance Spatial components already in place, LK Metrology wanted to take their application to the next level by utilizing the Application Lifecycle Management (ALM) framework and start with a tailored three-phased approach via Spatial's Assessment Program. This is a framework for managing an application's lifecycle, from initial idea through development, maintenance, and eventual retirement. Application developers benefit from ALM through shorter

> "Having Spatial reviewing sections of recent source code changes and provide feedback gave us the confidence that we were implementing the functions correctly and in an optimized manner. This type of understanding can't be achieved through just the standard technical support channel."
>
> **— Eric Hayes, Director - Metrology Solutions**

application release cycles, expanded knowledge through training and workshops, elevated product management, based on a tailored assessment program. The Assessment Program assured LK Metrology that they were getting the most out of this new data and given the tools and functionality needed to elevate their end users' workflows.

A team of Spatial experts worked with LK Metrology to discover, discuss, and provide suggestions and solutions for their challenges. They helped them uncover new capabilities to expand their functionalities and elevate their application. Spatial understood the geo-specific needs of LK Metrology as an internationally diversified company.

Elevating Product Management through Application Lifecyle Management

Conducted in conjunction with ALM, LK Metrology received a comprehensive overview of their current status and what they needed to do to take their application to the next competitive level. By analyzing CAMIO's current usage and identifying technical or version gaps, Spatial's expert technical team delivered recommended implementation outlines and prototypes for the critical steps. The Assessment Program provided the advice and thorough code review that LK Metrology application developers utilized to round out their product to a polished and incomparable state.

High Quality Functionality

With the integration of Spatial's 3D InterOp, CAMIO's interoperability enables users to import, interact with, share, and export 3D data across CMM platforms and manufacturing sites. 3D ACIS Modeler's Geometry Validation feature automatically detects which surfaces of the CAD model should be used to measure the feature allowing the appropriate touch point or scan path measurement strategy to be applied avoiding any areas where this is invalid geometry. Within the programming workflow, the advanced picking functions allow the user the option to choose the correct feature type out of a list of possible options without additional interaction. Additional features such as Auto Sensor Selection, full Probe Path simulation, and a Clearance Avoidance Box help to round out the CAMIO portfolio.

Integrating PMI and MBD for Extended Capabilities

LK Metrology knew that their implementation of Product Manufacturing Information (PMI) and Model-Based Definition (MBD) needed revamping and would need some help with extra and corner cases. As a result, Spatial helped integrate PMI and MBD reading and processing technology within CAMIO, a big part of extending the application's capabilities. Spatial then consulted with LK to review their implementation to ensure it was secure, efficient, and robust.

Thus, users can now quickly identify the links between graphical PMI and semantic PMI. They then can add the features, datum features, and tolerances into the existing teach path workflows that logically order the items and apply the measurement strategies and clearance moves. This process creates large sections of DMIS code with minimal user input.

Coordinated Analysis and Implementation

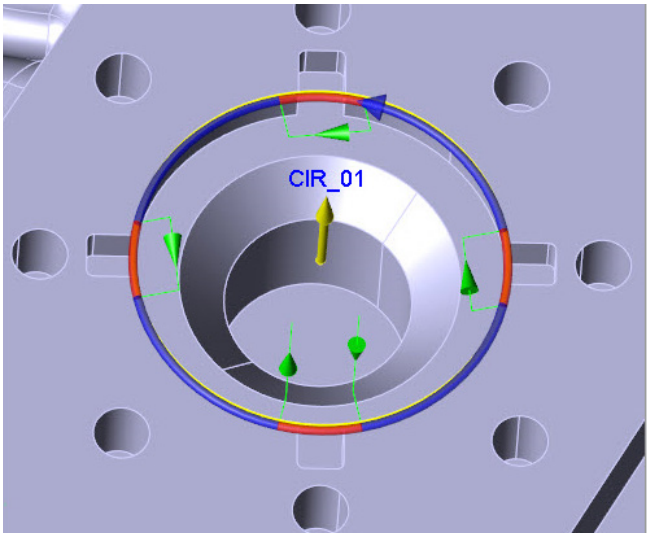
With each new functionality addition, the Spatial support team helped LK Metrology implement the code and discover and fix any bugs or issues. Through a collaboration plan and continuous engagement, Spatial enabled LK Metrology to create unique and valuable workflows within their application and gain deeper insight into areas of improvement for CAMIO.

KEY INSIGHTS

Supporting the Next Generation of CMM Software

Looking at the future of the Metrology market, the milestones are clear: precision and accuracy of code are critical, as is supporting software application developers with an industry-proven process from start to finish. MBD and PMI are quickly getting adopted in the industry, and in the future, most customers are likely to expect them to be used in software as a standard.

The precision and accuracy that LK Metrology provides with their cutting-edge solutions already exceeds industry standards, so when they sought to future-proof and develop



Geometry validation in action: Adjusting measurement strategy to bypass surface voids, ensuring precise inspection.

robustness in the code and overall offering of their CAMIO application they knew they could trust in Spatial again for a mutually beneficial partnership. They wanted a total solution to their issues and were open to exploring all the possible capabilities with the file formats they used. In turn, throughout the process, Spatial improved its quality, capabilities, and what it can support.

By engaging experts like Spatial in their application development, LK Metrology demonstrates excellence in the CMM industry and leads by example, showing what every Metrology software application can aspire to be. Their customers believe in standards and the use of Spatial's proven, world-class components, and they appreciate the power, stability, and capabilities of these solutions.

"Spatial has been a true partner in the development of our product. They have helped us to get the most out of their product and have been willing to work with us to improve their package, too. It has been beneficial for all."

– Steve Parker, Software Development Manager

Learn more about LK Metrology and their cutting edge CMM application, CAMIO.

Connect with LK Metrology

Ready to catapult your application ahead of the competition?

Connect with Spatial

About Spatial Corp

Spatial Corp, a Dassault Systèmes subsidiary, is the leading provider of 3D software development toolkits for technical applications across a broad range of industries. Spatial **3D modeling**, **3D visualization**, and **CAD translation** software development toolkits help application developers deliver market-leading products, maintain focus on core competencies, and reduce time-to-market. For over 30 years, Spatial's 3D software development toolkits have been adopted by many of the world's most recognized software developers, manufacturers, research institutes, and universities. Headquartered in Broomfield, Colorado, Spatial has offices in the USA, Germany, Japan, China, and the United Kingdom. For more information, visit **www.spatial.com**.

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