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## **UK Low Carbon Champions present LC Super Hybrid technology at future car conference in Stuttgart**

The winners of a prestigious UK 'Low Carbon Champions Award' will present details of their low cost LC Super Hybrid technology at a major international future car conference being held in Stuttgart this week – the birthplace of the automobile. The technology developed over a number of years by the Advanced Lead-Acid Battery Consortium (ALABC) and Controlled Power Technologies (CPT) is now at a high level of technology and manufacturing readiness. It is anticipated the technology will appear in cars from 2015 onwards.

Organised by the Institute of Automotive Engineering and Vehicle Engines Stuttgart (FKFS), the well-regarded Stuttgart International Symposium, now in its 13<sup>th</sup> year, supported by its 'premier partners' Audi, Bosch and Daimler, provides a global forum for the exchange of information and ideas, bringing together the latest research findings from science and industry.

Allan Cooper, European coordinator ALABC will present a technical paper while CPT exhibits its technology to an audience of engineers and scientists explaining how hybrid electric vehicle performance can be achieved at significantly lower cost using low voltage switched reluctance electrical machines for boosting and energy recovery of thermal engines combined with the major breakthrough of high power density lead-carbon batteries.

Currently recruiting more development and application engineers to increase its UK engineering team from 35 to 50 people, CPT is working closely with major vehicle manufacturers in Europe, the US and Asia as well as prominent universities and leading consulting engineers including AVL and Ricardo to develop a range of cutting edge automotive technologies focused on energy recovery.

The ALABC is similarly continuing to expand its membership as it begins a new phase of its research and development program starting this year. Details of the new research program

were unveiled at the consortium's 20<sup>th</sup> anniversary celebration held at the European Lead Battery Conference in Paris in September.

ALABC and CPT were recently recognised for their achievements by the UK's Low Carbon Vehicle Partnership (LowCVP), whose annual awards celebrate outstanding and innovative practice in accelerating the shift to lower carbon vehicles. The LowCVP described the achievement of developing an affordable and commercially viable large family car with low carbon emissions as "truly impressive".

The project has also received plaudits from L'Automobile magazine, which has been involved in testing a 12V version of the technology to ISO 9001 standard tests prior to testing a 48V LC Super Hybrid technology demonstrator currently in build. The monthly automotive title is the only magazine to carry out such tests in Europe, which the managers of the LC Super Hybrid programme have found invaluable for providing an independent assessment for benchmarking its own test measurements.

Allan Cooper's technical presentation entitled "Mild HEV performance at micro hybrid cost – a low voltage advanced lead-acid battery approach" will be delivered at 14:30 on Tuesday 26 February in König Karl Hall as part of a session on hybrid drive systems chaired by Prof. Karl-Ernst Noreikat of NorCon Scientific Consulting.

He will be accompanied by Nick Pascoe chief executive, Paul Bloore lead engineer and Dirk Zepp sales manager CPT. The company is exhibiting on booth 15 at the symposium, which is being held at Haus der Wirtschaft Wirtschafts, Ministerium Baden-Wuerttemberg, Willy-Bleicher-Strasse 19 in Stuttgart. The conference programme is available to download at [http://www.atzlive.de/pdf/stuttgarter\\_symp\\_e\\_2013\\_1.pdf](http://www.atzlive.de/pdf/stuttgarter_symp_e_2013_1.pdf)

### **The LC Super Hybrid technology**

The LC Super Hybrid programme was conceived by CPT and ALABC to show that significant CO<sub>2</sub> reduction can be achieved through electric hybridisation at low voltages (12-48 volts) complemented by the major breakthrough of high power density lead-carbon batteries.

The vehicle includes production-ready electric boosting technology since sold by CPT to the leading French tier 1 supplier Valeo, thereby becoming the first global automotive component manufacturer to offer car makers a range of electric superchargers. Other international companies involved are powertrain developer and systems integrator AVL Schrick based in Austria and Germany, drive belt specialist Mubea also from Germany, and Provector, a leading expert in battery management systems, based in the UK.

The range of technology offers at 12 volts the potential of a mass market, petrol-powered, large family car with superb drivability, impressive performance and excellent 5.6 litres/100km (50mpg) fuel economy achieved at substantially lower cost than an equivalent diesel or high voltage full hybrid model. The relatively low cost low voltage technology enables aggressive yet near-term down-sizing and down-speeding of existing engine families.

The LC Super Hybrid technology, which is backed by more than 10 years of continuous development for the switched reluctance motor-generator technology and 20 years of solid research to achieve the lead-carbon battery breakthrough, has ingeniously delivered a cost effective reduction of CO<sub>2</sub> emissions and fuel consumption without destroying the fun-to-drive factor and high energy density liquid fuel range advantage of gasoline engines.

The initial 12V demonstrator vehicle, based on a 1.4 litre VW Passat TSI, embraces low voltage switched reluctance motor-generators, which are not yet currently employed by the automotive industry in mass production. The motors are of simple robust construction using steel, aluminium and copper and by avoiding the use of permanent magnets provide an innovative cost-effective solution to the growing problem of insufficient and ever more expensive rare earth materials.

The impressive performance and excellent fuel economy are underscored by the acceleration figures and results measured on the standard European drive cycle. The LC Super Hybrid delivers CO<sub>2</sub> emissions of less than 130g/km compared with 140g/km for the baseline Passat 1.4-litre TSI model - generally considered an industry benchmark for fuel economy in this size of vehicle - and an even more significant reduction when compared with 160g/km for the 1.8-litre TSI model. This represents a reduction in CO<sub>2</sub> emissions of 8 and 23 per cent respectively.

Similarly, the excellent fuel economy of 5.6 litres/100km (50mpg) represents a significant 11 and 24 per cent improvement respectively when compared with 6.2 litres/100km (46mpg) for the 1.4-litre TSI and 6.9 litres/100km (41mpg) for the 1.8-litre TSI also measured over the standard European drive cycle.

Building on the success of their 12 volt technology demonstrator, CPT and ALABC are now in the vanguard of the new 48 volt vehicle developments proposed by leading German carmakers. The new standard provides an ideal compromise for performance and cost in the development of a new generation of affordable super fuel efficient cars. With global CO<sub>2</sub> emission targets rapidly converging, the auto industry has to achieve almost another 30 per cent reduction by 2020 putting pressure on automakers to come up with innovative and affordable technical solutions.

“Energy recuperation is the key to ground-breaking solutions that the motorist can afford and this has caused the industry to re-visit the previously mooted higher than 12 volts, but less than

60 volts, electrical architecture,” says Pascoe. “Mild electrification deploying a proposed nominal 48 volt standard will be a major factor for enabling the required motor-generator efficiency and power levels.”

Pascoe says the industry has reckoned the additional cost to the motorist to achieve the required 30 per cent reduction in CO<sub>2</sub> emissions is estimated at less than £1,000 for an equivalent performance family sized saloon. This is significantly less than the £5,000 UK government subsidy for electric vehicles; an on cost that would seem to remain unavoidable unless there is a significant breakthrough to reduce the cost of the high energy density batteries required for full hybrid and electric vehicle traction motors.

CPT’s elite team of development and application engineers is currently focused on bringing three switched reluctance automotive technologies to market readiness. Cobra is a water cooled electric supercharger for commercial vehicle and off highway applications. SpeedStart is a powerful water cooled starter-motor and generator able to provide torque assist to the engine and harvest kinetic energy. Last but not least the CPT technology known as Tigers is a water-cooled turbine integrated exhaust gas energy recovery system.

CPT and ALABC will have a 48 volt version of the LC Super Hybrid running in 2013 able to provide torque assist to the engine for launch and acceleration, optimise fuelling during cruise conditions, and harvest kinetic energy during braking.

### **Note to editors**

Controlled Power Technologies (CPT) is an independent, award winning, clean-tech company 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 vehicle powertrains. The company is a spin-off from the advanced powertrain development team established in the UK more than 10 years ago by Visteon, a spin out from Ford, when electric supercharging and other switched reluctance motor technology applications were first mooted, and its technology development partner Emerson Corporation, whose motor business has since been acquired by Nidec. CPT was established in 2007 as a management buy-in funded by venture capital to acquire this advanced powertrain business. The company comes with a highly experienced team of automotive engineers and is backed by a number of prominent investors specialising in the energy and environmental sectors. Further information on CPT is available at [www.cpowert.com](http://www.cpowert.com).

The Advanced Lead-Acid Battery Consortium (ALABC) is an international research consortium formed in 1992 to advance the capabilities of the valve-regulated lead-acid battery in order to

help electric and hybrid electric vehicles become a reality. The research resources of the world-wide membership of ALABC are pooled to carry out a large program of research and development that would otherwise not be possible. The ALABC is managed by the International Lead Zinc Research Organization (ILZRO) based in North Carolina. The International Lead Association (ILA), which is responsible for directing the lead-related activities of ILZRO, is headquartered in London. ALABC membership currently stands at over 70 organisations. Further information is available at [www.alabc.org](http://www.alabc.org).

## Ends

**ALABC/CPT media contact:** For a test drive of the 12V and 48V LC Super Hybrid technology demonstrators or to request a media interview with Allan Cooper or Nick Pascoe, please contact Rob Palmer on +44 7768 242761 or email: [rpalmer@palmerpr.com](mailto:rpalmer@palmerpr.com). High resolution images of the thumbnails below and previous announcements can be downloaded at [www.newspress.co.uk](http://www.newspress.co.uk).



**Pic 1 LC Super Hybrid technology demonstrator is based on a VW Passat 1.4-litre TSI model**



**Pic 2 LC Super Hybrid features an electric supercharger developed by CPT. This particular application of its 12-48V switched reluctance motor-generator technology has since been acquired by tier 1 manufacturer Valeo for high volume implementation of the technology**



**Pic 3 LC Super Hybrid features CPT SpeedStart advanced next generation stop-start technology (top right) and Mubea belt tensioner**



**Pic 4 LC Super Hybrid advanced new generation high power density lead-carbon battery installation and test equipment**