



1 *Intermodal shipment monitoring. Photo: Dirk Mahler*

TRANSPARENCY AND SECURITY IN LOGISTICS

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Growing market demand and increasingly complex supply chains are also confronting small and medium-sized freight forwarders and logistics providers with new challenges on a daily basis: Where is my shipment right now? What is the condition of my shipment and the means of transport? Are there bottlenecks and delays that require responses? Such information is indispensable for secure and on-schedule deliveries and, thus, customer satisfaction.

Enough standard solutions are now commercially available. Flexible and affordable custom solutions for medium-sized companies are a rarity, though. The Fraunhofer IFF has developed a system specifically for this clientele, which monitors logistical assets such as freight and means of transport. It is used to document and systematically control logistics operations. To do so, the current location and condition of shipped items are recorded and verified. This im-

proves the security of shipments considerably since damage or theft are detected early and stakeholders throughout the entire supply chain are enabled to respond with appropriate speed.

Shipment Monitoring

Tracking freight and its means of transport requires knowing its current location. The Fraunhofer IFF's tracking and tracing system employs state-of-the-art positioning and communications technologies combined in one modular system.

The autonomous, battery-powered positioning systems have GPS receivers that determine location and GSM communications modules that transmit data. This makes it possible to track logistical assets continuously while in transit. The positioning systems transmit current locations to a



central system in specifically configurable intervals or whenever unusual events occur. The central system processes and tabulates or maps the data. The system additionally features interfaces that transmit data to other logistics systems that document them or initiate other operations.

Condition Monitoring Sensors

Depending on the freight, special sensors can be used to scan condition: If freight is sensitive, shock sensors register excessive external impacts. The system notifies responsible individuals immediately and supplies the data for other analyses. Thus, temperature-controlled freight like food can also be monitored significantly more efficiently. Temperature sensors check, for instance, whether a cold chain has been maintained. If problems occur in transit, company headquarters is notified after a few seconds and can respond promptly.

The sensor data acquired are additionally linked with location data, thus making it

possible to identify the reason for a message as well as the time and location of damage.

Freight Identification

Tracking freight and its means of transport requires their unique identification throughout the process chain and the receipt of additional data relevant to operations to continue shipping. The Fraunhofer IFF therefore relies on identification technologies such as RFID or barcode. With optional memory, RFID tags additionally make it possible to store information relevant to operations, e.g. destination, directly on the monitored object.

Benefits at a Glance

Based on state-of-the-art sensor, positioning, identification and communications technologies, the Fraunhofer IFF develops and implements custom solutions for shipment tracking. They enable freight forwarders

and logistics providers to respond faster in their everyday business and to reduce or avert potential consequential damages or resulting costs.

System Features

- Unique identification of every single item or product lot, including the means of transport used, from small parcels to racks through containers
- Near real-time determination of current location with state-of-the-art positioning technologies
- Condition scanning and monitoring with special sensor technology
- Detection and documentation of damage and its cause
- Control center based on geographic data, which monitors and controls your logistics