FraDi – Cargo theft

Freight theft causes considerable damage to the logistics industry. EU-wide, goods worth around 8 billion euros disappear every year. In the majority of cases, thefts occur at night in unguarded parking lots. The aim of the project is to provide comprehensive, effective and efficient technical security systems.

The transportation by road is an integral part of the supply of our society with goods and merchandise. The damage caused by cargo theft is considerable with approx. 1% of the turnover. The logistics industry consequently claims the right to safety for drivers, the prevention of theft and fraud and the integrity of the transportation systems.

At present, the security measures taken by the authorities, the police and also the technical support tools are inadequate and insufficiently effective, although awareness of the problem has existed for years. The logistics industry, its customers and insurers are suffering. Drivers are threatened or attacked. Opportunities to intervene and prevent crimes are limited today.

Tasks for technical support systems are manifold and cover the topics: Detection, alerting, countermeasures and, if necessary, the prosecution of perpetrators or stolen goods. The comprehensive recording of incidents and their statistical evaluation, also using methods of artificial intelligence (AI), may allow prevention through prediction models. The use of mobile telephones should make it possible not only to alert the freight forwarder and driver concerned, but also to mobilise the police and the community of solidarity of nearby driver colleagues, rest stops and security forces.

Relevant projects are also eligible for funding measures within the framework of safety-oriented programmes by the federal states, the federal government and the EU.

Promising technical solutions must be comprehensively conceived and designed. Only selective measures and individual technical solutions have already been proposed, some of them are in use - but they do not solve the problems. The aim is to define and develop a networked system of components that can be effective in the fight against cargo theft. The following topics must be considered, analysed and provided with solutions.

The **risk analysis** is the basis for all technical specifications and requirements. Close co-operation between users, drivers, insurance companies, authorities and those with experience in technology, operational use and management must be organised and designed.
Methods: interviews, interdisciplinary discussion, workshop, report.

Locally **networked sensors** provide signals that contribute to the generation of a current situation picture in real time. In general, the quality of the derived statements is improved with an increasing number of independent sensors combined with a fusion of the data. Costs, concealed use, costs and easy handling are important basic conditions.
Potential sensor types: Acoustics, radar, gas, vibration, room surveillance, prepared tarpaulins and locks, GPS trackers etc.

Signal processing, classification and **pattern recognition** are the technical disciplines required for the processing and aggregation of sensor signals towards reliable alarm generation. In addition to a high recognition rate, low false alarm rates are important optimization criteria.

The **alarm is triggered** when an anomaly is detected. Effective countermeasures are conceivable if the users and the organizations and persons responsible for safety are suitably connected.
Potential target groups: Drivers, freight forwarders, local community of solidarity, security forces, insurance companies, police and authorities.

The **evaluation** and clarification of information flow, alarms and events follows on the basis of recorded data. Here, too, the paradigm generally confirmed today in the context of AI and digitization applies that the quality of results is determined by the amount of data collected and evaluated. A central evaluation of competent analysts is required. New findings are fed back into the continuous improvement of sensor technology and the subsequent model-based evaluation chain.

Prevention, i.e. the avoidance and prevention of damage-relevant events is the ultimate goal for the function of the entire system consisting of networked components in electronics, hardware, information technology, mobile communications and software.

Technology	Sensors, electronics, radio communication, signal acquisition, pattern recognition, classification, information technology, anomaly detection, mobile communications, digitalization.
Market	Transport and logistics, freight forwarders, relevant associations, authorities, police, investigative organisations.