

RESEARCH THEME: VIRTUAL DESIGN AND MANUFACTURING

INTAKE GAS/AIR MIXING ANALYSIS

This project aims to develop a computational analysis method for quantifying the effect on fuel/air mixing for a number of different fuel injector positions in the intake system of a given engine. The study will include the intake and compression stroke up to the point of ignition. The degree of mixing will be based on the distribution of fuel/air ratio in the cylinder.

Project Leader	Chris Seeling VPAC	Project Participants	GM Holden
-----------------------	-----------------------	-----------------------------	-----------

MULTI-DISCIPLINARY DESIGN EXPLORATION PLATFORM

This project is a key component of GM's strategic movement towards fully analysis-led design. This platform will enable Holden to efficiently and effectively develop design solutions that meet the varying performance requirements across different disciplines while driving towards mass efficiency/fuel economy and enhanced customer satisfaction.



Project Leader	David Colls VPAC P: 613 9647 5436	Project Participants	GM Holden VPAC
-----------------------	---	-----------------------------	-------------------

AMBIENT AIR TEMPERATURE

The project objective is to rethink the conventional HVAC outlets configuration and appearance and evaluate the non-conventional design concepts, to seek maximum design freedom and the potential integration of the HVAC outlets as part of the interior design feature. The simulation tool will enable the validation of air flow within the cabin for these new concepts for vent design.

Project Leader	Dr Chris Seeling VPAC	Project Participants	GM Holden VPAC
-----------------------	--------------------------	-----------------------------	-------------------

AUTOMATED KNOWLEDGE BASED FEATURE RECOGNITION SYSTEM

This project aims at developing a knowledge based feature recognition system for aerospace engineering design that will automate the feature information extraction from CAD models as well as provide interpretation and support for aircraft stressing analysis.

Project Leader	Xinghuo Yu RMIT	Project Participants	RMIT GKN
-----------------------	--------------------	-----------------------------	-------------

GM RAMSIS™ INGRESS/EGRESS SIMULATION

The aim of the GM RAMSIS™ Ingress/Egress Simulation project is to implement a CAD simulation tool that can predict and assess the ingress/egress motions for passenger car entry and exit. The results of ingress/egress motion simulation experiments will be integrated into the human modelling software RAMSIS. The result will be a tool that will enable product designers/engineers to optimise the design of driver/passenger entry and exit points for greater ease of use.



Project Leader	Bill Humphries SomaDynamics P: 618 8260 8921	Project Participants	GM Holden SomaDynamics UniSA
-----------------------	--	-----------------------------	------------------------------------

VIRTUAL INTEGRATED DESIGN ENVIRONMENT

The outcome sought from this project is the support of a longer term vision to enable the automotive industry based enterprise to drive the integration and efficiency of the vehicle development process. Preliminary work will see the mapping of the conceptual framework for the vehicle development process, and capability and practice in Australia. Tested guidelines will be developed to assist engineers and virtual teams to engage with product information and enterprise capability. The final component of the project will develop requirements for IDEs including requirements for product development based automation and integration frameworks.

Project Leader	Dr Chris Seeling VPAC	Project Participants	GM Holden UniSA VPAC
-----------------------	--------------------------	-----------------------------	----------------------------

MULTI-DISCIPLINARY OPTIMISATION

This project aims to reduce the vehicle development time by streamlining important design activities, and integrating them into a common framework for global optimization. This framework will include the ability to incorporate noise and vibration, durability and crash-worthiness assessment of vehicle body-in-white structures. The project enables increased engineering earlier in the vehicle design process by exploiting a range of coarse and fine grain analysis tools. This ultimately leads to a more refined and higher quality product for the consumer.

Project Leader	Dr Thomas Ting VPAC	Project Participants	Swinburne VPAC Deakin GM Holden Monash RMIT
-----------------------	------------------------	-----------------------------	--

PROACTIVE MAINTENANCE

The main scope of this project is to develop a new quality improvement tool to collect diagnostic and reliability data from a large number of test vehicles. A new user software tool will be used for data mining to statistically determine faults and precursors of faults. Assumed consumer behaviour and usage patterns will also be able to be verified.

Project Leader	Prof Jun Han Swinburne	Project Participants	GM Holden Swinburne
-----------------------	---------------------------	-----------------------------	------------------------

RAPID & AGILE GEOMETRY

This project is a deep dive into the technology and techniques for including packaging constraints in the virtual design process of vehicles. Included in the scope of this project are techniques from CAD, CAE and possibly hybrids of both. The result of this project is aimed to be a detailed description of the possible implementation paths for this often forgotten aspect of design and simulation.

Project Leader	Glenn Frankish VPAC	Project Participants	GM Holden VPAC
-----------------------	------------------------	-----------------------------	-------------------

WHOLE OF LIFE ENGINEERING - *completed, contact AutoCRC for details*

Aerospace design and engineering are highly weighted to 3D modeling and proof by analysis as opposed to test and demonstration. Tools for these processes are well established and in use. However at the production and in-service phase the use of data changes and engineering support becomes by-and-large manual. The project is intended to plug this gap by developing environments, tools and processes for engineers supporting production and in-service maintenance.

Project Leader	Adam Groszek GKN	Project Participants	CSIRO La Trobe Swinburne GKN
-----------------------	---------------------	-----------------------------	---------------------------------------