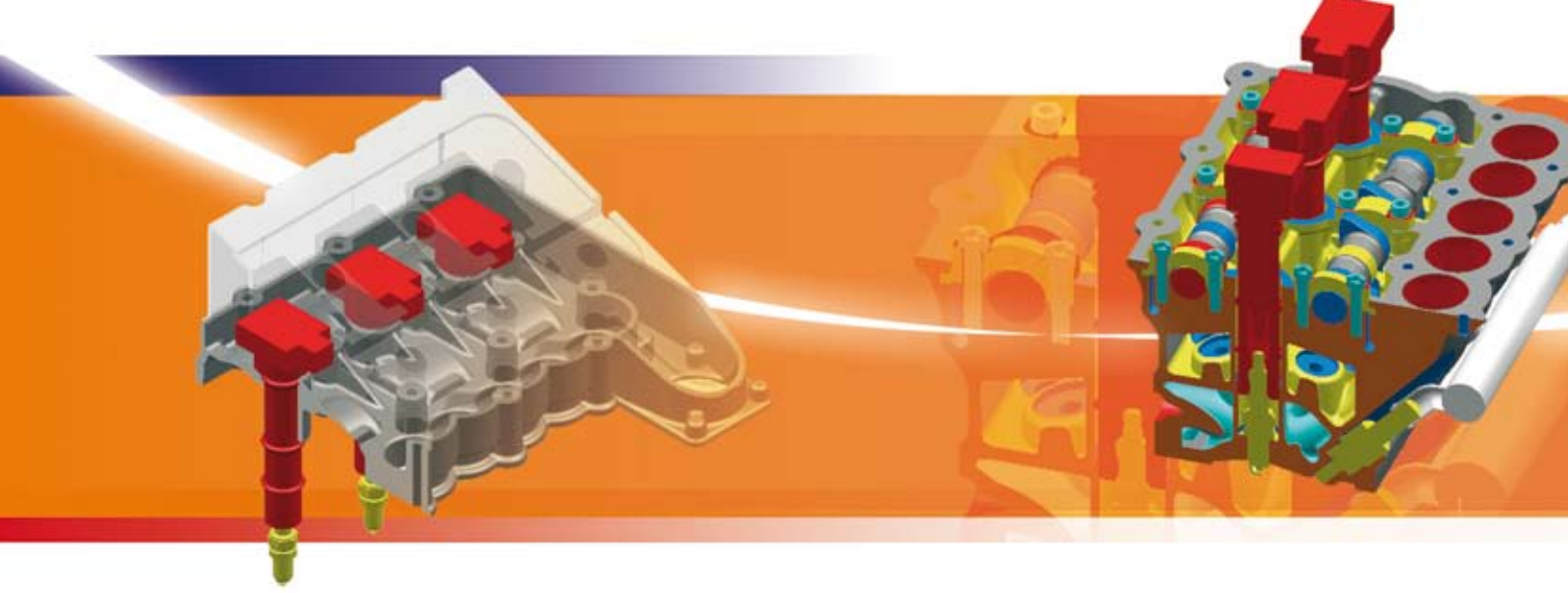
V5 PLM SUCCESS STORY

INTEGRAL POWERTRAIN

Driving down the time and cost of powertrain engineering with V5 PLM

DASSAULT SYSTEMES



Integral Powertrain Objectives

- ***Reduce cost and duration of powertrain engineering programs***
- ***Improve supplier and client design collaboration***
- ***Provide OEMs with unique powertrain engineering knowledge using state-of-the-art technology***

"We needed a unique suite of tools for powertrain engineering in order to provide a service to OEMs that our competitors could not. Only Dassault Systèmes V5 PLM solutions enabled us to do that."

John Mclean, Business Director, Integral Powertrain

Company Overview

Integral Powertrain Ltd. is an automotive powertrain engineering consultancy based in Milton Keynes, UK. Founded in 1998, Integral Powertrain's core business units include Powertrain Engineering, Tooling Design, Motorsport, and a specialist PLM division named Intrinsys.

Today, Integral Powertrain has prestigious customers among OEMs, engine manufactures, and Tier 1 suppliers including Aston Martin, Bentley Motors Ltd., DaimlerChrysler AG, General Motors, Jaguar Cars, MG Rover Group, Nissan Motor Co., JCB, Harley Davidson, Ford and Cummins Engines.

Business Challenges

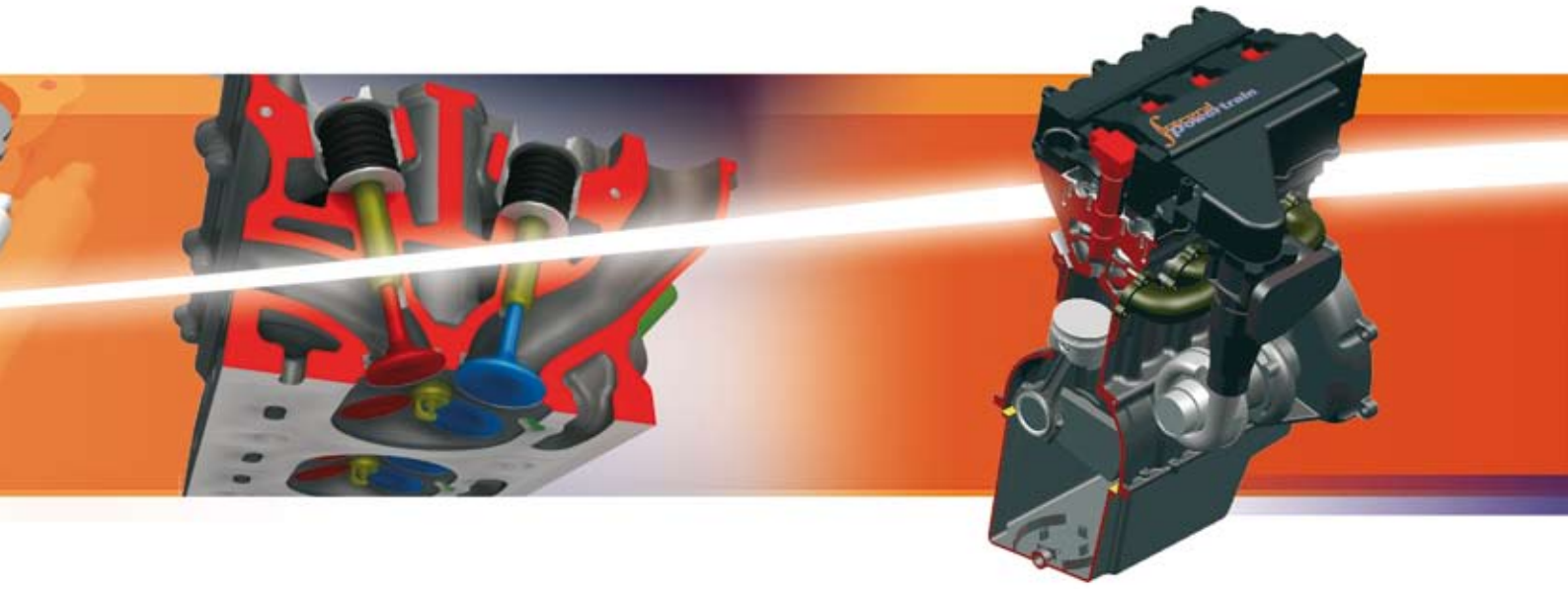
Increasing globalization and aggressive OEM purchasing strategies are driving intense competition in the automotive powertrain market. Therefore, in order to secure its business, Integral Powertrain must offer advantages to OEMs while maintaining product quality levels now required across the industry.

Cost and duration of powertrain engineering program

A complete powertrain engineering program costs approximately €300 million, and may take up to 48 months to complete. In this context, reducing the cost and time of powertrain engineering programs becomes a necessity to gain competitive advantage.

Supplier and Client design collaboration

The success of a powertrain engineering program depends largely on the ability of the OEM and suppliers to collaborate on product development to avoid unnecessary duplication and improve decision-making.



Solution

As part of its goal to reduce program time and costs and improve supplier-client collaboration, Integral Powertrain deployed CATIA V5, ENOVIA SmarTeam and ENOVIA VPLM, Version 5 Product Lifecycle Managemement (V5 PLM) solutions from Dassault Systèmes. Integral Powertrain identified many advantages for using the V5 PLM solutions in powertrain engineering.

Faster design

CATIA V5 automates repetitive design tasks through intelligent design templates, part of the CATIA V5 knowledge-based engineering solution. Consequently, powertrain design can be done faster by udapting the templates to OEM requirements.

Greater design quality

CATIA V5 provides early digital simulation and verification tools for powertrain parts and sub-assemblies thanks to a truly integrated environment for design and validation (digital mock-up and analysis tools). This enables Integral Powertrain engineers to continually review and evaluate designs at the early stages of an engineering program and ensures the quality of the in-progress work.

Faster tooling design

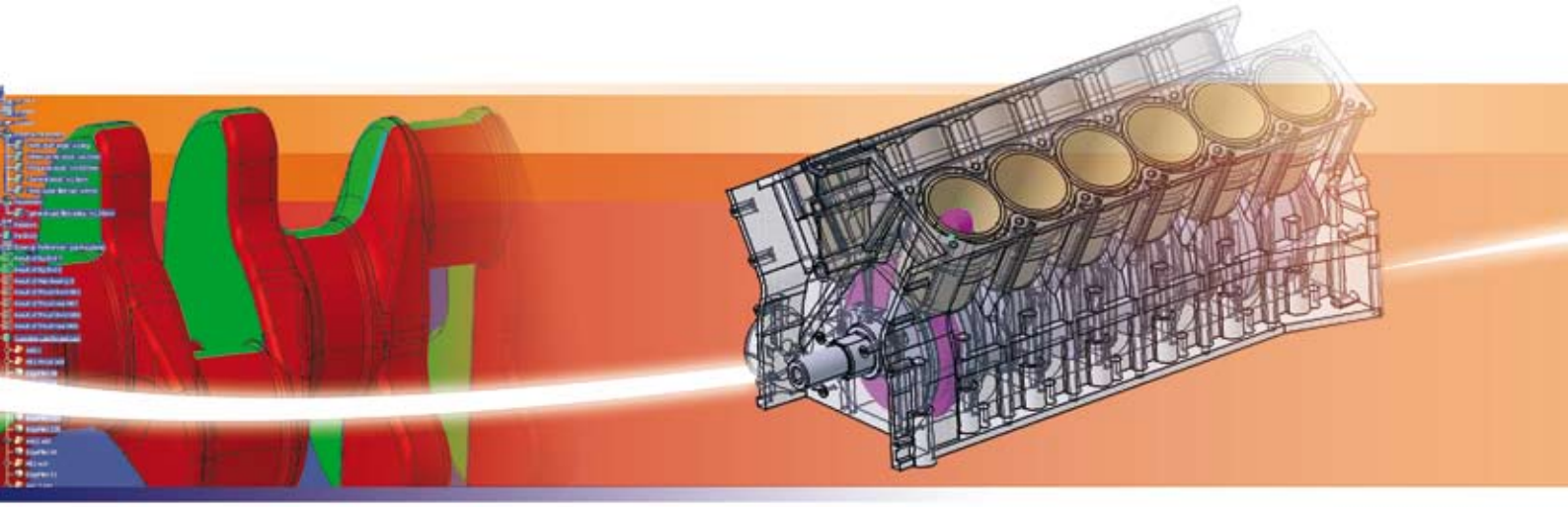
CATIA V5 techniques for tooling design allow associative tooling parts to be created directly from the master component. The tooling pack and any subsequent operations are thus controlled by the master. This ensures fast iterations between design and manufacturing.

Improved teamwork

Thanks to ENOVIA SmarTeam and ENOVIA VPLM solutions, design changes, workflow mechanisms (Smartflow) and multi-model links (in ENOVIA VPLM) can be easily managed enabling multiple users to gain simultaneous access to a full and up-to-date representation of data. The flow of information around the business is controlled and data management is automated, ensuring that designs adhere to defined rules.

"CATIA V5 offers us much more flexibility and enables our engineers to consider many more options before committing to the final design. This results in a superior product while saving both time and money."

Darren Cairns, CAE Director,
Integral Powertrain



"By using the CATIA V5 generative approach to powertrain development, we can generate detailed and accurate concepts in 40% less time, and so win more business and stay ahead of our competition."

Roger Duckworth, Engineering Director, Integral Powertrain

Results

Shortened powertrain engineering time

Integral Powertain has reduced development time for powertrain concept design by 40%* thanks to its V5 PLM solutions from Dassault Systèmes.

By allowing design reuse, accelerating the exploration of design alternatives, and providing early-validation tools, CATIA V5, ENOVIA SmarTeam and ENOVIA VPLM help Integral Powertrain designers to make better decisions and reach optimal, error-free designs in a shorter amount of time. Concurrent engineering and faster tooling design enable Integral Powertrain to shorten powertrain engineering design time as well.

Other time reductions achieved with V5 PLM include:

Engineers and designers can find information approximately 90% more quickly through the use of data management.

Engineering Changes (EC) cycle times have been reduced by about 25% through the use of better automation.

The time required to create Bills of Materials (BOMs) has been cut over 65%.

Overall manufacturing engineering cycle time has been shortened by 25%. In particular, EC review time at manufacturing stage is down 75%.

Reduced powertrain engineering costs

Costs for powertrain engineering programs have been significantly reduced thanks to Dassault Systèmes V5 PLM solutions. In some situations, it has been possible to reduce the cost of new parts in product designs by up to 40% due to the reuse of designs from previous projects.

*all figures based on an independent study performed by CIMdata

Moreover, the use of better automation has improved the management of changes: EC review meeting costs have been cut by 50%, while EC administration and execution costs are down 75%

Improved competitive advantage
Based on CATIA V5 template-based design, Integral Powertrain was able to capture its powertrain engineering knowledge by developing its own suite of powertrain templates named "Automated Intelligent Engine Design" (AIED).

These templates are used by Integral Powertrain for many significant engine design investigations. Even if the customer's project is not developed within CATIA, the time savings and engineering robustness far outweigh the additional time spent translating models to and from CATIA.

The combination of this much-improved engine design process and the availability of faster methods to create representative prototypes now enables Integral Powertrain's customers to obtain better quality engines in less time than was possible even six months ago.

Early-validated designs also mean less costly downstream design modifications and fewer physical prototypes. "The more virtual simulations that can be conducted mean less physical prototype testing, and therefore save time and money," says Roger Duckworth, Engineering Director, Integral Powertrain.

Finally, faster design enables Integral Powertrain engineers to be more productive. Application of CATIA V5 template-based design, design in context, digital mock-up and other features has reduced overall concept design labour costs by more than 40%.

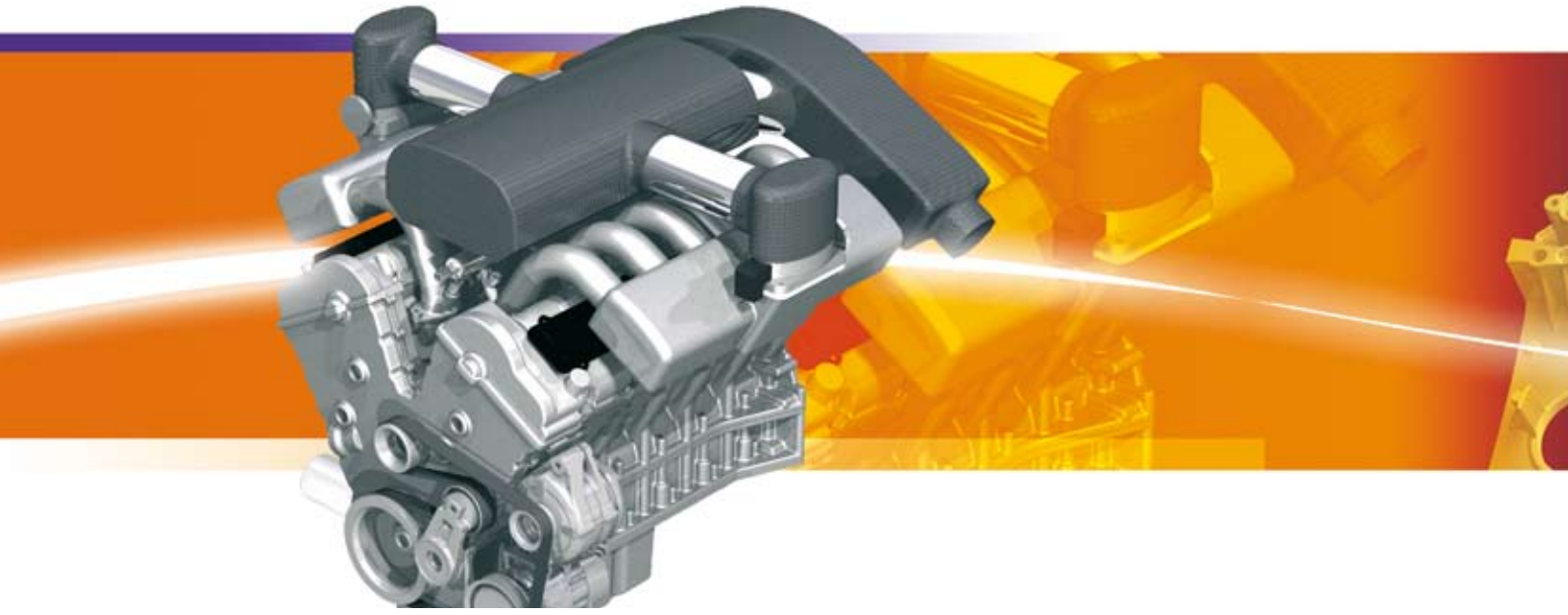
V5 PLM Key Benefits

- 90%
Data accessibility time
Engineers and designers are able to find information 90% more quickly through the use of data management.

- 20%
Cost for designing new parts
The cost of new parts in product designs has dropped by over 20% due to the reuse of designs from previous projects.

- 75%
Engineering changes (EC) costs
The use of better automation has improved the management of design changes: EC costs have been cut by 75%.

- 10%
Overall concept design time
Application of CATIA V5 template-based design, design in context, digital mock-up and other features has reduced overall concept design time by 40%.



Independent ROI study

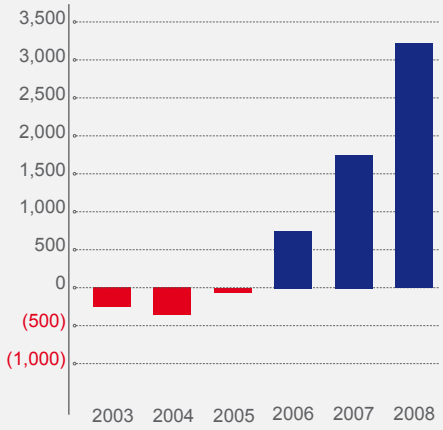
CIMdata performed an independent Return on Investment (ROI) study on Integral Powertrain's implementation of Dassault Systèmes V5 PLM solutions. The study was based on Integral Powertrain's data about the benefits of PLM versus the cost of implementation (software, hardware, training, maintenance and administration).

Findings

CIMdata took a conservative approach when measuring Integral Powertrain's ROI. The study findings show significant ROI:

- the payback period is 2.5 years
- the net present value of the investment (the cumulative discounted cash flow) over 6 years is 3,249k€
- the internal rate of return is 104.5%.

Cumulative Discounted Cash Flows - k€



CIMdata is a leading and independent worldwide consultancy specialized in PLM strategy

CIMdata

Future

Integral Powertrain's main mid-term objective is to accelerate concurrent and collaborative engineering to their supplier base with ENOVIA SmarTeam solutions. "Our aim is to have all of our suppliers either using ENOVIA SmarTeam, or having access to ENOVIA SmarTeam, so that we can collaborate more effectively by giving our suppliers greater accessibility to our live database, rather than a copy of the data," said Darren Cairns.

The company is also exploring other V5 PLM features such as CATIA V5 Machining applications and CATIA V5 Finite Element Analysis (FEA) products. "With CATIA V5, it is now possible to use FEA as a concurrent activity of the design process to help converge on a valid solution more quickly," said Cairns.

Finally, Integral Powertrain would like to expand their use of CATIA V5 templates into the area of tooling design and business processes, not only for the automotive industry but also in the aeronautic field.

"We are always searching for ways to gain competitive advantage. CATIA V5, ENOVIA SmarTeam and ENOVIA VPLM give us the infrastructure to reduce the effort spent on basic, repetitive tasks. We can now fully play our role of powertrain engineering consultants to OEMs."

Luke Barker, Technical Director, Integral Powertrain

V5 PLM for the Automotive Industry

DS has been working with major automotive manufacturers and supplier for more than 20 years to provide a complete range of leading PLM solutions.

Built from industry experience and addressing all key automotive development domains, Generative Car Solutions combine the best of Dassault Systemes's CATIA V5, DELMIA, ENOVIA and SIMULIA solutions with dedicated automotive best practices.

Fostering the capture, sharing and reuse of company knowledge while optimizing the end-to-end process from concept to maintenance, DS Generative Car Solutions help automotive manufacturers and supplier to significantly reduce design cycle time and increase productivity, profitability and rapid return on investment.

As a world leader in 3D and Product Lifecycle Management (PLM) solutions, the Dassault Systèmes group brings value to more than 90,000 customers in 80 countries. A pioneer in the 3D software market since 1981, Dassault Systèmes develops and markets PLM application software and services that support industrial processes and provide a 3D vision of the entire life cycle of products from conception to retirement

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The Dassault Systèmes V5 PLM offering consists of CATIA V5 for designing the virtual product, DELMIA for virtual production, ENOVIA for global collaborative lifecycle management (including ENOVIA VPLM, ENOVIA SmarTeam, and ENOVIA MatrixOne), and SIMULIA for virtual testing.

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