# Scanning Supercars

How Creaform's portable, handheld laser scanner helped a New Zealand company develop a 3D model of its handmade supercar.

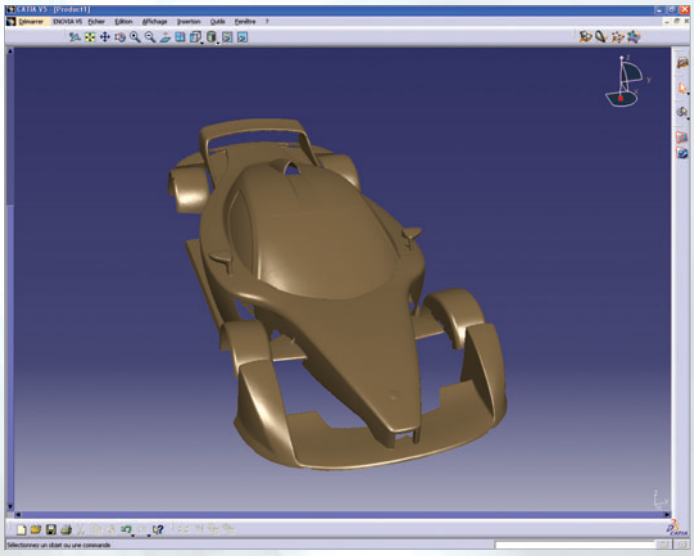
Supercars are high-performance, street-legal sports cars designed to fulfill the fantasies of the wealthy. A company from New Zealand has recently filled a perceived gap in the competitive yet potentially highly profitable international super-car market with its own specimen. Hulme Supercars Limited has created a mid-engine, carbon-fiber street machine with a power train and chassis that provides the driver with the feeling the car should be on the Formula 1 racing circuit.

## SITUATION & SOLUTION

The problem that Hulme Supercars was facing was to have a completely handmade car. When the final version was ready to go into production, the one-of-a-kind body needed to be reproduced, but there were no existing CAD files from which molds could be produced. A full 3D scan of the Hulme F1's exterior would be necessary to create a CAD model.

To save some time, the company turned to ScaNZ 3D™ in Hamilton, New Zealand. The car was transported to a garage near ScaNZ 3D so that it could be scanned indoors, during a brief stop in its promotional tour around the North Island of New Zealand.

ScaNZ 3D, New Zealand distributor of the HandyScan 3D line-up of products, was preparing for the REVscan™'s launch event the following evening. When the Hulme project came about, an application engineer for Creaform was already on site to provide product demonstrations and training in the use of the REVscan to ScaNZ 3D's team. Since this was ScaNZ 3D's first major project using the REVscan, our engineer did supervise the scan work, but because this revolutionary scanner was so easy to use, a ScaNZ 3D technician who was still in training could help in setting up the car for scanning and even performed several of the scans using a second REVscan unit.



The typical scanning time was greatly reduced by using two REVscan units to scan different parts of the car simultaneously, which is a unique benefit of this new system: allowing the user to easily register scans under a common reference or coordinate system. This is possible because one single mapping file (positioning features file) is created, copied and then opened by the VxScan™ software resident in two separate computers. Since the coordinate system of the scan was directly linked to the positioning file, using the same file with two scanners generated scans that were in the same coordinate system and therefore correctly aligned in relation to each other. Reflective and adhesive positioning targets affixed to the surface of the object itself were used to position the scanner in space: the targets were actually seen by the cameras mounted in the scanner and used as a positioning or reference system.

The complete scan work was done overnight, shaving and estimated 65% off the time it would take to scan the car with traditional devices. The handheld nature of the REVscan allows much more freedom and simplicity. Post-processing of the captured data is also significantly faster, since the VxScan companion software directly outputs data in the .STL file format. Therefore, the time usually spent working on processing a point cloud file is avoided.

To guarantee the best results, the engineers studied the correct balance between scan resolution and the number of scans. A box of 1,500 mm in size was defined inside VxScan to reduce the number of separate scans while optimizing the resolution and to meet the client requirements. VxScan's multi-resolution function was also used in order to define feature lines and fine details.

Another unique feature of the REVscan is that the user can see the surface of the object appear in real time on a computer screen as it is being scanned. This helped immensely with the Hulme F1 project because it meant that it was possible to capture a complete data set without holes. This alone saved post-processing time and enabled a rapid turnaround on the job. Otherwise, the car's owners might have had to withdraw it from a tightly-scheduled promotional tour.

Since every scan was linked to the same coordinate system, no alignment was needed prior to the actual stitching of the scans. At the end of the scanning session, all the scan results were combined together to produce one single and clean mesh of the whole car, that Hulme Supercars could use for production purposes.

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