



Issue 5 | April 2009

## CEO's Message

Welcome to our latest edition of AutoCRC Updates.

It has been a hectic several months for AutoCRC with critical industry and government initiatives demanding our close attention and much preparation.

Activity has focused around our third year performance review, the new CRC guidelines and the inaugural AutoCRC Technical Conference in March, along with detailed submissions for a number of government reviews and funding programs.

We are pleased to report that our important third year review has resulted in a strong endorsement of AutoCRC.

The international review panel found AutoCRC has very effective governance, effective and efficient research planning process, enthusiastic and high quality research students and impressive commercialisation, IP management and communication strategies.

The Panel noted that AutoCRC needs to identify new roles and opportunities in response to the very difficult financial pressures currently facing the Australian automotive sector. A formal meeting of Participants in December 2008 was well attended and heard a review of several strategic options under review by AutoCRC

The new CRC Guidelines mean business as usual for now, but within the next 2-3 years AutoCRC will be eligible to apply for up to an additional eight years funding. The 11th CRC selection round is already underway with the new guidelines, and some of the key changes are:

- The reinstatement of public good as a key objective for the CRC program
- Annual funding rounds with funding up to ten years

- CRCs must exit the program after 15 years
- Universities and research agencies will not be required to contribute cash
- CRC funds may be spent outside Australia (with local benefit caveats)



*Dr Matthew Cuthbertson,  
CEO AutoCRC*

AutoCRC has made formal responses to framework papers from government, on the \$1.3b Green Car Innovation Fund and the \$20m Automotive Supply Chain Development Program. In respect to the latter, AutoCRC will bid on behalf of the ASEA consortium for significant funding to coordinate supplier improvement activities.

In addition AutoCRC has lodged expressions of interest to the Victorian Science Agenda Program for funding for projects to a total value of more than \$20m. Initial feedback is expected in June.

The first meeting of the Automotive Industry Innovation Council took place in January 2009 and three AutoCRC board members now serve on the Council which has a key role to play in the strategic development and targeting government support for the Australian automotive industry.

The inaugural AutoCRC Technical Conference was held during Automotive Week at the Melbourne Exhibition Centre. The conference was a great success with keynote speakers including David Charles (Chair of the Innovation Council mentioned above), Mike Millikin (CEO of the Green Car Congress) and Robert McEniry (CEO of Mitsubishi Motors Australia). David Charles' address is summarised later in this newsletter.

Twenty peer-reviewed technical papers were presented at the conference alongside 14 student posters, highlighting much of the project work underway at AutoCRC. All

*"We are pleased to report that our important third year review has resulted in a strong endorsement of AutoCRC."*

## CEO's Message (continued)

technical presentations are available in a bound volume of proceedings, from [enquiries@autocrc.com](mailto:enquiries@autocrc.com).

Currently AutoCRC has 31 active research projects at ten locations in four states. Since our inception AutoCRC has completed 11 projects and has recently received its second royalty from VPAC for the sale of a new VicTorii portal license to RMIT University.

A new video production features 13 of our new technology demonstrators and this has been shown to the Third Year Review, our AGM and the AutoCRC Conference with excellent responses.

Thank you for taking the time to read this AutoCRC Update on our key activities.

## New Technology Demonstrators – Commercial Opportunities

After three years work AutoCRC is proud to unveil new technology demonstrators now ready for commercial application.

### New Generation Car Seat Adjuster Mechanism

This project has developed and patented a simpler, safer, lower cost seat adjuster mechanism.

The AutoCRC seat adjuster mechanism project is on track to provide the automotive industry an exciting new, safer and lower cost car seat assembly.



*The new generation seat adjuster mechanism is explained to ASEA team members, Michael Barker (left) and Peter Taylor (centre) by Francesco Schiavone of RMIT at the AutoCRC conference in March.*

### The Portable Virtual Training Demonstrator

For Automotive General Assembly Operators this demonstrator offers training before new components are ready for production line assembly.

Haptic devices create physical force sensations and vibrations emulating the feel of assembling physical components and advanced software provides depth perception when maneuvering three dimensional objects.



*The Portable Training Simulator Complete with Haptic devices for a real life feel for the task.*

## New Technology Demonstrators (continued)

### The ORTeV-On-Road Test Vehicle

This is a state-of-the-art data acquisition platform in a VE Holden Commodore.

Vehicle data collection includes speed, GPS location, lane tracking and feedback from all key vehicle controls. Virtually every element of driver behaviour and its affects on the driver are measured.

ORTEv provides the information needed to point to new generation technologies to lower cognitive loads and stress for safer driving. ORTeV is now available for independent R&D projects.



*ORTEv (On-Road-test-Vehicle) will test new technologies for stress free driving.*



### Speed Sign Recognition Demonstrator

The system scans the road identifying speed signs and alerts the driver with audible warnings, a readout, and can be linked to car cruise control systems.

The detection algorithm is implemented in a single chip producing a high performance cost effective package for mass production.



*The Speed Sign Recognition System at work at Latrobe University*

### VicTorii – a web based management system

VicTorii is a new web based management system for R&D projects which solves the obstacles diverse locations create for project planning, tracking and reporting on outcomes.

VicTorii enables a diverse multidisciplinary team to assemble and formalise projects on-line, simultaneously.

VicTorii™ provides budget and forecast validation, creating or amending Project Agreements, milestone tracking and approvals, invoice triggers, project snapshot reports, and many other features.

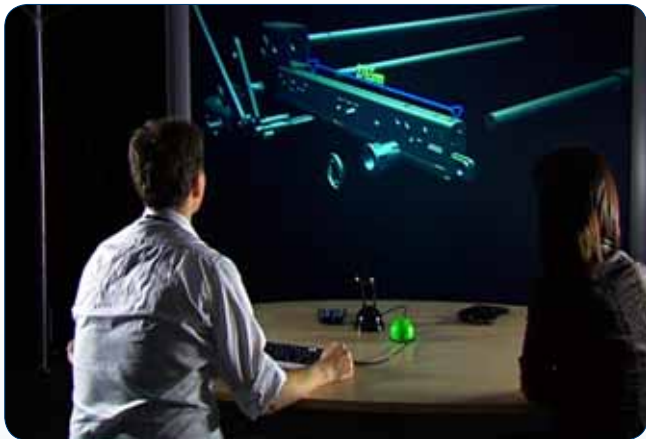


*The AutoCRC team putting VicTorii through a demonstration.*

## New Technology Demonstrators (continued)

### Integrated Design Environment

- IDE is a virtual environment in which engineers and designers will design and build vehicles in the near future.
- Issues such as design for assembly, structural improvement, aerodynamics and fuel economy can all now be accurately engineered in a virtual environment.
- The computer programming behind this virtual environment enables data from any source or in any format to be combined, and worked with seamlessly by design and engineering teams.



*The Integrated Design Environment – virtual design for reducing production costs.*

### Signature 2 Telematics Demonstrator



- The Signature 2 offers a telematics in vehicle interface with links to internet and GPS to provide wide ranging information.
- Navigation to points of interest, home automation, traffic camera feeds, personalised data display and vehicle management systems information are all available.
- In combination with optimised human machine interface, and driver distraction reduction technology, the AutoCRC Signature 2 demonstrator offers safer and more enjoyable motoring.

### AutoCRC 100% LPG conversion for heavy trucks

The dedicated LPG engine replaces the need for expensive and noxious diesel.

It offers a more fuel efficient engine, lower engine wear and a significant increase in overall power.

A new electronic engine management system controls engine timing and fuel to produce the most efficient operation and is linked to web based diagnostics and fleet management.



*The LPG conversion demonstrator - a Mercedes Benz 12 litre V6 Actros B-double compliant truck.*

## New Technology Demonstrators (continued)

### Noise Reduction

From extensive noise data collection researchers have developed a stand alone single chip unit that reduces the affects of noisy in car environments on recognition of the human voice.

The project also addresses the key issue of regional speech accents.

It offers Australia first custom speech database for use by manufacturers who would benefit from tuning their products to the Australian accent.



*Testing AutoCRC's voice recognition technology which offers 10% improvement on current technology.*

### New Guidelines for Child Car Seat Restraints

What products offer the best protection, how manufacturers design for installation and how best to fit them, have all been the subject of three years work.

Many tests and evaluations later new guidelines have now been completed for the design, installation and use of child seats and restraints.

This invaluable information is being made available to industry regulators, seat manufacturing companies, parents and car-makers to contribute to improved child passenger safety.



*One of the many car seat restraints tested at Monash University as part of the study.*

## New Technology Demonstrators (continued)

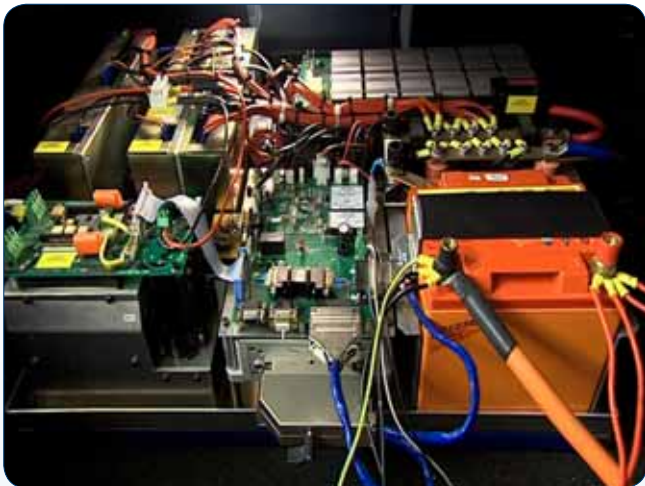
### Hybrid Vehicle

The AutoCRC Hybrid vehicle demonstrator uses advanced high efficiency power management hardware and software.

Power systems are air cooled and the energy from braking is captured by supercapacitors allowing the use of smaller batteries and prolonged battery life.

The hybrid system reduces fuel consumption and greenhouse gas emissions by up to 50%.

The demonstrator can be programmed for a range of energy storage options and operating regimes.



*The AutoCRC Hybrid vehicle demonstrator showcases Australia's capability to develop a new technology hybrid vehicle.*

### Older Driver Study

AutoCRC has funded a study into the behaviour of older drivers.

This study utilises Monash University's new portable advanced driving simulator.

Drivers undergo an eight-minute test replicating a range of situations known to challenge older drivers, including merging, major intersections, right turns and avoiding sudden obstacles.

The older-driver study is being funded by AutoCRC in association with Monash University and GM Holden.



*The Monash University portable advanced driving simulator is going to major Holden dealerships to collect data from older driver volunteers.*

All AutoCRCs Exciting New Technology Demonstrators are now ready for commercialisation for AutoCRC industry project partners and interested parties.

A Video Production highlighting 13 AutoCRC Technology Demonstrators is available now from [enquiries@autocrc.com](mailto:enquiries@autocrc.com)

## The Future Shape of the Automotive Industry – AutoCRC Conference 09

This is an edited version of a presentation by David Charles, Chairman of the new Automotive Industry Council at the inaugural AutoCRC Technical Conference. A full version of the keynote speakers presentations are at [www.autocrc.com](http://www.autocrc.com).

With the meltdown of the global economy most of the world is going through a once in a lifetime crisis.

Until confidence in the banking system is restored and credit starts to flow normally, conditions will be difficult and any improvements in the economy look unlikely until 2010.

The impact on the future shape of the automotive industry world wide is likely to be significant and expect household names to disappear with a major consolidation of car makers and component suppliers.

This is not surprising, since after housing the purchase of car requires a large amount of money usually financed on credit which is why the automotive industry was quickly affected by the credit crunch.

This has a larger economic impact than one would imagine for while in large countries automotive accounts for 3-4% of GDP, it can account for up to 40% of the reduction in expenditure during a downturn.

This can partly be explained by the large indirect effects of reduced automotive sales through its large and complex supply chain taking in significant products from other industries such as steel, rubber, glass, aluminium and plastic to name a few.

The serious nature of this issue is demonstrated by the catastrophic decline in car sales in the US alone. US February 09 sales are down for General Motors by 53% from 2008, Ford is down 48% and Toyota by 40%. US sales have fallen 40% since 2008 and for the first time sales in the US are now less than sales in China.



David Charles .

*“The automotive industry is a large provider of jobs and increasingly it is a knowledge based industry.”*

## Auto CRC Conference 09 (continued)

This has occurred in a context where structural pressures were already influencing sales. Capacity exceeded demand, markets were mature, oil prices and regulators were both impacting in profitability.

Major reinvestment was already demanded.

You may ask why this merits government intervention to save major manufacturers.

The automotive industry is a large provider of jobs and increasingly it is a knowledge based industry with large design and engineering centres. It is also a major investor in new plant and equipment and an incubator of major manufacturing methods such as mass manufacturing and lean manufacturing. It is one of the biggest performers of business R&D with significant links to universities and research centres.

In a word the social capital built up in the automotive industry is very large and it demands and is getting support from policy makers.

In addition European governments recognize that new standards are demanding major new investment in drive train and light materials to support efforts to cut greenhouse gas emissions.

I mentioned earlier that household names will disappear. The market also will see a major shift as overwhelming demand in Asia boosts production in India and China. New technologies will come on stream as dependence on carbon fuels falls. Delivering innovation will be the measure of long term survival and success.

Already we have seen the launch of the Tata Nano in India – a car selling for less than A\$3,000.

The Australian automotive industry must find ways to offer internationally competitive pricing with low tariff support and embrace innovation like never before.

Hence the role AutoCRC has to play will be a vital one in the development of areas where Australia is strong enough attract global and Australian investment.

It is encouraging that the AutoCRC major third year review has indicated that it is an organisation well placed to effectively help ensure the future role of an Australian automotive industry.

For its part the key task of the Automotive Industry Innovation Council is to assist the industry to develop a shared vision and identify areas of innovation which will be crucial to the industry's future.

*“The Australian automotive industry must find ways to offer internationally competitive pricing with low tariff support.”*

## AutoCRC PROJECT

### *New One Piece Car Mirror — Without Glass*

Australia's AutoCRC (Cooperative Research Centre for Advanced Automotive Technology) has announced a cooperative venture to produce the world's first plastic one-piece automotive mirror.

With project partners Visiocrp Australia (formerly Schefenacker) and the University of South Australia the AutoCRC project aims to produce a low cost automotive mirror that is lightweight, provides a heated surface and no longer requires glass.

The plastic one piece mirror will replace the traditional components of glass, backing plates and screen printed resistive heater pads on automotive exterior rear-view mirrors.

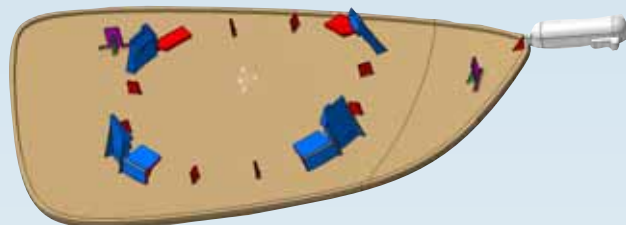
Visiocrp Australia's sister company in France has already developed a prototype utilising technologies that include injection compression moulding, vacuum metallisation and traditional liquid silicon hardcoats.

The Visiocrp prototype has already overcome the obstacle of moulding strain free, curved mirrors.

The University of South Australia (UniSA) has extensive experience in vacuum coating technology including plasma polymerisation and sputter coating and has developed patents in a number of thin film coating technologies.

The AutoCRC project brings together this expertise to develop a second generation manufacturing process that will replace traditional liquid hardcoating with a Plasma Enhanced Chemical Vapour Deposition Process. It will replace expensive glass and a sputter coated resistive heating system will be applied to the mirror to replace screen printed heater pads.

These are currently imported and assembled to the glass separately. This will create a new lightweight product which meets the demand by car makers for lower cost, lighter weight more fuel efficient environmentally friendly vehicles.



*Visiocrp France's Aspheric plastic mirror design with front surface to be coated with the reflector and hardcoat and rear surface with clips and terminals for actuator and heater connection respectively. The rear surface will be coated with a combination of metal alloys that will serve as the heater element.*

The development of the all-in-one mirror incorporating backing plates, mirror, heating plate and hard coat in a single device which in turn will reduce weight allowing even lighter weight structural materials.

#### **Major tasks facing the project include:**

- a prototype injection compression moulding tool
- a first surface plastic reflector which meets automotive specifications for glass optics.
- proving the durability of the PE-CVD hardcoat against automotive specifications such as scratch, UV resistance and general environmental durability.
- a sputter coated heater solution that meets automotive specification, ie defrost and de-ice times
- value-add coatings that can be included in the in-line vacuum process, including Colour tints (ie. blue glass required for BMW, Audi etc.)

Visiocrp is the current global market leader in automotive mirrors and purchased more than 24 million pieces of curved and aspheric glass and 16.9 million heater pads in 2007.

Visiocrp Australia is based in Adelaide and is part of the Visiocrp Group which employs more than 5,000 people at 21 sites in Europe, America, Asia and Australia.

Its global leadership offers a clear path to market and quick uptake of the new one-piece car mirror once manufacturing is possible.

## Linsey Siede ASEA Program Director .....reports on the implementation of ASEA Stage 3 Pilot.

ASEA is a national government /industry initiative which "Through the creation of an independent, best-in-class benchmarking process and targeted supplier assistance initiatives, aims to assist automotive suppliers achieve world-class capability and competency levels" [www.asea.net.au](http://www.asea.net.au).

With sales volumes throughout the global vehicle industry continuing to reduce, there is an urgent need for suppliers to focus on activities that can immediately improve business efficiencies and deliver results to their bottom line. A longer term requirement is to review or implement new strategic plans that can deliver opportunities from a broader customer base.

During the past six months, ASEA trainers and coaches have successfully worked in partnership with more than twenty Australian automotive component suppliers to turn these needs and objectives into realities.

ASEA is currently working with suppliers located in four states including Victoria, South Australia, New South Wales and Queensland. ASEA programs are specifically designed around a best practice training/coaching model in order to maximise knowledge transfer.

Through tailored programs that are specifically focused on delivering results in the key areas of Strategic Business Planning, Lean Enterprise, and Supply Chain Management, ASEA has been able to help a variety of companies deliver positive outcomes for both the near and long term.

The response and the feedback included in more than 25 questionnaires received from suppliers, coaches and trainers, has been overwhelmingly positive.

The questionnaires are completed both half way through a project as well as at the completion, to not only monitor and gage the performance of all the participants involved throughout the entire process, but to also rate the ability of the project team to achieve the deliverables.

Some of the promising outcomes that are emerging from the various projects are quite significant.

Positive comments from a number of these projects include:

### **Strategic & Business Planning Projects:**

- Greater confidence to survive the current market challenges.
- A much clearer road map regarding the way forward via diversification.
- The Situational Analysis identified significant business opportunities
- A consolidation of the business may lead to a potential savings of \$1.2m.
- Greater understanding the competitive environment is shaping the strategic direction.

### **Lean Enterprise Projects**

- Productivity improvements of 10% - 30% are being achieved.
- Lean 5S activities have achieved a reduction in quick die change of 50% plus an 11% increase in output.
- The lean diagnostic identified \$ 0.5 m savings opportunities.
- Value Stream Mapping indentified a manning reduction from 5 to 4 person team.

Since commencing ASEA Stage 3 Pilot, the ASEA management team has developed a rigorous and robust process for recruiting and engaging industry experts and specialists as both ASEA coaches and training providers.

All ASEA coaches and training providers are well credentialed and experienced having demonstrated their vast expertise, knowledge and sound experience throughout their careers. Further, all Strategic and Business Planning, Lean Enterprise and Supply Chain Management coaches and training providers have been certified after completing a two day intensive professional coaching course.

For further information on the ASEA Pilot, suggestions or if you would like to be added to ASEA Newsletter distribution list, please email: [angela.birley@asea.net.au](mailto:angela.birley@asea.net.au)

## Focus on Student Projects

### *Metal Foam Core Structures for Automotive Applications*

In this edition we take a look at Eileen An's AutoCRC project into the development of metal foam core structures for front and rear crash boxes in motor vehicles. Eileen has degree in Mechanical Engineering at the University of Science and Technology Beijing and is currently a PhD candidate at Deakin University.

The reduction of car mass has received considerable attention in recent yeas and auto makers aim to reduce both fuel consumption and environmental pollution. Increasing demands however for improved passenger safety and comfort have led to increased weight in new car models. Change of design geometry and application of new materials are the two basic approaches now being considered to satisfy both mass and safety requirements.

Metal foams are ideal energy absorption materials due to their long plateau behaviour under compression. Al, Mg and their alloy foams are of special interest because of their unique combination of properties such as ultra-low density, high specific stiffness, excellent energy absorption and acoustic dampening. The use of foam-core structures provides exceptional energy absorption and strength to weight ratio. These are attained by using thin dense skins which sandwich a low-density core.



*Eileen An*

To date such systems have concentrated upon Al foam cores which themselves demonstrate exceptional impact-energy absorption capabilities as demonstrated by uniaxial compression tests. However, a number of gaps still exist in the knowledge of this field, in particular: i) the optimum core structure in terms of intrinsic mechanical properties of the alloy and density; ii) the interaction mechanism between the foam and skins in terms of total energy absorption and strength; and iii) the influence of the skin properties upon beam collapse. Eileen's work will aim to fill some of these gaps.

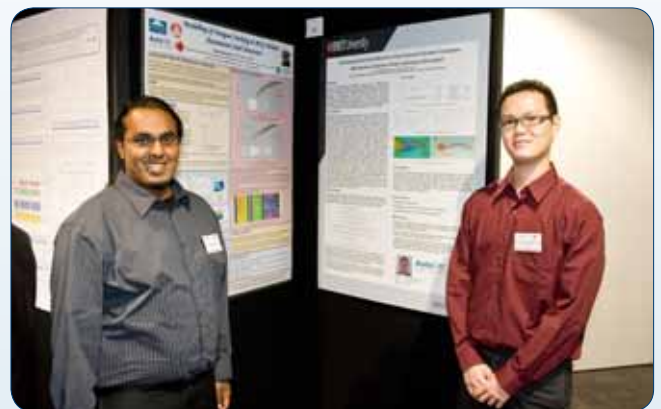
## AutoCRC Inaugural Conference Highlights

Keynote Speakers included Robert McEniry CEO of Mitsubishi selling up the i MiEV, the first production ready electric car and Michael Millikin of the Green Car Congress on where the motor industry (US) has to go to remain viable.

Robert McEniry (below) and Michael Millikin (left)



Tony Sama and Gary White (centre) present Natalie Michael of Swinburne University whose presentation, *Paradigm to Assess Driver Distraction in Real and Virtual Environments* won her the prize for the best student presentation.



Yogen Padayatchy (left) of Monash University and Pongpat Thavornpattanapong of RMIT display their posters on their respective AutoCRC student projects, *Fatigue Cracking in Mig Welded Automotive Steel Structures* and *Developing Numerical Model for Flow Induced Vibration Excitation Mechanisms Towards Virtual Laboratory Simulation*

## AutoCRC Inaugural Conference Highlights (continued)



There was time for relaxation. Here Dr Sri Lathabai of CSIRO (right) and Chetan Nikhare and Rajani Sudharsan of Deakin University at cocktails at the close of the conference.



AutoCRC Board Member Bronwyn Constance and Matthew Cuthbertson with RMIT student Balwinder Kaur explaining her AutoCRC Project, the Development of Heat Reflective Pigments.



RMIT students Blake Harris and Tom Sterling showing their electric race car to AutoCRC CEO Matthew Cuthbertson and Projects Coordinator, Anjana Panditaratne.

## AutoCRC at “Science meets Parliament”

This is a regular event providing scientists around Australia the opportunity to meet and inform our parliamentarian about science and its value to the community. These two day events are organised by the Federation of Australian Science and Technical Societies.



AutoCRC was invited to the March 2009 Science meets Parliament (SmP) where the science presenters spend the first day in a series of seminars and workshops designed to assist them to get their message across.

A key focus is how to approach parliamentarians and understand the competing interests at work. A major message was for presenters to know what they wanted out of the meetings and what was the major point they wanted to make.

The second day was the presentations to our federal parliamentarians. It was great to find that so many parliamentarians were well informed of the broader issues and interested in the details that our scientists and engineers provided. Many professional organisations have the opportunity to nominate attendees to SmP so it was fortunate that AutoCRC had a large contingent of participants who were nominated through various societies:

The AutoCRC team was Dr. Gary White – AutoCRC (presenter), Ms. Kate Neely – AutoCRC, Dr. Thomas Ting – VPAC, Dr. Judith Charlton – Monash University, Mr. Richard Yeo – ARRB, Dr. Amy Albrecht – School of Mathematics, UniSA.

## New People To Strengthen AutoCRC

The headquarters team has been strengthened with further consulting support, reporting to the Research Manager. They join Jason Miller and Dr Matthew Dingle on a part time basis. They are: Mr Tim Olding (formerly GM Holden), to assist with development of visionary projects for AutoCRC, especially in the area of alternative fuels and Dr Gottfried Lichti (Consultant). Dr Lichti will assist AutoCRC inventors with drafting Records of Invention and to work with inventors and patent attorneys in maximizing the scope of claims in patent applications.