

Report to Partnership Meeting 8th April 2011

STRATEGY DEVELOPMENT

CHRONOS Low Cost CIS

Background

The **Technology Strategy Board (TSB)** stimulates technology enabled innovation in the areas which offer the greatest scope for boosting UK growth and productivity.

The Technology Strategy Board promotes innovation through investing in programmes and projects, spreading knowledge, understanding policy, spotting opportunities and bringing people together to solve problems or make new advances. The Technology Strategy Board is an executive non-departmental public body (NDPB), which is sponsored by the Department for Business Innovation and Skills.

The Project

The opportunity offered by the TSB was identified by Nexus Alpha and JMW as a means to bring both companies' concepts for solar and wind powered customer information systems that could be rolled out at public transport interchanges from the drawing board to reality. Having conceived of the idea of a collaborative project the next issue was to identify a public sector partner interested in having the technology tested in their area and prepared to invest in the project. HITRANS were approached and readily agreed to be involved in the project securing the opportunity to have groundbreaking CIS technology introduced at public transport nodes in the Highlands and Islands. This also meant that the technology would be delivered in the toughest of proving grounds with daylight hours in the winter being a particular challenge for the development of solar power CIS solutions.

The project partnership was extended to include Moray Council in phase 1 as the initial CHRONOS bus system locations were in Moray and Phase 2 saw ScotRail join the partnership.

Project Objectives

The main social objective of the project has been to build a cost-effective maximum capability display solution which gives those in rural & low foot-fall areas confidence in public transport (through the provision of service availability information). The aim of this is ultimately to increase passenger confidence to deliver modal shift.

The main commercial objective of the project is to create a customer information system that offers a significant whole life cost saving when compared with the alternative traditional power supply systems.

The environmental objective of the project is to offer a product that will help contribute to public sector climate change objectives/targets. The product has been born from the commitment of the partners towards carbon efficiency.

Phase 1 – Testing Solar and Wind Power for Bus Stop CHRONOS

The first phase of the project saw the introduction of CHRONOS displays at two bus stops in Moray. The locations were:

- Dufftown, at Glenfiddich Distillery
- Findhorn Foundation

The first generation CHRONOS units used a combination of cholesteric LCD and LED display technologies coupled with the Nexus Alpha Hermes Lite low power computer (a sophisticated device that runs on a meagre half a Watt of power – around a twentieth of the power demand of even a small Netbook computer!) powered by a solar panel with wind turbine backup. Battery packs were designed to provide back up capacity for a 2 week period.

The units were installed in December 2009. This meant that they were severely tested by the worst winter in a century. This really proved the value of the TSB as an approach to supporting businesses in the early stage of bringing products to market and required Nexus Alpha to redesign parts of the

unit to account for temperatures dropping well below minus 20 degrees Celsius. The thermal stress between the LCDs and the cast epoxy front lighting module caused damage and these have since been re-designed to remove the problem. Data gathering in the first winter also proved that the solar panels alone were sufficient to generate enough energy to power the displays even at these northerly locations although for critical systems a longer battery backup period would be required.

Introducing New Partners and Technology

The first phase of the project built on the bus shelter displays that Nexus Alpha had already developed to a large extent. In developing the next phase of the project HITRANS brought ScotRail into the project as a partner. This allowed the product to develop from its now tested bus platform to deliver a solution to the rail sector and open this large market up for future sales.



Above – CHRONOS at Glenfiddich Distillery

Phase 2 – The Rail Solution

With lessons learned from Phase 1 and a new set of system requirements to meet the needs of a rail environment the displays for ScotRail introduce some novel innovations: the introduction of 'flip-dot' technology using solar power and the first application of a novel power unit optimised for solar powered systems which is designed to ensure maximum benefit from the solar array and the least energy waste. The power supply features a unique charge buffer technology that ensures the batteries are properly managed without sacrificing charging efficiency, a problem that is of particular concern where modest panels must be partnered with large battery capacity. The systems are again based around the HERMES Lite computer which also drives an audio output which is triggered by button and/or the RNIB's React radio triggers. The integrated support for DDA compliance is acknowledged by First ScotRail as a significant benefit of these systems.



Above – Phase 2 CHRONOS

The battery storage capacity has been set to ensure that the sign will continue to display information for a 6 week period even if no top-up charge is received from the solar panels. This means that if the solar panel is covered in a thick layer of snow the displays will still provide information until the ScotRail maintenance crew return on their routine 4 week visit to each site and the solar panel can be cleared of snow!

The signs obtain their train information from ScotRail's Station Customer Information System which is provided by ATOS Origin Ltd. The data is fed to the signs over GPRS – the data handling protocol within mobile phones. The signs format this data both for display and for audio output – the latter using reconstructed natural speech. In addition messages can be sent from ScotRail's Customer Service Centre to advise customers of route disruption or other information. These messages can also be voiced.

The Phase 2 CHRONOS sign installation is scheduled to commence in late March with displays to be installed at the following locations:

- Aviemore Station Bus Stance
- Forres Station Bus Stance
- Thurso Station Bus Stance
- Golspie Station
- Lairg Station
- Tain Station
- Invergordon Station
- Alness Station
- Muir of Ord Station
- Beaully Station

Evaluation

Researchers from Robert Gordon University were contracted to undertake a pre and post installation survey of the CHRONOS sites. The pre installation surveys showed real demand from passengers for better information in real time to be available for passengers travelling from each of the stations surveyed.

The post installation surveys are scheduled to take place in April and will be available for the judging panel should this supplementary source of information be of interest.

Partnership Success

The CHRONOS project has been a real success for each of the project partners.

TSB has provided funding to support the development of a truly innovative product that will provide a new and different solution in the ITS field. The unique nature of the product means that the **TSB** can have real confidence that this product will sell well and return their investment many times over from tax revenues related to these sales.

Nexus Alpha, with the support of JMW, has brought a product to market that they are confident will sell strongly and **Nexus Alpha Low Power Systems** can lead the way in the growing market for renewable energy transport products that are easy to install to tight programmes that deliver a substantial whole life cost saving for the purchaser as well as carbon saving.

HITRANS, Moray Council and ScotRail have been given the opportunity to influence the design and development of this innovative product and as a result the product has been tailored to their specifications. Moreover the level of funding these partners have provided to the project have been very low when compared to the return on their investment being the introduction of a total of 12 CHRONOS units.

Transport Awards

The project partners have submitted two entries to the 2011 Scottish Transport Awards in the following categories and await the outcome of shortlisting:

- Transport Partnership of the Year
- Contribution to Sustainable Transport

Funding

The core elements of the project were funded from the Technology Strategy Board, Nexus Alpha, JMW Systems and HITRANS/ScotRail. The ScotRail finding met HITRANS commitments as a project partner in the original Technology Strategy Board application.

In addition to the core costs for the Technology Strategy Board project phase 2 covered the following additional cost items:

- Installation of Flip Dot Functionality - £11,250
- Installation of Tag Reader Technology - £14,175
- ATOS Configuration - £6,080
- IDP Design Costs - £1,300
- Evaluation - £5,760

HITRANS met the Evaluation cost of £5,760 from the 2010/11 Research and Development Budget.

HITRANS funded further phase 2 costs along with ScotRail with our share of £8,327 coming from the Digital Gateway project within the 2010/11 Research and Development programme.

Recommendation

1. Members are asked to approve the report.

Risk	impact	Comment
RTS delivery	√	The project supports delivery of the RTS strategic policy of developing a fit for purpose multi-modal transport system.
Policy	√	As above
Financial	-	The HITRANS contribution to the Project of £14,087 has been met from within the Research and Development Programme for 2010/11
Equality	-	

Report by: Ranald Robertson
Designation: Partnership Manager
Date: 24th March 2011