REINDEER HERDERS CONNECTED BY PROTEUS

By Eurotech

The EU funded N4C (Networking for Communications-Challenged Communities) Project is bringing Internet and email access to remote wilderness regions. As part of this ambitious undertaking, Eurotech's PROTEUS embedded single board computer is successfully helping to connect the nomadic Sámi herders of Northern Sweden with friends, family and the outside world.

Eurotech single board computers (SBCs) are exceptionally reliable for rugged applications and the PROTEUS fanless embedded board continually demonstrates exceptional performance across a wide range of sectors from defence to transport. Based on the Intel® Atom™ Processor, the PROTEUS combines flexibility and high performance with exceptionally low power consumption, characteristics that are proving invaluable for an exciting communications project taking place in a wild and challenging region of Swedish Laponia; the Padjelanta National Park.

The N4C Project (http://www.n4c.eu/) is part of the EU's Future Internet Research and Experimentation activity, extending Internet access to people and businesses in the remote corners of Europe. With this aim, N4C involves a series of field trials of architecture, design, infrastructure and applications of networks being operated in these areas. The tests, which began in 2008, are now in their second year, having logged up a series of encouraging results. The project is due to run until May 2011, building the technology to extend the reach of the Internet to new frontiers.

A key aspect of the communication model for this project is Delay-Tolerant Networking (DTN) Technology which Intel and Trinity College Dublin (TCD) have brought from the lab to the field in the N4C project.

HERDERS AND HELICOPTERS

Sámi reindeer herders traditionally lead a largely nomadic life and are one of the most ancient and resilient cultures in Europe. They are also however innovative users of technology and the helicopter has become an essential support, not only for delivering supplies and transporting local produce such as fish for sale in the towns, but also for locating and herding the reindeer that are their main source of livelihood.

The work involved is similar to ranching over wide distances and includes penning herds, marking calves and taking care of the animals that will be used for meat, skin and a range of traditional products. No part of this vital resource is wasted.

With the N4C project, the helicopter is now taking on a new role in communications. DTN has been used to take advantage of existing helicopter routes to carry email and web traffic to and from four Sámi village locations between 20 and 50km distant from any power or networking infrastructure. Without affordable satellite or any cellular connectivity, these villages have become centres for tests that involved setting up a solar powered Wi-Fi hotspot at the edge of each community.

Known as village routers and built by TCD and the Intel open innovation lab, each of these devices incorporates a PROTEUS SBC and serves traffic to browsers and email clients using the DTN bundle protocol. Bundles containing transactions are stored at each router for transfer to a helicopter on a regular flight ferrying people and supplies, which will then re-transfer the bundles to Internet gateways at one of two local helicopter bases with wireless connections.

"This process is similar to how DTN is planned to be used in space when rovers on Mars will send information back to Earth via orbiting spacecraft," explained Kerry Hartnett.

PROTEUS RUNS THE ROUTERS

Tests have been taking place each summer and this year has seen the longest set of trials yet. Laponia has nearly 24-hour daylight during the summer months but not necessarily sunshine. A week of solid rain during this period is not uncommon and temperatures can fall significantly during the night.

The village routers and all their component parts needed to be very robust to cope with these weather conditions. This included compliance with the IP66 waterproofing standard. Each is powered by 60W solar panels and 12V batteries, while the PROTEUS board runs all the communications functions, including wireless, email, web and the DTN protocol.

Kerry Hartnett explained that PROTEUS has provided the project with many significant benefits. *"We selected the Eurotech PROTEUS board for its low power Intel Atom processor and its large array of peripheral connections. The Eurotech team has also provided us with invaluable technical support, including taking on board our requirements for utilising the PROTEUS Real Time Clock (RTC) in a BIOS release to enable us to run advanced power management scripts, to better take advantage of power from the solar panels."*

The N4C project at Padjelanta is a fine example of innovative sustainable technology that is enhancing a traditional lifestyle, helping the reindeer herders with both personal and business contacts, such as (in future) transactions with their banks. The Internet and email facilities are also valued by tourists and hikers in the region, who can now enjoy peace, solitude and a magnificent Arctic landscape without entirely losing the benefits of 21st century communications.

A Dublin based company, Tolerant Networks Ltd. (http://tolerantnetworks.com/), has been set up to commercialise the village router hardware, software and DTN combination. Founded by Dr Stephen Farrell and Kerry Hartnett in April 2010, Tolerant Networks Ltd. saw the potential of the PROTEUS as the key communications component for their solar powered system of village based routers for extreme locations like the Padjelanta National park.

For more information please visit our website www.eurotech.com or contact our sales team on +44 (0)1223 411200 or email sales@eurotech.com