



DG-TRACK

Dangerous Goods Transport Tracking and Tracing
in the Medical Sector

Project background & motivation

Transport of goods is an important economic factor in Europe and is continuously growing in terms of tonne-kilometres. About 8% of all freight transports are dangerous goods, corresponding to more than 7 billion tonne-kilometres in 2007. Future outlooks indicate a considerable increase in the transported volume of dangerous goods in Europe. It is estimated that around 600.000 dangerous goods vehicles are operating today in Europe, rising up to 780.000 in 2020.

The transport of dangerous goods always carries a considerable risk for the driver, road users, as well as the environment. This is illustrated by a number of tragic catastrophes in recent years, involving dangerous goods. These incidents have given cause for intensive discussions on possible integral safety concepts to track & trace the transport of hazardous goods.

An important milestone in improving safety and security of dangerous goods transport is the introduction of the ADR1, an international regulation that lays down the definition of dangerous goods, their packing and labelling as well as the construction, equipment and operation of the vehicles carrying the goods in question. ADR entered into force in 1968 and has been continually amended up to the present day.

However, a key problem today is that in nominal situations, neither the local, national nor European civil authorities have an overview or situational awareness of dangerous goods transport. A consequence of this lack of information is that in case of an alert and/or emergency, civil security authorities have no knowledge of the nature and characteristics of the goods transported and are therefore unable to take risk-reducing preventive measures. This results in potentially dangerous situations, or causes delays and/or inappropriate reactions to events, with human, economic and environmental consequences.

Within the domain of transport of dangerous good, the transport of medical goods represents an area with particular features: some medical goods are already dangerous in the smallest quantities, e.g. with infectious substances like Ebola virus, Hepatitis B virus or the HIV virus; transports may often not be marked as dangerous goods, but can still cover a high risk for first responders or the environment; medical dangerous good transports are characterised by the fact that they are often sent in small quantities and are consigned together with other goods that are not dangerous; and there are strong requirements concerning the information security and privacy as medical transport also includes e.g. blood and organs, related to individual citizens.

The feasibility study will address the feasibility of an integrated solution and associated services supporting the transport logistics for medical appliances, samples and waste (i.e. blood, surgical instruments, organs, etc). Because of the potential for infection, this transport is classified as dangerous goods transportation.

User community & demand

The potential user and stakeholder community for an integrated solution supporting dangerous goods transports in the medical sector is diverse, and includes government, regulatory bodies, medical institutions and organisations (senders and receivers), logistics companies, motorway operators, insurances, and emergency services.

The proposed activity will address in the first instance the stakeholders and users involved in the transport of dangerous medical goods in Luxembourg. The following organisations have expressed their interest in the proposed feasibility activity:

Administration des Services de Secours (ASS) Luxembourg

The Administration des Services de Secours (ASS) Luxembourg (LUX) operates the national Emergency Rescue Center and is responsible for implementing measures to protect and rescue people in danger and to protect property in case of disastrous events, catastrophes, accidents, fires and floods.

Their user needs include:

- Timely information on the dangerous goods to the emergency services in case of an incident, in order to reduce the risks to first responders,
- Fast and easy access to the information and availability to both the central headquarters as well as mobile command centers.

ZITHA Klinik (LUX) & Krankenhaus der barmherzigen Brüder Trier (D)

The hospitals ZITHA Klinik (LUX) and Krankenhaus der barmherzigen Brüder Trier (D), representing the senders and receivers of medical goods. Their user needs include:

- Understanding the position and condition of the dangerous goods, and associated information, during the transport,
- A single point of access for information on the content of the medical goods transported
- Support for the logistics and transportation form handling

T&E Gefahrgutlogistik (LUX)

T&E Gefahrgutlogistik (LUX) is a global logistics service provider representing the transporter. Its user needs include:

- An independent entity that ensures a high quality and correctness of the transport,
- A solution to understand which transporter contains which dangerous medical goods,
- Driver support about e.g. safe routes, traffic jams, and allowed parking places.
- Expert-Training of people involved with the transport of dangerous medical goods (sender, driver, receiver,...)

Foyer (LUX)

The insurance company Foyer (LUX) is interested in the impact the information and tracking and tracing services may have on the insurance premiums.

The study will further investigate those users and stakeholders relevant to deploy the solution on a pan-European basis. The consortium will also assess the added value of the solution in the wider domain of dangerous goods transport, opening additional market and service provision opportunities.

Technical status and added value of space

Nowadays, many logistic companies use fleet management solutions that allow them to track their transporters. The transporter typically has an on-board unit that sends the GPS location via terrestrial or space based communication networks to the fleet management system. Such solutions can also enable the tracking of dangerous goods but there are several inherent challenges:

1. There is no possibility for public safety providers to access such information directly. Therefore the only chance to get information is to call the logistic service provider (if it is known to whom the transporter belongs) and to ask about the cargo.
2. The logistics companies themselves do not always know whether the concerned transport contains dangerous goods, as they have no trace on any single item within the transported lot (i.e. when a complete container is transported). This requires that also the single dangerous medical goods are tagged and that their information is linked to the transporter.

Most of the technologies and components for an integrated service to overcome these shortcomings are presently available. To provide all users with the necessary services and information space assets are considered an essential element, both in terms of the functionality they offer, as well as supporting continuity and availability of the necessary information, especially in critical emergency situations;

1. Satellite Navigation is required to understand the position (tracking and tracing) of the vehicles transporting the dangerous goods and the position of the emergency services to support first response activities,
2. Satellite Communications is required to provide reliability and continuity of communications from the central headquarters to the mobile command centres, in case of an accident, to ensure that the information related to the dangerous good is available to first response emergency services. ASS has already mobile command centres equipped with satellite telecommunication (based on Astra2Connect) to ensure two-way broadband communication with their rescue teams in those parts of Luxembourg which are not covered by terrestrial solution.

The proposed activity will investigate the integration of space and terrestrial assets to provide information services and support to the actors involved in the transportation of dangerous medical goods. Based on a central secure database containing the information of the medical transport, and tracking and tracing thereof, the proposed integrated solution and associated services support the sender and receiver in preparation and maintenance of the documentation in one single (and therefore less sensitive to errors) point of access.

It shall provide the logistics companies with an understanding what is loaded in the transporter and what is its position. And in case of an incident, it shall provide the position data and the associated information of the dangerous medical goods to the emergency services.

Sustainability potential

It is clear that in case of an accident involving transport of dangerous goods, there is a strong need to better understand the dangerous goods and how to handle them, in order to reduce the consequential damage as much as possible. To achieve this, the first responders and emergency services need to know as soon as possible that dangerous goods are involved in an accident, and which these goods are and how to handle them.

As most existing solutions relevant for this activity are single user based, there is a need for an integrated solution involving all players involved in such dangerous goods transports and associated incident management. For the proposed study, representative stakeholders and users from the related communities have expressed their interest to contribute. They have expressed their appreciation for the potential of such services to improve the efficiency of their operations in terms of faster and better information, cost savings, and in the case of ASS the potential for reducing the consequential damage and associated costs in case of an accident for the emergency services, the general public and the environment.

Important for the implementation of a sustainable information and management service will be the eventual selection of a trustworthy service provider accepted by all stakeholders. The consortium partner Entreprise des Postes et Télécommunications (EPT) (LUX) provides already similar services in Luxembourg and is recognised as trustworthy organisation. They have confirmed their interest to become the operational service provider of the DG-TRAC services.

The logistics company T&E (LUX) has already indicated that they are willing to continue with and contribute to a potential demonstration project in case of promising study results.

The consortium has identified security and privacy as well as clearance of information as elements critical for the success of the integrated services. Therefore, special attention will be paid to these aspects during the study.

By addressing a sustainable solution in the transport of medical dangerous goods in Luxembourg, the consortium provides for a reference case to open the way forward for a pan-European implementation with growth potential into the common transport of dangerous goods other than medical.

Feasibility Study

The objective of the study is to assess the technical feasibility and commercial viability of an integrated solution and its associated services, supporting stakeholders and users in the value chain of transport of medical dangerous goods.

The feasibility study will follow the logic as outlined in the IAP AO 6124 (Open Call for Proposals for Feasibility Studies) and will include the following elements;

- 1. User and Stakeholders Requirements Definition:** analysing the needs and requirements of the stakeholders and users via user workshops and interviews. T&E will use its customer base and contacts with Luxembourg and international transport companies to create a broad input base.
- 2. State of the Art Technology Identification:** performing a state of the art analysis identifying the necessary technologies. It includes a review of existing communication solutions, fleet management and tracking solutions, and information management solutions.
- 3. System and service definition:** defining the system and service design of the DG-TRAC service including the system design, communication architecture and interfaces, services and devices for logistics companies, public safety services, hosting and clearance services and aspects for security, privacy and confidentiality.
- 4. Proof of Concept:** proofing the principles of the planned services.
- 5. Viability Analysis:** addressing the economic and non-economic viability of the DG-TRAC service including the potential business models for senders / receivers, logistics companies and authorities. The non-economic viability analysis will address especially legal aspects, as well as security and privacy issues.
- 6. Roadmap and preparation of a demo project:** defining the roadmap towards a sustainable service and the steps necessary to make the service sustainable. It will include the definition and planning of a potential demonstration project.

The planned duration of the feasibility study is 9 months. Pending positive results of the activity, the continuation with a demonstration project is foreseen.

Consortium

The consortium consists of;

1. HITEC Luxembourg (LUX, prime) will be responsible for study management, system and service design, integration of the solutions into a complete DG-TRAC service.
2. Entreprise des Postes et Télécommunications (EPT) (LUX) aims to become the operational service provider and will be in charge of the viability analysis, the Proof of Concept, the definition of the roadmap, and eventually the service implementation.
3. The Interdisciplinary Center for Security Reliability and Trust of the University of Luxembourg (SnT) (LUX) will be in charge of the security and trust aspects as well as contribute to the viability analysis.
4. Centre de Recherche Public Henri Tudor (LUX) will be in charge of the analysis of state-of-the-art technologies.
5. Centre des technologies de l'information de l'Etat State Information Technology Centre (CTIE) (LUX) will contribute to the aspects of service hosting and security facilities to ensure secure, confidential and reliable data transmission and storage.
6. T&E Gefahrgutlogistic (LUX) will provide access to selected clients in order to define valid scenarios and to assess the viability of the service approach.
7. The stakeholders and users involved are the Administration des Services and Secures (ASS) of Luxembourg, two hospitals from Luxembourg and Germany, T&E Gefahrgutlogistik, and the insurance company Foyer.

Contact

For further information, please contact the project coordinator:

Harold LINKE
HITEC Luxembourg S.A.
5, rue de l'Eglise
L-1458 Luxembourg
harold.linke@hitec.lu
www.hitec.lu