Inside track

Cargo Security International reviews the development phase of Isotrack, an EU-funded container tracking and monitoring system

The launch of a press release or a demonstration at a trade show is often the first time that the wider world is alerted to the development of new technology. However, as those engaged at the research and development (R&D) sharp end of a project's life cycle are only too well aware, the embryonic stage of any technological development is one of immense challenges, uncertainties, but above all, possibilities.

A review of the *Isotrack* project, a European Union (EU)-funded programme to develop a tamper-proof container tracking and monitoring system, provides a very useful insight into the nuts and bolts process of early system development. While the device is still some way away from coming to market, the project focus is very much on solving the all too present problem of both tracking a container and ensuring its security.

Simple need

As Dougie Bryce, director of timber shipping company **TTS** and also exploitation manager for the Isotrack consortium explains, the germ of the idea for the device came from a simple need to be able to track containers (although the scope of the project has already evolved into wider areas of application).

'TTS is based in Melton Mowbray in the UK,' says Bryce, 'and by coincidence the town is also home to **PERA**, one of Europe's leading innovation and technology R&D companies.

'We approached PERA with a view to developing our concept. To cut a long story short, with PERA's help we ended up putting a consortium together which applied for a **European Commission** (**EC**) grant under the *Seventh Framework Programme* (*FP7*) to develop Isotrack.'

The Isotrack consortium is chaired by **ADS**, the trade organisation which represents UK aerospace, defence and security industries. Consortium founder member TTS is responsible for dissemination and exploitation and also provides shipping expertise. PERA/ISRI is heading up the development of the technology in association with Norway's **Teknologisk Institutt**, and the **Astrata**

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Group is supplying the tracking and mapping solutions. **Lloyd's Register** is providing its global shipping expertise, while **Containerships** of Finland will draw on its knowledge of container trades, and **EMA**, through its Bluetraker system, will provide a ship-to-shore solution to ensure that the containers are 'visible' at all times, even when passing through extreme latitudes.

Secured funding

With secured EU funding of €2 million ($2.75 million), the project went live in November 2008 and prototype development was, at the time of writing, on target for a November completion date, when a report on project progress will also be submitted to the EC.

The fundamental aim of the project is to develop a tracking and monitoring system that incorporates volatile organic compound (VOC), carbon dioxide (CO_2) and low level radiation sensors, as well as the detection of door intrusion. One might suggest that a number of systems with these capabilities are already commercially available, but the Isotrack consortium claims that the unique selling point of its device is that it will be fitted *inside* the container. Precisely how this will be achieved is being kept under wraps at the moment but it is understood that the system will be housed in a radome which will be encapsulated within the container. The final touches are also currently being made on patent application submissions relating to the incorporation of the sensor technology within the container space.

The system is designed to be modular so that a number of sensor types could be interfaced with the system depending on

Contact:
Dougie Bryce
Exploitation Manager
Isotrack
Tel : +44 1664 412607
Email : stellarview@mac.com

the end user application. A CO_2 sensor, for example, would detect the presence of human cargo while a vibration sensor could detect the movement of the whole container. With the current prototype specification, a passive infra red (PIR) sensor has not been included as this would have to be mounted outside the radome within the container. Yet again, at present, intrusion can only be detected via the door of the container, but future applications could potentially incorporate air pressure sensors that could detect a breach in the fabric of the container.

The sensitivity of the system is such that the loading of cargo is detected immediately, as well as its removal or reorganisation within the container. An intrusion or sensor alert will be sent in real time using global positioning system (GPS), global system for mobile communications (GSM) messaging or Iridium satellite.

There are, of course, instances of cold spots in GPS and GSM coverage, but the system is designed to resend alert messages. Whilst at sea, communication will be via satellite and in future system variants the consortium intends to include satellite transmission as a back-up to GPS/general packet radio service (GPRS).

The Isotrack box has been designed to permit user interrogation, and there will be an alarm database where all recorded incidents are stored with the details of container location.

The issue of a short battery life is often a limiting factor in the successful use of a tracking device: supply chains are often made up of a number of intermodal transits, each element of which can fall prey to delay or diversion. Furthermore, all the sophisticated sensor gadgetry in the world counts for nothing without a failsafe power source.

Dougie Bryce of TTS stresses the longevity of the Isotrack system's battery lifespan: 'It will have a dramatically extended battery life compared to other systems; we believe we can safely talk in terms of years rather than a month as is the present limit for some systems.'

Battery life is significantly extended because the system's electronics switches to sleep mode, and is only activated when an incident occurs.

The development phase of the project must be concluded by November 2011, and over the next year the consortium plans to test the system onboard a container vessel. What happens to the Isotrack project post-November 2011 can't be predicted at this stage in the development cycle although Bryce points out that there is an EC mechanism for further funding after the end of this phase of the project.

Broad potential customer base

Clearly a broad potential customer base and the potential for volume production would be the ideal future scenario for the Isotrack team, but the reality is that bringing technology to market can be a time-consuming and difficult process.

Bryce is confident that the base cost of the system can be economical, and the retrofit market also offers major supply opportunities. He acknowledges, however, that until the necessary patents are in place and a demonstration model has been produced, discussions with potential manufacturers can only be couched in general terms.

Initial approaches to possible end users have to date been directed towards US homeland security agencies and related departments and organisations. Beyond this target sector, however, Bryce sees that 'the commercial potential for this system is enormous'.

Although beyond the current scope of the project, Bryce points to the potential for 'instant manifesting', whereby radio frequency identification (RFID)-tagged goods could be identified by an integrated RFID reader at the point of stuffing or removal.

'Any pilferage would be reported as it happened, so we will be stepping up our approach on commercial applications from here on,' says Bryce.

The year ahead is set to be an interesting one for the Isotrack developers, so for those interested in the issue of container security, the message (both literally and figuratively) must be 'watch this space'!

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Isotrack consortium

ADS : www.adsgroup.org.uk
Astrata Group: www.astratagroup.com
Containerships: www.containerships.fi
EMA: www.bluetraker.com
Lloyd's Register: www.lloydsregister.co.uk
PERA: www.pera.com
TTS: www.tts.co.uk
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