



Immediate: 24 June 2013

## **48V LC Super Hybrid to showcase breakthrough lead-carbon battery technology at Advanced Automotive Battery Conference**

The Advanced Lead Acid Battery Consortium (ALABC) is paving the way for a new generation of affordable and cost-effective micro-mild hybrid cars with its low CO<sub>2</sub> emission vehicle demonstration programme known as the low cost lead carbon LC Super Hybrid conceived in association with Controlled Power Technologies (CPT). Its latest 48 volt technology demonstrator will take centre stage this week at a major international battery conference in France focused on the activities of European carmakers, where its preceding 12 volt demonstrator will be available for carmakers to ride and drive.

Following its world debut at the International Vienna Motor Symposium in April, the 48 volt LC Super Hybrid demonstrator is taking another break from its preparatory build and test programme in Germany, which is being handled by systems integrator AVL, and in the UK by CPT, to be further showcased this week at the Advanced Automotive Battery Conference (AABC) being held at the Palais des Congrès in Strasbourg from 24-28 June.

“The LC Super Hybrid programme was conceived by the ALABC and CPT to show that without destroying the power, torque and acceleration - and hence spritely performance with all the fun and enjoyment of driving a car - significant CO<sub>2</sub> reduction can be achieved through electric hybridisation at low voltages below 60 volts supported by the latest lead-carbon batteries,” says Allan Cooper European project coordinator ALABC. “Most significantly the high performance and low fuel consumption of this new breed of micro-mild hybrid cars can be achieved at a quarter of the add-on costs associated with more expensive high voltage mild, full, plug-in and range extended hybrids and battery electric vehicles. Moreover, the low voltage electrification of the powertrain deploying nominal 12, 24 and 48 volt grids keeps it below the critical 60 volt high voltage safety threshold.”

Allan Cooper will deliver a technical presentation at the AABC symposium on the innovative lead-carbon battery technology applied to the LC Super Hybrid and other ALABC technology demonstrators during the Advanced Automotive Battery Technology, Application and Market (AABTAM) session on ‘Energy Storage for Low-Voltage Hybrids’ to be held at the Palais des Congrès on the morning of Thursday 27 June. The session will be chaired by Dr Eckhard Karden a technical expert in micro-hybridisation and battery energy storage technology at Ford's Corporate Research and Advanced Engineering Centre at Aachen in Germany.

Allan Cooper is an independent consultant and European coordinator of the ALABC program working closely with the International Lead Association, which is headquartered in London, and with companies including AVL, CPT and Ricardo for developing low CO<sub>2</sub> emission vehicles. In 2008 he was awarded the International Lead Medal for exceptional contributions to the industry in the areas of lead metallurgy, production technology and lead-acid battery development, particularly in the field of electric and hybrid electric vehicles. He graduated from the University of Cambridge.

Allan Cooper will be accompanied to the conference by Nick Pascoe chief executive officer and Paul Bloore senior engineer for powertrain integration at Controlled Power Technologies. They will be joined by David Wilson president and Boris Monahov program manager of the ALABC.

“The lead-carbon battery is an important breakthrough for hybrid electric vehicles,” says Monahov. “It is a lead-acid battery with special types of carbon added to the negative plates. It’s taken many years of hard work for the members of the ALABC to achieve this advance in lead-acid batteries for HEV applications. Lead-carbon batteries retain all the advantages of ‘regular’ lead-acid batteries: low cost, high specific power, outstanding cranking ability at very low, moderate and high temperatures, and can be fully recycled using existing technologies and equipment.”

“The big benefit of lead-carbon batteries is their long cycle life in HEV applications – well above 100,000 road miles – comparable to the life of the vehicle. Utilising the combination of Faradaic and capacitive processes in the negative plates with added carbon, lead-carbon batteries have been shown to tolerate the relentless high current charging and discharging required in micro-mild hybrids, which are forecast to dominate the automotive market over the coming 10-15 years. This new breed of micro-mild hybrid vehicles, developed by ALABC, CPT, Ricardo, Valeo and AVL working closely with leading carmakers, is expected to be on the roads from 2015 onwards.”

After years of fundamental battery research, Monahov has spent more than a decade in product development and technology optimisation of advanced lead-acid and lead-carbon batteries. Previously an associate professor at Professor Pavlov’s lab in the Bulgarian Academy of Sciences at Sofia in Bulgaria, he is currently managing the ALABC international research program which is supported by the International Lead Zinc Research Organization (ILZRO) based at Research Triangle Park at Durham in North Carolina.

“We have achieved a high level of readiness for meeting the needs of the world’s leading carmakers and their global Tier 1 suppliers,” adds David Wilson president of the ALABC. “We’ve spent 20 years developing this new battery chemistry while CPT has similarly spent more than 10 years applying itself to the refinement of highly complementary switched reluctance motor-generator technology for low voltage automotive applications.”

“The introduction of this technology from 2015 onwards is a realistic timeframe,” says Nick Pascoe chief executive Controlled Power Technologies, “particularly as we’re now seeing rapidly maturing definitions of nominal 48 volt architectures by leading carmakers, supported by the global tier 1 supply base, and increasingly diverse powertrain and vehicle applications being primed for series production. Besides,

2015 is when carmakers have to meet European CO<sub>2</sub> emission levels of 130g/km reducing to 95g/km by 2020.”

Based on identical basic specification 1.4 litre VW Passat family sized saloons, the production-ready LC Super Hybrid technology at 12 volts has already been widely demonstrated to carmakers in Europe and the US following its debut at the 2012 Geneva Motor Show. It offers the potential of a mass market, petrol-powered, large family car with superb drivability, impressive performance and excellent fuel economy of 50 miles per imperial gallon (42mpg US or 5.6l/100km) and 130g/km on the NEDC New European Drive Cycle.

At a nominal 48 volts a further improvement of 4-8 per cent is anticipated - and at both voltages significantly more miles per gallon and comparably fewer litres per 100 kilometres in real world driving - while delivering the performance and driveability of a 2-litre class vehicle. This is achieved at substantially lower cost than an equivalent diesel model. The low voltage technology enables aggressive yet near-term down-sizing and down-speeding of existing gasoline engine families.

The more powerful 48 volt demonstrator offers significant additional functionality including torque assist to the petrol engine for launch and low speed transient acceleration, optimised motorway cruise conditions with electric assist ‘load point moving’ and a leaner fuel calibration, in-gear coast-down and the ability to harvest significantly more kinetic energy from regenerative braking. It cleverly combines cost effective, advanced lead-carbon batteries with CPT’s production ready, versatile SpeedStart® motor-generator system, which has been recently validated for 1.2 million stop-starts compared with 150,000 to 300,000 for first generation micro-hybrids.

The vehicle also includes production-ready electric boosting technology sold by CPT to the major tier 1 supplier Valeo based in France. Other international companies involved are powertrain developer AVL based in Germany, drive belt specialist Mubea also from Germany, and Provector, a leading expert in battery management systems, based near Cambridge in the UK.

For more than a year now the 12V LC Super Hybrid vehicle has been thoroughly tested and driven by many vehicle OEMs and automotive journalists both in Europe and in the US with enthusiastic responses. ALABC and CPT expect to release comprehensive performance data regarding the 48V vehicle fuel economy and energy management later in the year, after which both vehicles will be available for evaluation and back-to-back comparisons.

Further details on the Advanced Automotive Battery Conference in Strasbourg are available at <http://www.advancedautobat.com/conferences/automotive-battery-conference-Europe-2013/index.html>

### **Notes to editors**

The ALABC and CPT have been jointly recognised for their affordable low cost LC Super Hybrid technology breakthrough with a prestigious award presented by the UK’s Low Carbon Vehicle Partnership (LowCVP). The award was co-presented in the category for ‘Low Carbon Innovation by an

SME' – an award open to small and medium sized enterprises such as CPT and academic institutions such as the ALABC research consortium.

The LowCVP announced the winners of its 'Low Carbon Champions Awards' in January 2013 at its London headquarters in Westminster also home to the Institution of Mechanical Engineers (IMechE), a supporter of the awards, which celebrate outstanding and innovative practice in accelerating the shift to lower carbon vehicles and fuels and reducing road transport emissions.

### **About the ALABC**

The Advanced Lead Acid Battery Consortium is an international research cooperative comprised of lead producers and smelters, battery manufacturers, equipment and carbon suppliers and research facilities organised to enhance the performance of lead-acid batteries for a variety of markets, including hybrid electric vehicle (HEV) applications and various energy storage systems.

Founded in 1992, the Consortium pools the resources of its global membership to perform specific research on advanced lead-acid batteries and develop new technologies and battery concepts (over 110 successful projects) that otherwise would not be possible by any single entity.

The ALABC is a program of the International Lead Zinc Research Organization (ILZRO) based in North Carolina, and is managed by the International Lead Association (ILA) headquartered in London. For more information about the ALABC and its accomplishments, visit [www.alabc.org](http://www.alabc.org).

### **About Controlled Power Technologies**

Controlled Power Technologies is an independent, clean-tech UK company, based at Laindon in Essex and Coventry in the West Midlands, specialising in the development of cost-effective CO<sub>2</sub> reduction measures for the global automotive industry that avoid major redesign of the powertrain or vehicle electrical system. Its core competencies include low voltage power electronics, advanced control software and the application of low voltage electrical machines to gasoline and diesel powertrains.

CPT gained significant prominence and credibility in the automotive industry when it sold its production ready VTES electric supercharger business in December 2011 to Valeo for £30 million. A select team of advanced powertrain development engineers, originally established in the UK by Ford then Visteon, had worked on the technology for more than 10 years following careful research and selection of switched-reluctance machines as the best technology for low voltage micro-mild hybrid vehicle applications.

CPT is similarly focused on bringing its closely related Cobra, SpeedStart and Tigers technology to mass market readiness. Cobra is a water cooled electric supercharger for commercial vehicle and off highway applications. The Tigers unit is a water cooled turbine integrated gas energy recovery system that will soon be making its first appearance in the Technology Strategy Board co-funded Vipers technology demonstrator programme led by Jaguar Land-Rover supported by CPT. The Vipers consortium members also include Ford, IAV, BP, University of Nottingham and Imperial College London.

CPT's technology development partner is Nidec Corporation of Japan, one of the world's leading suppliers of electric motors. CPT was established in 2007 as a management buy-in funded by venture

capital to acquire Visteon's advanced powertrain business. It comprises a highly experienced team of automotive engineers and is backed by a number of prominent investors specialising in the energy and environmental sectors including Turquoise Associates. The company is currently recruiting more high calibre engineers. Further information on CPT is available at [www.cpower.com](http://www.cpower.com).

**Media contacts:**

In Europe, and for a test drive of the new 48V LC Super Hybrid technology demonstrator when it becomes available later in the year and to request a media interview with David Wilson, Allan Cooper and Nick Pascoe please contact Rob Palmer on +44 7768 242761 or +44 1582 763255 or [rpalmer@palmerpr.com](mailto:rpalmer@palmerpr.com).

In the US, and for further information on ALABC and to interview Boris Monahov, please contact Chip Bremer on +1 919-810-1353 (direct) or +1 919-361-4647 x3033 or [cbremer@ilzro.org](mailto:cbremer@ilzro.org).

High resolution images of the pictures below can be downloaded at [www.newspress.co.uk](http://www.newspress.co.uk).



**Pic 1 -- 12V and 48V LC Super Hybrid demonstrators are based on the VW Passat 1.4-litre TSI.**



**Pic 2 – Low cost 12V and 48V LC Super Hybrid demonstrators feature an electric supercharger developed by CPT and acquired by Valeo in 2011 for high volume production**



**Pic 3 -- 12V and 48V LC Super Hybrid technology demonstrators feature CPT's multiple patent protected SpeedStart motor generator technology (top right) and Mubea belt tensioner**



**Pic 4 – Low cost LC Super Hybrids both feature Exide Orbital advanced lead-carbon batteries. Pictures show 12V installation (above) and 48V installation (below), with additional AVL test equipment and Provector battery management system in the foreground, which are eliminated in a production car, leaving just a single battery nominally rated at 1kWh.**

