



## Turning Dreams into Reality, Manufacturing Dream Cars with the FARO Design ScanArm

In the world of manufacturing, few companies can embody the idea of ‘fun’ and ‘dreams’ in what they do. Often, business owners get caught up with increasing brand awareness, maximizing profits, or achieving high levels of efficiency - at the expense of neglecting their original aspirations. Against this backdrop, MOONCRAFT CO., LTD. (Mooncraft) from Gotemba city, Shizuoka prefecture, is one company that dares to dream, and strives hard to turn its dreams into reality.

Established in 1975, Mooncraft was founded by car designer, Mr. Takuya Yura. The company designs and develops racing cars, creates aerodynamics using in-house wind tunnel test equipment, and manufactures car components made from carbon fiber reinforced plastics (CFRP). Mooncraft regularly integrates technologies that were used to manufacture advanced racing car models into designing regular racing cars. In addition, the company adopts innovative manufacturing techniques like utilizing carbon fiber – a technique developed by the Aerospace industry.

### Industry

Automotive

### Applications

- Reverse engineering

### Benefits

- Time saving on measuring process & preparation
- Portability of ScanArm reduced number of processes involved to scan

# Reverse Engineering: Complex Designs & Black Parts

Previously, Mooncraft carried out its measurements using only 2D instruments such as calipers and layout machines. However, as 3D computer-aided design (CAD) technologies advanced and grew in popularity, car component designs became more complicated as well, and it was no longer sufficient to rely on subjective judgment. This led to Mooncraft introducing the FARO ScanArm® – a portable coordinate measuring machine (CMM) integrated with a Laser Line Probe – to its operations in 2005.

The ScanArm's scanning capabilities suited Mooncraft's needs well, as the development of a race car called for sophisticated, high-resolution reverse engineering tools. Mr. Taisuke Shinse from the Development Division at Mooncraft explained, "The race car development process starts by hand, and digital data is not available at this stage. Since our team's strength lies in overseeing the entire process, from product design through to completion stages, we decided to invest in the ScanArm to accurately digitize and record a proper set of data."



The process of attaching the 3D shaped part to the 1/5 model, to undergo wind tunnel testing. This helps Mooncraft to create a faster and safer car.

Fast forward to 2016, Mooncraft purchased an additional FARO Design ScanArm to further strengthen its reverse engineering capabilities. With the introduction of industrial autoclave processing, carbon fiber composite parts became commonplace in the race car industry. Mooncraft saw a rise in the number of black parts and observed that the shapes requiring scanning were growing in complexity. The team recognized the demand for a prompt reflection of the scanned data and understood that a better, more efficient solution was needed. This was when they went on a year-long search to identify the best laser scanner for their measurement needs, evaluating various camera-type and handheld scanners.

Commenting on their procurement process, Mr. Tatsuya Sekine, Development Division Manager at Mooncraft, elaborated, "We decided against camera-type scanners as they are too large to physically move anywhere for measurements. Besides, we don't have a temperature-controlled room as we conduct our measurements on the shop floor. We also looked at handheld scanners but the team felt it was too time-consuming to have to apply and remove target marks to the parts we had to scan,



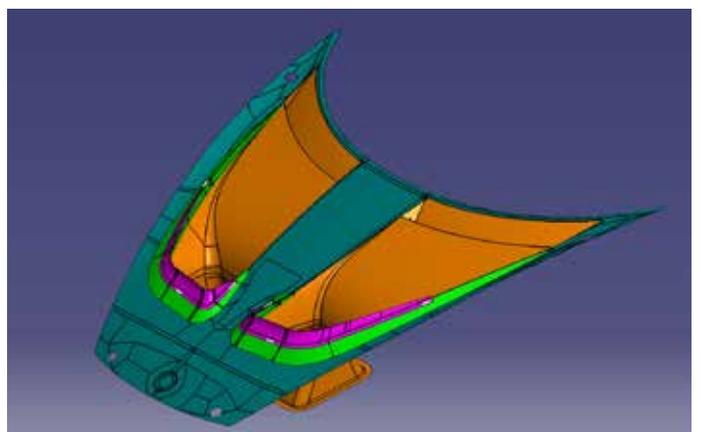
The wind tunnel test equipment used by Mooncraft.

especially since we conduct checks for interference during the manufacturing process. We finally went with the Design ScanArm as the articulated arm was still the easiest solution for us to implement, and the team was already familiar with the technology. What sealed the deal was the device's optically-superior blue laser technology that allows us achieve our desired level of scanning performance."

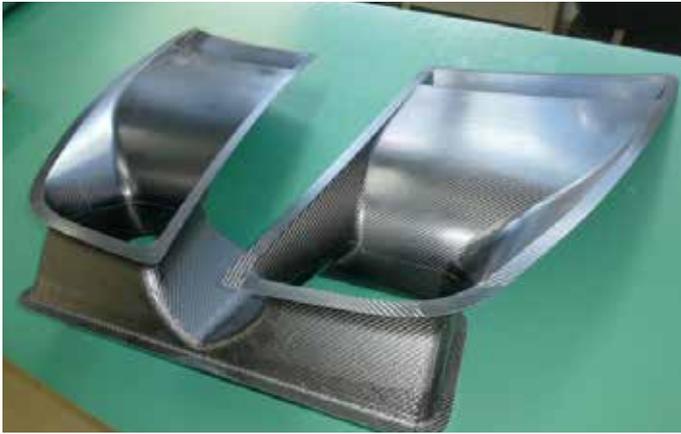
## Shortening the Delivery Time: Reducing Preparation &



A Mooncraft employee demonstrates how the FARO Design ScanArm is used to scan components on a race car.



A CAD design of Mooncraft's race car component.



A sample of Mooncraft's carbon fiber reinforced polymer race car components.

toys, and stationery – placing a strong focus on innovative design through the application of the latest technology. Mr. Sekine concluded, “I think developing a race car requires advanced technologies, like a solution to reduce air resistance, for instance. This concept can then be integrated into the development of regular cars in the market. Our involvement in developing the ‘car of the future’ has allowed us to shine in this area. Mooncraft was founded on the belief that dreams can become reality, and we have continued to achieve things that normal companies find impossible. It is truly gratifying to enjoy what you do.”

## Measurement Times

Portability was the key consideration for Mooncraft during the evaluation stage. In essence, the team needed a solution that would allow them to carry out inspections anywhere – whether on the shop floor or a separate job site in another factory – because measurements need to be taken as the race car is being assembled. Mr. Sekine shared, “The Design ScanArm is a portable CMM with an integrated laser scanner. It provides convenience as it can be easily transported in a case and easily set-up by one person in a few simple steps. Also, preparation time has been eliminated since the Design ScanArm can scan our components without the need for a spray or target marks. Additionally, the device’s fast scanning speed reduces the amount of time taken for measurements, shortening the overall delivery time.”

In the past, the team at Mooncraft had to apply a powder spray on black parts to acquire scan data. However, the same method cannot be applied to carbon fiber, as the droplets would seep into the mesh material. To mitigate this, Mooncraft would use a yellow masking tape on the carbon fiber, which was time-consuming due to the complicated design of the car components. Mr. Yutaka Kikuchi from the Development Division said,

“Thankfully, with the Design ScanArm, we can now scan black parts quickly and accurately. We used to take up to two full days to completely scan one car, but we can now finish the same task in one day.

The scanner’s compact size makes it easier to carry around, and its counter balancers and ergonomic design allows us to handle the device with more ease. All in all, the Design ScanArm has helped us to reduce the amount of effort involved around our scanning tasks.”

## Boasting Innovative Design & the Latest Technology

Apart from race car design development, Mooncraft is also involved in the industrial design of prototypes and mass-produced goods – including six-wheeled cars, furniture,

## About MOONCRAFT CO., LTD.

Founded in 1975, MOONCRAFT CO., LTD (Mooncraft) designs and develops racing cars, creates aerodynamics using in-house wind tunnel test equipment, and manufactures car components made from carbon fiber reinforced plastics (CFRP). The company also pursues various project such as industrial design and development assignments. Mooncraft is also highly regarded for leading achievements in race car development, as well as for utilizing latest technologies such as wind tunnel testing equipment or autoclave systems, and possessing capabilities throughout the design, development, and manufacturing stages. The company is also recognized for its achievements in transportation industrial design and development.

For more information: [www.mooncraft.jp](http://www.mooncraft.jp)

## About FARO

FARO is the world's most trusted source for 3D measurement, imaging and realization technology. The Company develops and markets computer-aided measurement and imaging devices and software. Technology from FARO permits high-precision 3D measurement, imaging and comparison of parts and complex structures within production and quality assurance processes. The devices are used for inspecting components and assemblies, rapid prototyping, documenting large volume spaces or structures in 3D, surveying and construction, as well as for investigation and reconstruction of accident sites or crime scenes.

FARO's global headquarters are located in Lake Mary, Florida. The Company also has a new technology center and manufacturing facility consisting of approximately 90,400 square feet located in Exton, Pennsylvania containing research and development, manufacturing and service operations of its FARO Laser Tracker and FARO Factory Array Imager product lines. The Company's European regional headquarters is located in Stuttgart, Germany and its Asia Pacific regional headquarters is located in Singapore. FARO has other offices in the United States, Canada, Mexico, Brazil, Germany, the United Kingdom, France, Spain, Italy, Poland, Turkey, the Netherlands, Switzerland, India, China, Malaysia, Vietnam, Thailand, South Korea, and Japan.



## Featured Product

### FARO Design ScanArm

FARO Design ScanArm is a portable 3D scanning solution tailored for 3D modeling, reverse engineering, and CAD-based design applications across the product lifecycle management (PLM) process.

For more information [www.faro.com/DesignScanArm/sg](http://www.faro.com/DesignScanArm/sg)

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