Electronic Supply Chain Manifest (ESCM)

The Problem

Ground-air intermodalism has become one of the fastest growing sectors of the freight industry. A recent DRI-WEFA study estimates that air cargo’s growth will exceed 7% annually. While increasing cargo values and expedited delivery pressures have highlighted efficiency, the September 11 attacks have also brought security issues to the forefront. The Electronic Supply Chain Manifest (ESCM) sought to combine both security issues and efficiency opportunities together with public sector stakeholders to develop and operationally test an ESCM system.

How ESCM Worked

ESCM was a cooperative effort between ATRI; the Federal Aviation Administration; the U.S. DOT Office of Intermodalism; the Federal Highway Administration; the State of Illinois; the Chicago Department of Aviation; the New York-New Jersey Port Authority; and, select vendors of advanced security technology systems. The ESCM operational test designed, deployed and tested a unique suite of cutting edge technologies to enhance security and operational efficiencies throughout the air cargo supply chain.

The ESCM project developed and integrated a user friendly electronic manifest system with advanced security technologies—encrypted internet transactions, smart cards, and biometric fingerprint readers. The system was used to transmit shipment information, track cargo movements, and support the security of personnel access to cargo along a three-mode supply chain—shippers/receivers, trucking companies, and air cargo carriers.

Utilizing a variety of technologies to address an assortment of public- and private-sector interests and issues, the ESCM employed the following:

Security:
- Biometric fingerprint readers to restrict unauthorized system access and validate driver identification.
- Smart Cards that integrate data encryption and biometrics to enhance security of the ESCM system.
- Triple DES 192 bit encryption to protect data.
- System computers configured to prevent tampering of data once it has been entered into the computer.

Efficiency:
- Internet traffic routing to a central server for reliability and peak load handling capability.
- User familiarity with data fields.
- Ease of use.
- Data import/export capabilities.

ESCM Benefits

During operational testing, ESCM showed 56 to 100 percent reductions in time spent by participants on the processing of manifests and load transference from one mode to another. These reductions resulted from less time spent with paperwork, data entry, arranging and confirming trans-shipment, verifying the identities of drivers and tracking of cargo. These reductions can translate into real cost savings for companies. Conservative estimates of ESCM cost savings per shipment are:

- $1.52 for manufacturers
- $3.51 for trucking companies
- $2.72 for airlines

Significant security enhancements were also demonstrated through ESCM’s ensuring controlled access to cargo and cargo documentation via a biometrics and smart card access and secure transmittal of sensitive cargo information. Positive chain of custody tracking also provided increased cargo security.

The Future of ESCM

The operational success of the ESCM along with the strong private and public partnership building that resulted from the test, points the way towards future adaptations of the ESCM for broad use in B2B, B2G, and G2G data exchanges to improve security and efficiencies across the international supply chain.

Presently, the system is being incorporated into the National HazMat Security Operational Test and the FHWA International Supply Chain Standards initiative.
ATRI's primary mission is to conduct or support research in the transportation field, with an emphasis on the trucking industry's essential role in the U.S. and international marketplace.

This is one in a series of research summaries detailing work on ATRI's Research Agenda. It is designed to provide the trucking industry with practical information on the results of a specific research study.