



For resin-based parts, the trend is in favour of the Connex, which now accounts for over one third of production

Case Study

At a Glance

Company: Jaguar Land Rover
URL: www.jaguarlandrover.com
Location: Coventry, UK
Industry: Automotive

Challenges

Broaden in-house prototyping capabilities to enhance automotive styling and provide elastomer-like design testing

Solution

Objet Connex500™ 3D Printing System

Results

- Faster development and testing of complex and multi-material parts
- Working models produced quickly in a single process for immediate style, fit and function testing

The power of two

Jaguar Land Rover installed a Connex500 from Objet in the summer of 2008. The 3D printer was chosen for its multi-material capability, which combines two different materials and draws on their best attributes to deliver superior models.

The two global premium brands of Jaguar and Land Rover have been under single ownership since the year 2000, firstly as part of the Ford Motor Company and now as the UK-based wing of the Indian TATA Group.

The two marques originally started life with completely different perspectives. The first Jaguar, the SS100, was launched in 1935 as the first 100mph affordable sports car. With classic lines and high performance it became the inspiration for a remarkable lineage of Jaguar cars with a reputation for speed, comfort and race winning. In contrast, the first Series 1 Land Rover 80, built in 1948, had completely different attributes, being an 'all-purpose vehicle' with a rugged, no-frills design and off-road capabilities. Today, there are eight vehicle lines produced by Jaguar Land Rover (JLR). To ensure that these lines maintain their premium position in the marketplace, almost 20% of Jaguar Land Rover's workforce is employed on product development, using the very latest CAD techniques with in-house prototyping and tooling to quickly prove designs. In addition to CNC model making and a fully equipped metalwork and toolshop, the prototyping capabilities include several RP machines using SLA, laser sintering and polymer jetting technologies.

Prototyping parts direct from CAD data

Jaguar Land Rover invested in the Connex500 in 2008 to broaden its resin-based RP prototyping capabilities. The ability to create models direct from CAD data with elastomer, rubber-like materials and produce working mechanisms, were other key benefits that would contribute towards reducing development cycles. To prove its capability, the Connex was initially tasked to produce a complete facia air vent assembly for a Range Rover Sport. It was modelled using rigid materials for the housing and air-deflection blades, and rubber-like materials for the control knobs and air seal.

Jaguar Land Rover was able to print the complete facia air vent, as a working part, in a single process. Once printed, the model was taken from the Connex, cleaned and tested immediately, proving that the hinges on the blades all worked and the control knob had the right look and feel.

The backbone of Connex is Objet's PolyJet Matrix technology. By jetting two distinctive model materials in preset combinations in a matrix structure, it is possible to create multiple





flexible and rigid materials with different mechanical and physical properties as well as finishes. Using this technology, Jaguar Land Rover's Connex has accumulated 5000 hours of operation, printed over 2500 parts and used 600kg of resin. It's a testament to the productivity and reliability of Objet technology that the 3D printer has required little maintenance and replacement of just five print heads throughout this time, at the intervals recommended by Objet to maintain optimum quality.

The number of parts produced on the Connex has been steadily increasing as the team have found new ways to capitalise on the Connex capabilities. The figures are still only a small percentage of the 30,000 parts prototyped by Jaguar Land Rover every year, but many of these are laser sintered. For resin-based parts, the trend is in favour of the Connex which now accounts for over one third of production. Interestingly, the Connex is often used to produce single-material rigid parts due to its speed and simple post processing. When in multi-material mode it is used for a variety of activities. These include styling and HMI (Human/Machine Interfaces) concepts, such as knobs, switches & key fobs.



Fit and function testing

Over-moulding is also an important function of the Connex. Two materials are used, but not mixed, to create, for example, a cover with rubber seal. Once cleaned the assembly can be used directly for fit and function testing. Other key areas for Connex-use include the development of door seals and protective gaiters, where just the non-rigid TangoBlack Plus is used, and more recently the creation of parts for functional testing.

The biggest user of Connex capabilities is the styling department at Jaguar Land Rover. Over half of everything produced on the 3D printer finds its way into the design studio to help finalise new design proposals.



A good example was the creation of an entire telescopic headlamp washing system that extends and cleans headlamps every fifth time the windscreen is washed. The Connex-printed components proved to be robust enough for rigorous testing, allowing the design to be proved before moving into the expensive tooling stage.

The different attributes of the Connex clearly come into play in different ways for the above applications, but in summary the general benefits for Jaguar Land Rover are good part definition with high accuracy and dimensional control as well as fast turnaround due to easy operation, a fast build speed and simple clean-up process. More specifically, the Connex has impressed with its ability to prototype parts direct from CAD data that would have been time consuming or expensive by other means.

ABOUT OBJET GEOMETRIES

Objet Geometries Ltd., the innovation leader in 3D printing, provides 3-dimensional printing systems that enable manufacturers and industrial designers to reduce cost of product development and dramatically shorten time-to-market of new products.

Objet's ultra-thin-layer, high-resolution 3-dimensional printing systems and materials utilize PolyJet™ polymer jetting technology, to print ultra-thin 16-micron layers. The market-proven Eden™ line of 3D Printing Systems and the Alaris™30 3D desktop printer are based on Objet's patented office-friendly PolyJet™ Technology. The Connex™ family is based on Objet's PolyJet Matrix™ Technology, which jets multiple model materials simultaneously and creates composite Digital Materials™ on the fly.

All Objet systems use Objet's FullCure® materials to create accurate, clean, smooth, and highly detailed 3D parts.

Objet systems are in use by world leaders in many industries, such as Education, Medical / Medical Devices & Dental, Consumer Electronics, Automotive, toys, consumer goods, and footwear industries in North America, Europe, Asia, Australia, and Japan.

Founded in 1998, Objet serves its growing worldwide customer base through offices in USA, Mexico, Europe, Japan, China and Hong Kong, and a global network of distribution partners. Objet owns more than 50 patents and patent pending inventions. For more information, visit us at www.objet.com.

Objet Geometries Inc.
North America
5 Fortune Drive
Billerica,
MA 01821
USA
T: +1-877-489-9449
F: +1-866-676-1533

Objet Geometries GmbH
Europe

Airport Boulevard B 210
77836 Rheinmünster
Germany
T: +49-7229-7772-0
F: +49-7229-7772-990

Objet Geometries AP
Asia Pacific
Unit28, 10/f, HITEC
1 Trademart Drive
Kowloon Bay, Kowloon
Hong Kong
T: +852-217-40111
F: +852-217-40555

Objet Geometries AP
Limited China Rep Office
Rm 1701, CIMIC Tower,
1090 Century Blvd,
Pudong Shanghai
200120 China
T: +86-21-5836-2468
F: +86-21-5836-2469

info@2objet.ch www.2objet.ch

© 2010 Objet, Quadra, QuadraTempo, PolyJet, FullCure, SHR, Eden, Eden250, Eden260, Eden260V, Eden330, Eden350, Eden350V, Eden500V, Job Manager, Objet Studio, CADMatrix, Connex, Connex350, Connex500, Alaris, Alaris30, PolyLog, TangoBlack, TangoBlackPlus, TangoGray, TangoPlus, VeroBlue, VeroWhite, VeroBlack, VeroGray, Durus, Digital Materials, PolyJet Matrix and ObjetGreen are trademarks of Objet Geometries Ltd. and may be registered in certain jurisdictions. All other trademarks belong to their respective owners.

