

Tadiran is the choice in the harshest of environments – application example “Cryoegg”



Scientists studying the glaciers are using new technology to investigate the hidden environment underneath the ice, and Tadiran batteries will provide the power behind the science. Understanding the water channels beneath glaciers will help scientists understand how glaciers will respond to climate change and help forecast future changes in sea level. This environment – buried beneath kilometres of ice in Greenland and Antarctica – is very difficult to access, but new technology is opening it up to scientific study.

Cryoegg measures temperature, pressure, and electrical conductivity, returning the data in real time. In the latest version, the power will be supplied by an internal Tadiran Pulses Plus battery with sufficient capacity for two measurements per day for up to two years, although higher reporting rates are available at the expense of battery life.

Cryoegg is deployed by drilling a hole into a glacier (which can be up to 2.5 km deep in Greenland) and lowering it to the bottom. Once there, its spherical shape allows it to travel in the water channels, pushed by the force of the water, and report data on what it finds.

The project has been developed by Dr Liz Bagshaw and Dr Mike Prior-Jones at Cardiff University’s School of Earth and Environmental Sciences. Dr Mike Prior-Jones joined the project in 2019 and did a complete re-design of the electronics, incorporating new radio technology from the utility metering sector (169 MHz Wireless M-Bus) and using a lithium polymer battery. Field trials in Greenland and Switzerland during 2019 showed that the lithium polymer battery would not hold sufficient energy for long-term measurements. To solve this problem, the Cardiff team turned to Tadiran. The particular challenge was to find a battery with high energy density, good low-temperature performance, and the ability to provide short pulses of high current for the radio transmitter. The battery system used is our 3.9 V technology combined with the very latest design of hybrid layer capacitor (HLC-1020P6) offering high power, low self-discharge, and the ability to operate in this extreme climate.

The compact design of the Tadiran Pulses Plus battery means that the planned operational life has now doubled to more than 2 years even at -30C. It is because of the wealth of experience in the market sector and proven technology that Tadiran was selected for the next generation of battery power.



Cryoegg is an innovative new instrument developed by Cardiff University, used to study water channels underneath glaciers. It returns its data wirelessly, using radio transmission through the ice. Most existing studies of this environment have used cabled sensors, but the cable is easily damaged by the moving glacier and sometimes only lasts a few weeks before it breaks. Eliminating the cable is key to getting more data, but also means the instruments need an internal battery capable of surviving in this harsh environment for several years, providing a reliable source of power for the sensors and radio transmitter.



 **TADIRAN BATTERIES**
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