



## **PRESS INFORMATION**

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### **HITTING THE 'TARGETT' IN THE AEROSPACE SECTOR**

Gaining rapid and accurate measurements of large surface areas is a task which has taxed designers and engineers over many decades – yet without such data, optimisation of production is difficult – and CFD analysis of performance is impossible.

The problem is exacerbated when the areas that are shiny or reflective, making the use of technologies such as laser scanners potentially unreliable due to the reflection of the laser interfering with the readings being taken.

And when speed is of the essence – for example because of either tight production deadlines or the need to gain competitive advantage – then the importance of getting the task completed quickly and accurately becomes heightened.

In the aerospace sector, even smaller aircraft have surface areas of several hundred square feet or more. The tiniest fault or imperfection at any stage of the engineering process – particularly on exposed surfaces which need to deliver minimum aerodynamic resistance - can cause significant performance issues down the line.

So how can aerospace manufacturers needing to rapidly reverse engineer components, or even whole aircraft, be sure not just that their prototype meets CAD parameters, but that the final manufactured version meets those same stringent tolerances?

Co-ordinate measuring machines are not an option here because while they are highly accurate at measuring a few points, time simply does not permit the measurements of enough points to gain a truly accurate representation of the whole surface. Meanwhile, laser scanners are also not viable since, in addition to the problems they have in coping with reflective surfaces, their ability to measure only a relatively small 'stripe' at one time places significant demands on the operator, in terms of both time and skill, in 'patching' the stripes together to deliver a complete point cloud.

This was the issue facing Gloucestershire-based Targett Aviation, a specialist repair and maintenance centre for sports aircraft, which has recently moved into the field of single-seater, electrically powered aircraft designed for the fast-growing sport of air racing.

Roger Targett explained: “Air racing is rapidly growing in popularity and of course with electric aircraft there is none of the risk associated with using flammable fossil fuels. The focus when designing the aircraft is very much on speed rather than endurance with a maximum flight time of up to 20 minutes.”

The aircraft being designed by Targett Aviation – named the Rebel Electric Racer - has a wingspan of around 20 feet and the company initially created a lifesize ‘proof of concept’ model to secure investment.

With this complete, the next phase was to gain an accurate representation of the entire aircraft for virtual testing and finite element analysis (FEA) on CAD with the aim of optimising the aerodynamic design of the final aircraft.

Targett Aviation contacted Leicestershire-based white light scanning specialists Phase Vision whose Quartz range of scanners is proven in the acquisition of millions of points to create a highly detailed point cloud in just a few seconds – even when contending with large and reflective surface areas.

A team of two Phase Vision scanning experts visited Targett Aviation and using products from the company’s acclaimed Quartz white light scanning range, scanned the entire aircraft within a few hours – a total of some 250 scans which have since been ‘patched’ and surfaced ready for the FEA stage. Even after data reduction, some 250M measurements were available in this detailed model.

Two scanners were used – a Quartz 1200DBE was used to scan the wings and fuselage. This scanner is capable of a very large measurement volume – up to 8m<sup>3</sup> can be scanned in a few seconds, which was ideal for the large areas of the aircraft; while the smaller details were scanned using a Quartz 800DBE, which filled in the detailed areas at very much higher resolution.

Russell Coggrave, CTO of Phase Vision explained: “Potential issues during the scanning included the gloss black finish of the model – which would have caused issues for laser scanners due to its reflectivity and interference with the readings – and also the varying light conditions within the hangar. This again may have posed problems for more sensitive systems designed primarily for use in carefully controlled or laboratory conditions – but the fact that Phase Vision scanners are designed for use in all types of environments meant the measurements were not affected.”

Once the design is optimised through CFD and FEA, the CAD equipment will be used to drive a five-axis router which will create the moulds from which the final aircraft will be manufactured – true reverse engineering. A full working prototype will then be created.

Roger Targett added: “We were highly impressed by the speed and accuracy of the measurements taken by the Phase Vision team. Without this equipment there is no way that such a detailed virtual representation have been delivered within the required timeframe. We can now forge ahead with the virtual testing confident that what we are working on is a faithful reproduction of the ‘proof of concept’ model.”

For further information call 01509 839000 or visit [www.phasevision.com](http://www.phasevision.com).

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### **About Phase Vision**

Phase Vision has been a pioneer in the development of full field white light 3D metrology since 2002. We design and manufacture one of the fastest, most accurate medium- to large-volume 3D measurement solutions in the world, with clients spanning some of the biggest names in Aerospace Engineering, F1 Motorsport, Marine, Advanced Composites and General Industrial Manufacturing. Robust hardware and software solutions engineered for the most demanding customers are designed, manufactured and quality tested at our new high-tech facility in the UK. Leading-edge scanners, seamless compatibility with the latest 3D CAD software together with a “Can Do” approach to problem solving makes Phase Vision the ideal metrology partner for your supply chain. Phase Vision technology helps optimise processes, save time, reduce costs and offers new ways of approaching common engineering and measurement problems more effectively.

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