FARO®

user story 04/10

The FARO system is equally impressive for taking exterior as for interior measurements in Dingolfing and Regensburg.

Objective – Leadership in Innovation

FARO *has successfully combined three tried-and-tested measuring systems in the Track ScanArm. The mobile measuring system is particularly impressive in the measurement of entire vehicles, not least as a result of its efficiency.*

The BMW Group relies on the latest, state-of-the-art technologies, in particular in development and production. In this context, the Track ScanArm from FARO, which is used at the plants in Dingolfing and Regensburg (both in Germany), represents an equally clever and mobile measuring system in Geometric Integration measuring technology. What was required was a system for recording tactile points and surfaces irrespective of location, as well as wireless transfer rather than via a tool. Calibration was therefore not to be conducted by means of reference marks, as this represents an uncertainty factor, for example because of the moving parts. The objective was clearly non-contact wireless transfer – this was the basic requirement of the system to be procured. FARO's Track ScanArm, which ideally satisfied the requirement profile, was ultimately ordered for the German plants.

The Track ScanArm combines the FARO Laser Tracker, the seven-axis FaroArm Quantum with a range of 2.4m, and the Laser Line Probe V3 scanner. The package is completed by Polyworks software. All measuring systems can be linked together by means of a common coordinate system. The coordinate system can be calibrated either by means of the laser tracker, by means of tactile measurements by the FaroArm or through scanned measurements. The coordinate system is then transferred to each of the other systems, for example from the tracker to the arm or vice versa – and thus from any vantage point. As the fixed base, the >>

5 GOOD REASONS

... why you should consider the FARO Track ScanArm:

1 Combination of FaroArm and tracker: Large range, small details which are difficult to access, highest precision

2 Benefit from the high accuracy of both individual systems

3 While measuring with the arm it is not necessary to be in line of sight with the tracker. Thus you measure/ scan with real 6/7 free axes

4 Only one laptop necessary for the control of both products

5 Laser Tracker and ScanArm can also be used indivually

@ WWW.FARO.COM/LASER-TRACKER

@ WWW.MEASURING-ARMS.FARO.COM

INSPECTION

ALIGNMENT

>> laser tracker either stands on the tripod as in Regensburg or is hung from the ceiling as in Dingolfing. The coordinate system is transferred from the fixed base of the laser tracker to the arm, irrespective of where it is located in the respective measuring environment. This means that you calibrate and can then carry out measurements – separate from the tracker and without any visual contact – of both the exterior and the interior of the vehicle, with all seven degrees of freedom. Tactile measurements or the scanning of surfaces are ideal for precisely those places that cannot be reached with the laser tracker. The Track ScanArm ultimately combines the advantages of the laser tracker, tactile measuring arm and laser scanner systems, supplemented by powerful software and a computer.

One key bonus of the system is the option to use all the products that make up the Track ScanArm individually.

FARO provided a suitable partner for the implementation of this ambitious project for the two Bavarian BMW plants simply because FaroArms have already been successfully employed both in Regensburg and in Dingolfing for some ten years now. The plant in Lower Bavaria alone currently has a wide range of FaroArms from the Gold, Fusion and Platinum series. The initial presentations of the Track ScanArm were carried out as long ago as 2006. The system finally became really interesting for metrologists when FARO was also able to offer wireless vehicle network transfer. Procurement was followed by the installation phase, during which the specialists from both partners contributed their expertise. The Track ScanArm has been in operation as planned since mid-2009. In the end, there were several reasons that spoke in favour of the FARO system compared to that of a competitor. These included not only the price but also the fact that the quality experts at both plants were already familiar with the measuring arms and their high level of accuracy. There is also the "monopoly position" resulting from the fact that at the time FARO was the only company able to offer wireless transfer of the vehicle network.

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The range of tasks covered by geometric integration is extensive: the focus is on product qualification during the product development stage; or pilot production, in order to get the suppliers' parts up to series production standard and to ensure that the entire vehicle is ready for production. This is also followed by analysis in the series production process whenever a component cannot be fitted as required. In the course of the measurements required for testing, the Track ScanArm is regularly employed throughout the entire vehicle, on both the interior and exterior, in a very wide variety of ways. The system is furthermore used for checking production tools and jigs. Assembly jigs are currently being measured in Regensburg, so that it will be possible to restore the current status of the C-frames after retooling. In the case of

these measurements, the system is particularly impressive not only for its mobility but also for perfect 'job-sharing': The measuring arm is used whenever measurements need to be taken in locations that cannot be accessed by the laser tracker. The tracker is used, on the other hand, for measuring points at heights of up 3.0m which cannot be reached with the measuring arm.

The combination of tracker, tactile measuring arm and laser scanner has proven absolute stood the testing in both Dingolfing and in Regensburg. Not least because transfer can be carried out anywhere and the system offers all degrees of freedom – so that there are no limitations. The specialists at BMW have also come to appreciate the mobility of the measuring system. The Track ScanArm also plays a similarly important role for the Regensburg plant as a replacement for and a supplement to the underfloor measuring system, in order to avoid capacity bottlenecks. If the stationary measuring machine is busy, the FARO system offers the flexibility of enabling positioning the vehicle wherever there happens to be space at the moment, and the measurements can then be carried out there. In cases where the item to be inspected can only be transported into the measuring area with great difficulty, if at all, the Track ScanArm also offers the possibility of going straight to the part, for example to the production line, in order to carry out the measurements in situ. Thanks to the portability of the system, the specialists in Geometric Integration can make considerable savings in terms of transport costs and time. And when in this context the analysis is carried out more quickly, it is of course also possible to respond more quickly to any inaccuracies, which represents a significant advantage particularly in the series production process.

One essential bonus of this system is the option of using each of the products individually – the tracker just as much as the tactile measuring arm and the laser scanner. Metrologists are already making full use of this advantage, as when the Track ScanArm is not needed at least one of the individual products is used virtually every day. The laser tracker suspended from the ceiling in Dingolfing represents an innovative solution: Any possibility of contact by a person, a machine or anything else can thus be excluded, thus achieving greater measurement precision. "The tracker can also cover several workstations as a result of its elevated position, and hence a greater measurement volume. If the system is to be deployed at a different location, its mobility is still guaranteed, because all one has to do is wind down the tracker head and pack it in the box, which might take five minutes," stresses Matthias John, Senior Laser Tracker Account Manager at FARO.

The laser tracker is suspended from the ceiling in Dingolfing. As a result, the possibility of any 'outside contact' can be excludeds.

The Track ScanArm adds another element to the existing comprehensive array of measuring devices in Dingolfing und Regensburg, and quite considerably increases efficiency in the case of certain measuring tasks. On this basis, the metrologists can select and utilise the most effective measuring system available in each case, for any application. This also applies especially with regard to the combination of scanning and tactile measurement for large measurement volumes, and the possibility of mobile deployment on the production line.

Roland Schlüßl, Key Account Manager at FARO and responsible for BMW client support, sums it up as follows: "The experts in Geometric Integration measuring technology at BMW are quite satisfied with the Track ScanArm system. And it's no wonder, as the automotive industry is virtually predestined for the combination of these measuring systems, because the components to be measured are too large for the measuring arm, and the laser tracker can do little on its own. Admittedly, we also learned quite a lot in the course of the installation process at BMW, and we were able to develop the Track ScanArm even further in the process. Now the package is absolutely 'spot on' and is already being used by various other car manufacturers."

The Track ScanArm is particularly impressive for its mobility when measuring assembly jigs.