



## Press release

18th September 2015

### BATTERY THAT WILL OPERATE AT MINUS 80 DEGREES IN THE OFFING:

Hyperdrive Innovation Ltd and OXIS Energy Ltd are amalgamating their expertise to work on an Ultra-Low Temperature Battery (ULTB) project. This project will explore the feasibility of a high energy density battery chemistry with innovative packaging and control electronics that will be capable of operating in one of the harshest environments in the world. Such a battery would allow British Antarctic Survey (BAS) to significantly increase autonomous scientific measurements made in the Antarctic without increasing transport costs or emissions. OXIS Energy will develop a low temperature electrolyte for Lithium Sulfur (Li-S) rechargeable battery chemistry and Hyperdrive Innovation Ltd will gestate a chemistry-agnostic battery management system and packaging that will withstand and outperform the current lead-acid battery solutions. This project will be led by Hyperdrive Innovation with an advisory input from BAS as they will be the first customer for the project output. The resulting technology will lead to a follow-on mid-stage programme to develop a high energy density rechargeable battery that will operate at -80 °C. OXIS and Hyperdrive will then look to expand the use of this technology to adjacent markets.

Hyperdrive's Managing Director Stephen Irish says "The superior energy density offered by lithium sulfur makes it well suited for portability, especially in vast, remote locations like the Antarctic where flight is the only method of transport and operations are restricted by resources and weather windows. We're particularly excited to have the opportunity to prove our Battery Management System (BMS) technology for use with this emerging cell chemistry working with BAS to tackle the challenges of designing an energy system capable of withstanding extremely cold temperatures."

The use of Lithium Sulfur chemistry is innovative because it is a next generation battery technology that has a theoretical energy density far higher than any Li-ion solution. OXIS has been developing Li-S cells for over ten years, and has already managed to build pouch cells that are 300Wh/kg, which is more than any Li-ion chemistry can practically achieve. Li-ion as a technology is already on the market as a range of chemistries, each with their own strengths and weaknesses, while Li-S is only just beginning to enter the market now.

According to Huw Hampson-Jones, CEO OXIS Energy, "It is very difficult to secure the effective utilisation of battery systems in extreme temperatures, whether hot or cold. OXIS Li-S cell technology can operate at up to 80c, but to do so at the other extreme of -80c is very challenging. The programme will have an important impact on vehicles operating in cold climates such as North America and Northern European countries."

The successful completion of this project which is supported by Innovate UK's energy catalyst will put the UK at the forefront of battery technology with the potential for a unique range of high energy density batteries for cold climate operations.

### **About OXIS Energy Ltd**

Since it was founded in 2005, OXIS Energy Ltd has been at the forefront of developing Lithium Sulfur battery technology. During the first phase the company invested heavily in design and development and is now ready to move into the production of Lithium Sulfur cells for a series of applications. With 23 families of patents, OXIS has been granted 65 patents with another 60 pending.

One of the most important breakthroughs achieved by OXIS relates to safety. One of the problems with Lithium ion is its volatility but OXIS now has demonstrable empirical data to demonstrate the safety of its battery technology.

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### **About Hyperdrive Innovation Ltd**

Set up in 2012, Hyperdrive Innovation is a forward thinking technology business specialising in lithium ion energy storage systems and associated electronics for low carbon automotive, industrial, offshore and subsea applications.

Hyperdrive opened a new lithium ion battery production facility in 2015 to complement prototyping and vehicle development capabilities on the same site at the Future Technology Centre in Washington, Tyne and Wear. The flexible factory can accommodate modular and custom designed packs for electric and hybrid vehicles, portable power and off-grid energy storage.

Hyperdrive's batteries include its in-house developed Battery Management System (BMS) technology to provide automated cell balancing, pack health monitoring and protection. The BMS controls charging and will automatically switch off the charger for safe operation whilst an inbuilt Battery Fuel Gauge provides continuous state of charge and state of health data.

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