

Integral Powertrain, Ltd. CATIA V5 speeds engine design, reducing cost and saving time



A V12 Engine Concept Designed Using CATIA V5

Highlights

- *Integral Powertrain wanted to increase revenue, by cutting engine development time and costs*
- *CATIA V5 reduces the number of prototypes required, while SMARTEAM controls data flow and automates Computer Aided Design (CAD) data management*
- *Using CATIA V5, Integral Powertrain has developed an in-house engine design methodology, reducing development times and increasing design flexibility.*

Integral Powertrain Tier 1 supplier to top OEMs

Integral Powertrain, Ltd. is a consultancy specialising in automotive powertrain engineering and the design of associated tooling. Established in 1998 and based in Milton Keynes, UK, the company is a renowned Tier 1 supplier to many of today's global automotive OEMs.

Integral Powertrain has pioneered the application of CATIA V5 to powertrain engineering, developing advanced processes to rapidly create 3D CAD geometry for major components. Using the 'Generative Powertrain' philosophy, tooling models and even associated NC cutter paths are produced in parallel with the engine design, and kept up-to-date through automatic links, enabling faster tooling design and manufacture.

CATIA V5 powers powertrain engineering

"CATIA V5 is the best tool to come along in years for powertrain design," said Engineering Director and company co-founder Darren Cairns. "Working with multiple OEMs means that we don't always have the choice of which system to use for a project, but whenever we have the freedom, we much prefer to use CATIA V5."

Principal Engineer Andrew Early is similarly enthusiastic about the power of CATIA V5. "We always are up against time constraints – that's the nature of our business," he said. "But we know that if we are using V5, we can explore more design alternatives in a given time than other systems would allow us to address."

With its vast experience using previous CATIA versions, Integral Powertrain has gained a detailed understanding of CATIA's capabilities and potential. "It is common for an OEM to produce 100 prototypes for a new engine, and the development phase can take between 38 and 60 months," Cairns said. "With CATIA V5, you could reduce the number of prototypes by 25 percent and probably save up to \$4 million in costs. Similarly, the cost to design a complex component, such

as a cylinder head, could be reduced by 20-30 percent, while derivative development costs could be reduced by 75 percent."

CATIA V5 leads to custom engine design methodology

Using CATIA V5's embedded Knowledgeware capabilities, Integral Powertrain has developed its own engine design methodology called Automated Intelligent Engine Design (AIED). IP has developed a set of knowledge-driven modelling templates for each of the major engine components." AIED has been used to develop a feasible concept for a



V12 engine in less than five weeks," Cairns said. "AIED gave our customer much more flexibility and allowed many more options to be considered before committing to the final design, delivering a superior product while saving both time and money.

CATIA and SMARTEAM streamline development

"We have found that by using CATIA V5, rather than its predecessor, the lead time necessary to develop complex parts such as a cylinder head can be reduced from 10 to 8 weeks, making it possible for us to generate an additional 20 percent in revenue per year. Similarly, training time and

cost is a lot lower than with CATIA V4, for instance. We can train a new-hire in V5 in just 25 percent of the time it took with V4. Being a design consultancy, this offers us considerable benefits."

Integral Powertrain also uses SMARTEAM to control the flow of information around the business and automate CAD data management. "We work as a team using a number of linked CATIA V5 models and associated design tools to ensure designs adhere to defined rules," Cairns said. "In addition to basic document management which keeps our CAD processes under control, the use of SMARTEAM 'WORK FLOW' provides a mechanism to manage our change control approval management and lets us maximise the benefit of our investment in knowledge-based design tools.

"We are always searching for ways to gain competitive advantage," he added. "CATIA V5 and SMARTEAM have done just that by giving us the infrastructure to reduce the effort spent on repetitive tasks and basic geometry creation, and allowing us to spend more time on technical issues."

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IBM Product Lifecycle Management

Tour Descartes
La Defense 5
2, avenue Gambetta
92066 Paris La Defense cedex
France

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