



Issue 6 | October 2009

CEO's Message

This edition marks a number of significant highs for AutoCRC since our last newsletter in April.

One of the real highlights was winning the Minister's CRC Star Award at the CRC Association Conference in Canberra for the work in the Automotive Supplier Excellence Australia (ASEA) Project – and in particular for our work with Geelong based component supplier Backwell IXL. This followed our excellent third-year performance review results reported in our previous edition.

Other highs include winning the contract for the Automotive Australia 2020 project. This technology and road-mapping initiative will help shape the future of the Australian Automotive industry. The project is carried out under the auspices of the Automotive Industry Innovation Council and is funded by the Commonwealth and Victorian Governments. The first phase of Automotive Australia 2020 has been completed and a link to its Vision Report is on the home page at www.autocrc.com.

The ASEA Project has brought to fruition much of its promise with the completion of the Stage 3 Pilot in June and the all important (36) improvement projects implemented with 27 supplier companies across Victoria, NSW, Queensland and South Australia. A major industry forum to celebrate the many successes of this project was held at Toyota's head office and featured keynote presentations by senior purchasing executives from all three local vehicle producers.

AutoCRC is now applying for funding to support the full-blown ASEA Improvement Program from the Rudd Government's \$20m Automotive Supply Chain and Development Program.

The AutoCRC Visionary Projects Program has produced a highly productive response with the receipt of 41 expressions of interest from our research organisations, with support from industry and government.

The first of three projects have commenced and are progressing with some momentum. These are for a:

- Lightweight Modular Vehicle Platform
- Volume Efficient High Pressure Storage Vessel
- Electric Vehicle Drivetrain



Dr Matthew Cuthbertson with David Sykes the General Manager of Backwell IXL showing off the Star Award Certificate.

Please take time to read our Visionary projects story in the newsletter. This provides more information on the scope and outcomes for these three projects.

A further three new projects from the UniSA are under consideration as part of the Visionary Projects initiative.

The Visionary Projects program offers significant new activity for AutoCRC, and a number of Australian universities.

It also fills gaps in the AutoCRC research program and injects new funding into key R&D effort.

Its worth noting that many of the expressions of interest involve work in intelligent transport systems and are likely to lead to the development of another four AutoCRC Visionary Projects. One of these in particular has strong government support and aligns with a major initiative by another CRC to provide a digital communications system to avoid rail level crossing accidents.

Applications for funding under Victoria's Science Agenda Investment fund have also been successful subject to a final business case assessment. Funds are expected to flow

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CEO's Message (continued)

in November for two projects one into electric vehicle interiors and the other into lightweight shape memory alloy actuators for automotive applications.

Now in its fourth year AutoCRC has completed 16 projects with IP encapsulated in 13 concept demonstrators and a further 16 projects are fully scoped and awaiting approval.

AutoCRC has filed its first international patent application which is for the invention of a new blind riveting system. A royalty-bearing license has also been executed with Advanced Vehicle technologies for IP arising from the Diesel Truck LPG Conversion Productivity System.

AutoCRC pursuit of potential collaboration with the Chinese automotive industry through the China Victoria Automotive Cluster mission in July has progressed with ongoing discussions for student exchanges and collaboration with two Chinese universities Tongji University School of Automotive Studies in Shanghai and Hefei University of Technology in Hefei.

AutoCRCs active student program is continuing apace and features later in the newsletter. Of particular note is a national curriculum project involving Kangan Batman TAFE and Blade Electric Vehicles. The project is utilising a Hyundai Getz conversion to an electric drivetrain to document new skills required by mechanics to maintain electric vehicles.

New staff have joined AutoCRC since our last newsletter. I'd like to welcome Viviana Carreno, Kassandra Koudelka and Dr Thomas Ting to the team. Please see our new staff segment in this newsletter for more about their roles.

Congratulations must also be extended to AutoCRC board member Professor Peter Hodgson (Deakin University) who has been awarded a prestigious Laureate Fellowship from the Australian Research Council.

Dr Matthew Cuthbertson
Chief Executive

AutoCRC Wins CRC STAR Award For Excellence

The 2009 CRC Program STAR Award was won by AutoCRC and presented at the CRC Conference in Canberra in May by the Minister for Innovation, Industry, Science And Research, Senator Kim Carr.

The award only one of two for the year was in recognition of the Automotive Supplier Excellence Australia program (ASEA). The aim of ASEA is to support Australian component suppliers in competing internationally, and accessing global automotive supply chains.



Minister for Innovation, Industry, Science And Research, Senator Kim Carr presents the 2009 CRC Program STAR Award, accepted by Dr Matthew Cuthbertson, CEO AutoCRC

ASEA received strong unified support from the Australian automotive industry, including funding from Ford, GM Holden, Toyota and Mitsubishi, the Federation of Automotive Products Manufacturers and the Commonwealth, Victorian and South Australian governments.

The particular focus for the CRC STAR award was the high level engagement of the ASEA program with SMEs. A good example was the Geelong-based components supplier Backwell IXL, which participated strongly in the ASEA program, achieved excellent gains in productivity and identified new opportunities for growth.

A full version of this story can be found at www.autocrc.com.



The Star Award won by AutoCRC was one of only two bestowed for excellence this year by the CRC Association.

“Technologies for Sustainable Vehicles” – First Project Report

This is the first report from the AutoCRC Project “Planning for Electric Vehicles in Australia”.

The project will produce a series of reports to lay the foundation for the introduction and use of electric vehicles in Australia.

An important aspect of the project will be the preparation of an implementation plan, in conjunction with the industry partners, for conducting a full scale electric vehicle trial in Adelaide.

This first report called *Technologies for Sustainable Vehicles* is a technology review.

In its first chapter it canvasses the need for sustainable transport from dwindling fossil fuel supplies and the need for reducing green house gas emissions.

The report then brings together invaluable information about the range of options for more sustainable transport

in all its forms from more efficient combustion engines to electric vehicles, hybrids and hydrogen and biofuels. The comparative impact and time-lines for the adoption of new technologies are important issues addressed by the report.

The capabilities of current generation electric vehicles are examined as are the obstacles to their wide availability in the market such as regulatory issues and infrastructure.

The report points out that almost every major automotive company plans to launch their own electric cars within the next two years and that Australia has some catching up to do.

One hundred years after electric vehicles once were popular one important conclusion is that battery electric vehicles are simpler and will be cheaper to own than any other vehicle and will play an important part in reducing transport emissions.

This report runs to 67 pages and a full version can be downloaded from the link on our website home page.



The Mitsubishi iMiEV which is expected to be used in the full scale electric car trial in Adelaide.



Automotive Australia 2020 Shaping the Australian Automotive Industry

Automotive Australia 2020 is a roadmap that will help support decisions on where billions of dollars of government investment in the Australian automotive industry will be spent.

The roadmap will be the key resource in particular for the Australian Government's \$6.2 billion New Car Plan for a Greener Future.

The Project is endorsed by the Automotive Industry Innovation Council and funded by the Commonwealth and Victorian Governments. AutoCRC is manager of the project Automotive Australia 2020.

The roadmap will identify and prioritise new opportunities for Australia's three major motor vehicles producers, 200 specialist component suppliers and in excess of 500 firms that support large vehicle production in Australia for domestic and export markets.

The first stage in the roadmap for the industry's future has already been held in the form of a workshop to develop an agreed vision.



The Vision Workshop held in early September was hosted by the Victorian Dept of Innovation Industry and Regional Development.

The vision statement developed at this event and through extensive research and interaction with the industry recognizes that Australia has the capacity to develop new vehicles from concept to release and produce cars that excite consumers at home and overseas. The vision statement makes four major objectives:

- Australia's automotive industry must achieve recognition as a strategic element of the global automotive industry to be attractive to global companies and their investors.
- Australia must have a sustainable, profitable vehicle manufacturing industry with global reach that maximises opportunities in local and international markets.
- The industry must be bigger, more productive, and provide more jobs in the manufacturing and supply sectors.
- This can be achieved through leveraging existing strengths and building new capabilities.

The Vision Workshop defined in detail trends and drivers of technology needs and the required capabilities and defined evaluation criteria that will be used to prioritise short and long term opportunities from the next models through to 2020.

The Automotive Australia project is expected to finish its road mapping task by April 2010.

Its six phase program has five key tasks to completion:

- Defining immediate domestic and long-term future global market need
- Understanding national capability
- Identifying key tactical and strategic opportunities
- Strategic opportunity roadmap development
- Prioritisation

The final phase (prioritisation) will see the decision which will shape the future of the industry and will define selected priorities for investment and support.

AutoCRC Updates will feature brief reports on each stage of the program as it unfolds.

A full report of the Vision document is available at www.autocrc.com and a media release issued by Australian Innovation Minister, Senator Kim Carr, and the Victorian Industry and Trade Minister, Martin Pakula can be found on our website as well.

AutoCRC Visionary Projects Generate Strong Interest – Three New Projects

The call by AutoCRC for expressions of interest for visionary projects has generated a strong response from the Australian R&D community.

Forty one proposals were received by AutoCRC representing a range of research institutions, automotive component suppliers, public sectors organisations and CRCs.

Eleven of the 24 proposals were from intelligent transport system and intelligent vehicle system disciplines.

AutoCRC CEO, Dr Mathew Cuthbertson says, "Three projects have been selected as AutoCRC Visionary Projects and a number of further expressions of interest are likely to lead to further new AutoCRC Projects".

"The three successful projects are already up-and-running and development has been encouraging over a short time-frame."

The three projects are:

- **lightweight modular vehicle platform**
- **volume efficient high pressure storage vessel**
- **electric vehicle drivetrain**

The **lightweight modular vehicle** platform project involves a significant collaborative research effort across several universities and automotive component suppliers.

This has brought together the relevant expertise and knowledge in the development of lightweight vehicle structures in Australia into a single project.

To fast track the program two existing concepts will be used as the platform for further development. These are the Duoleta, four wheel concept developed by UniSA and the T2, three wheeled concept developed by Deakin University in 2008.

The project will focus on the broad range of research themes required to deliver a commercial lightweight modular vehicle platform including the hybrid joining of multi-material lightweight structures, the design and



The Duoleta, four wheel concept vehicle developed by UniSA. One of the platforms to be used to fast track development of a new lightweight vehicle platform for an electric car.

manufacture of cost effective composite structures and light alloy development for specific applications.

The project aims to develop several high level concepts for evaluation and conclude with the fabrication of a single physical prototype for commercialisation. A preliminary physical prototype is to be unveiled at the Shanghai World Expo in 2010.

The **electric vehicle drivetrain for Australia** project aims to take electric drive motor technology from well established research at CSIRO and international electric racing car success at RMIT to an applied demonstrator for manufacture in Australia for both local and overseas sales.

Manufacture or control of IP within Australia for this project is necessary for a viable vehicle industry.

The key project deliverables cover all the elements of an ultra-lightweight high efficiency motor based on the CSIRO solar motor, similar low weight and ultra-efficient controller, a supercapacitor and battery pack and integration into a high performance demonstration vehicle.

AutoCRC Visionary Projects (continued)

There is keen interest in this project for local manufacture and licensing.

Compressed natural gas is already used in trucks, buses and cars in various part of the world but it requires the use of large volume tanks to achieve a comparable range to other fuels. CNG is cleaner than diesel and petrol and 30% cheaper. The design and manufacture of a **volume efficient high pressure storage vessel for gaseous fuels** for compressed natural gas will enable better use of this alternative fuel for internal combustion engines.

The project will utilise advanced composites and metals technologies and develop designs that may be integrated into the vehicle structure saving weight and space.

The key outcome from this project is the manufacture of a tank which will take up less space and weight and provide a range for CNG fuelled vehicles that is comparable to conventional fuelled vehicles.

Dr Cuthbertson says that AutoCRC is expected to announce further successful Visionary Project in due course.

“The key outcome from this project is the manufacture of a tank which will take up less space and weight and provide a range for CNG fuelled vehicles that is comparable to conventional fuelled vehicles.”

TAFE Project for Electric Vehicles Maintenance

AutoCRC has forged its first link with the TAFE system in a national curriculum project to identify new skills needed by TAFE graduates to service electric vehicles.

The joint initiative involves Kangan Batman TAFE and Blade Electric Vehicles.

Kangan Batman is undertaking a detailed analysis of each step involved in the process used by Blade at its workshops to convert a Hyundai Getz to electric drive.

A new training program will be developed once the documentation of the process is completed.



Hyundai Getz electric drive conversion

AutoCRC Undergraduate Program Highlights

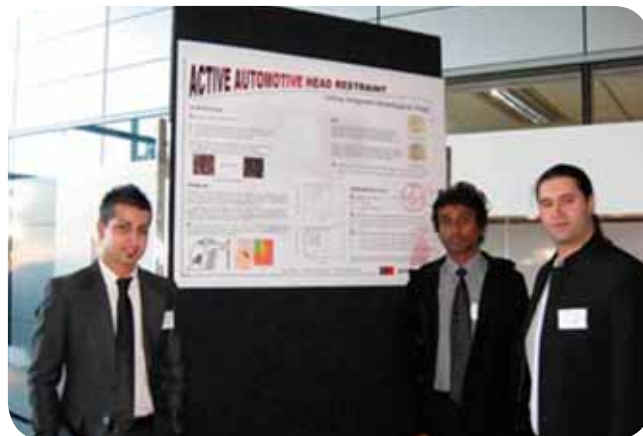
The level of enthusiasm and focus that an undergraduate student team can bring to bear on a practical research problem is astounding. We are seeing many great results for companies who are participating in the undergraduate projects. We still need projects for 2010 and this is the best time for us to recruit enthusiastic students. If you have a practical problem and are happy to have students working on it over the next year, let us know and we'll help you to get set up. The program costs nothing for industry employers, we'll take care of intellectual property and confidentiality issues and you could find your next star employee.

AutoEngineer to Publish Student Reports

Final year students participating in the AutoCRC program in 2009 now have the opportunity to have their reports published in the Society of Automotive Engineers Australia Journal – AutoEngineer. This is a first for our program and we look forward to seeing some of the great work done by our students getting noticed within the industry. All student theses will still be made available through AutoCRC. The abstracts for 2007 and 2008 projects are on our website at www.autocrc.com

AutoCRC Selects Electric Vehicle Design by Monash Student.

AutoCRC has a strong focus on electric vehicles. Part of this focus has seen several final year design students at both Monash University and University of South Australia develop EV designs based on the Duoleta lightweight vehicle concept. A team from AutoCRC has chosen the design that we feel has the most impact as a novel and practical new concept. The chosen design, by Richard Li from Monash University, is called the MiraQua and was inspired by traditional Chinese concepts of water. Its main novel features include a single front end diagonal lifting door for unique ingress and egress and easy parking, and a very distinctive droplet shape with reconfigurable interior to allow large loads.



2009 research plan presentation



Tony Sama looking forward to reading undergraduate research reports in the SAE-A journal AutoEngineer.



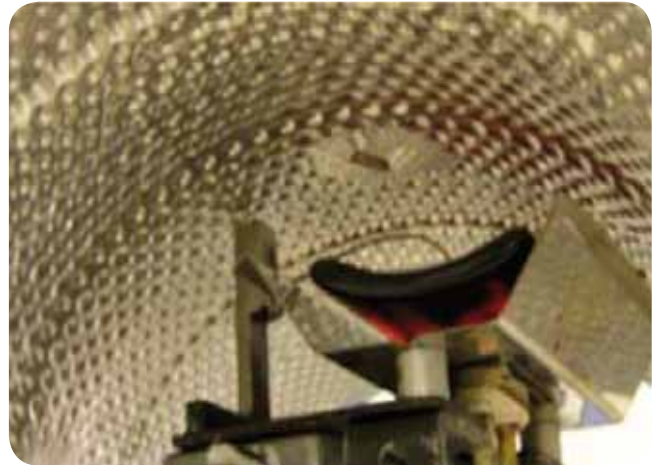
*MiraQua electric vehicle design
by Richard Li of Monash University*

Undergraduate Program Highlights (continued)

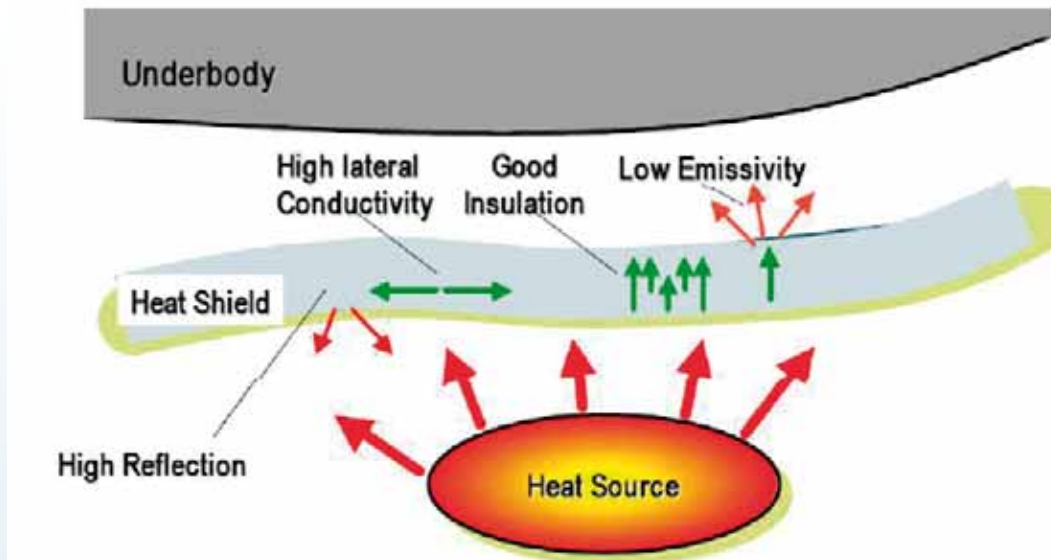
Deakin Students Success in Heat Shield Project

A group of final year students from Deakin University have had an impact on the design of a heat shield produced by Backwell IXL for Toyota. Their research has led to a change in design specs.

Ross McDonald Business Development & Engineering Manager for Backwell IXL Pty Ltd says, "The undergraduate team did fantastic work on testing and measuring the performance of the local prototype aluminium heat shields we produced for Toyota. We have used the Deakin Uni test results to support our request to Toyota Technical Centre to have our emboss pattern added to the component drawings as a locally produced alternative".



Heat shield testing



Schematic of heat shield problem

AutoCRC Postgraduate Program

End-of-Life-Vehicle (ELV) project gets support through DEEWR Diversity and Structural Adjustment Fund.

The ELV project which is the first of its kind to see collaboration across two universities with a cluster of multidisciplinary postgraduate students and a large group of external policy stakeholders, has received a funding boost through the Federal government initiative to encourage universities to work together in complementary areas. With all four postgraduate researchers getting right into it, and with a new group leader in RMIT's Dr Lucien Koopmans, the ELV project is set to change the way that Australia manages vehicle scrapping.



Some of AutoCRC's 50 postgraduate students

Over 50 students have now received scholarships through AutoCRC's postgraduate scholarships program. We are expecting a further 20 scholarships to be taken up through the visionary projects program over the next few months. Further information for each project can be found on our website at www.autocrc.com.

Focus on Postgraduate Student Projects

Supply Chain Outcomes

Dr. Yousef Amer is a Lecturer, course coordinator and research supervisor at the University of South Australia, School of Advanced Manufacturing and Mechanical Engineering. He holds a PhD in Mechanical and Advanced Manufacturing Engineering. Yousef has over 18 years experience working in manufacturing and supply chain and logistic environments in South Australia.



He has recently completed his AutoCRC sponsored PhD project to improve supply chain outcomes.

His PhD research "Optimising order fulfillment performance using Design for six sigma and fuzzy logic" developed as a response to his observation of the need to improve order fulfillment within firms. With 47% of firms only focussing on their internal processes his model provides a way to improve supply chain outcomes and to shift the focus out across the chain.

His order fulfillment model measures and improves supply chain performance and supports the strategy of meeting customer's needs by adapting Design for six sigma; which focuses on customer requirements from the design onset and fuzzy logic; which can account for the fuzzy and variable supply chain environment. It considered the possibility that performance measurement

can aid integration between members of a supply chain and improve overall supply chain business outcomes.

By applying the developed order fulfillment model in a case study application, a representation of detailed activities of order fulfillment processes was demonstrated providing key internal and external performance indicators. A theoretical transfer function for predicting the performance of the perfect order fulfillment incorporating fuzzy set theory provided a way of monitoring supply chain performance. This was shown to be an effective way for monitoring and controlling order fulfillment variables, optimizing the supply chain order fulfillment process and meeting customer's requirements. It was also demonstrated that the model was an incremental step towards supply chain integration.

An added benefit of the order fulfillment model presented is that it can be applied from any position and adapted to any process within a supply chain making it a flexible and useful model for supply chain management. Currently he is advancing his research by focusing on the demand management process and the sustainable supply chain, the need to consider carbon reduction into the future and the effects it may have on supply chain management.

Yousef is also able to work with industry to address specific research needs and is always happy to discuss operational issues with the view to finding solutions.

Dr. Yousef Amer

Email: yousef.amer@unisa.edu.au

New People at AutoCRC

AutoCRC is pleased to welcome a number of new staff to its team.

Kassandra Koudelka has been appointed to a new role responsible for the administration support and the coordination of the Automotive Australia 2020 project and will be based at the AutoCRC / ASEA office located at Unit 1/3 Westside Avenue, Port Melbourne.

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Viviana Carreno is our new Company Accountant and has a Bachelor of Commerce from La Trobe University and a CPA. Viviana is also registered with the Australian Taxation Office as a Tax Help Accountant providing Tax Return support for the disadvantaged.

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Dr Thomas Ting has been appointed to the new position of Commercial Manager for AutoCRC with overall responsibility for negotiation, documentation and implementation of plans for commercialisation of AutoCRC's research outcomes.

Thomas will also maintain oversight of Third Party involvements in AutoCRC's research and commercialisation activities. Thomas will join AutoCRC on a 2-year secondment from the Victorian Partnership for Advanced Computing (VPAC).

Thomas has a BE (Hons) in Mechanical Engineering and a PhD in Chemical Engineering, both from Monash University. He has worked on a collaborative development project funded by Monash and the US Air Force and later for JDS Uniphase. He joined VPAC at the start of 2003.

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