ISO Shipping Container Tracking and Monitoring System

Funding: European (7th RTD Framework Programme)

Duration: Nov 2008 - Oct 2011

Status: Complete with results

Background & policy context:

90% of all cargo moves in containers and approximately 250 million are shipped annually. There were 1138035 SMEs in EU 25 as of 2003 in the transport and communications industry. The SME segment of the road transport industry in EU 25 employs 3.2 Million people, whilst 107200 personnel are employed in the SME maritime transport industry. Our member transport operators face theft of goods, illegal immigration, transport of dangerous goods and drug and contraband smuggling. In addition to these crimes, authorities must be vigilant to possible terrorist use or targeting of transport vehicles and infrastructure. Among these multiple threats, the misuse of the ISO maritime shipping container transport system is the most important one requiring a co-ordinated pan European response. The ubiquity of containers is the system’s principal strength; however, there is little or no control over possible misuse of the system by terrorists because less than 2% of containers are X-rayed or checked at ports. Current tracking devices require external antennas and are prone to damage or vandalism.

Objectives:

Our concept is to replace the container door with a composite one which is transparent to RF. Tracking and sensing electronics to detect door opening, chemical explosives, radioactive devices and stowaways would be encapsulated in the door, thus greatly improving security and reducing losses. Target price of the system is € 740. We have estimated that over a ten-year period insurance savings alone would amount to approximately € 38 billion across Europe.

Parent Programmes:

FP7-SME - FP7-SME - Specific Programme "Capacities": Research for the benefit of SMEs

Institute type: Public institution

Institute name: European Commission

Funding type: Public (EU)

Partners:

- Clecat - European Association for Forwarding, Transport, Logistics and Customs Service, Belgium
- Sairro Composites S.A., France
- zoCA CONTAINER SECURITY BV, Netherlands
- TTS- (Shipping) Limited, United Kingdom
- Flextrack APS, Denmark
- Containerships Ltd Oy, Finland
- Lloyd’s Register EMEA IPS, United Kingdom
- the UK Intelligent Systems Research Institute Limited, United Kingdom
- Teknologisk Institut AS, Norway
- Bulgarian National Forwarders Association, Bulgaria
- Astrata Europe Limited, United Kingdom
- EMA DOO - Oznacevanje in Sledljivost v Industriji in Logistik, Slovenia
- the Defence Manufacturers Association Limited, United Kingdom

Organisation: ADS Group Ltd

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Technologies:

Infrastructure management
Multimodal border management technologies

Development phase: Research/Invention

Key Results:

New technologies to expose suspicious cargo

EU-funded scientists are delivering cutting-edge tracking technology to detect dangerous material or stowaways in shipping containers.

Freight and haulage operators face a wide spectrum of security risks regarding the transport of shipping containers.

This may include transport of dangerous goods, theft, drug and contraband smuggling, or even illegal immigration.

With fewer than 2% of containers X-rayed or physically checked at customs, the maritime International Organization for Standardization (ISO) shipping container transport system presents the most important security risk. Against this backdrop, the 'ISO shipping container tracking and monitoring system' (ISOTRACK) project focused on designing a new and improved system.

While current tracking systems require external antennas and are likely to suffer from damage or vandalism, ISOTRACK designed a technology so innovative it is capable of picking up on a radio frequency (RF) signal in a steel container. The project worked on developing a robust composite container door that withstands typical operational loads and stresses.

It will be transparent to RF radiation, and incorporate electronic sensors to detect chemical explosives, radioactive substances or stowaways.

To locate the container, a tracking and telemetry system was used.

This was based on the Global Positioning System (GPS), Global System for Mobile Communications (GSM) and Zigbee wireless mesh network technologies. Researchers tried to gain further insight into the operation of metal oxide thin-film and semiconductor sensors to avoid false alarms for events caused by background radiation.

Detection accuracy and confidence level of any alarm event should exceed 98%. This composite door and modular elements will fit to existing and new shipping containers, making cargo shipping significantly safer and more efficient.

STRIA Roadmaps: Vehicle design and manufacturing, Other
specified
Water transport (sea & inland)

Transport mode: Freight transport

Transport policies: Safety/Security

Geo-spatial type: Infrastructure Node