

Air Cargo Electronic Supply Chain Manifest (ESCM)

Industry and government are concerned about the capacity of ports and terminals, and the highways, rail lines, and waterways that serve them, to handle steadily increasing volumes of intermodal traffic, especially containerized freight. The volume of intermodal containers moving through ports worldwide doubled over the past decade. Similarly, the volume of intermodal freight by air, rail, and truck grew just as dramatically. Over the next two decades, volumes are expected to nearly double again.

Today's intermodal freight system is not equipped to handle this growth. Ineffective links among modes are degrading the reliability and performance of carriers, shippers, and terminal operators. Moreover, the lack of effective information sharing among stakeholders creates bottlenecks and unnecessary delays in the efficient movement of freight. These deficiencies increase operating costs and congestion and decrease safety, economic competitiveness, and air quality.



Air cargo was the fastest growing segment of the freight industry in the 1990s.

Time pressures to deliver cargo more quickly than ever before have focused more attention on the ground-to-air intermodal link. Truck-to-air cargo movements grew rapidly in the 1990s and are expected to continue to increase in the future. Yet, the logistics links between these two modes are still largely maintained and regulated using paper- and telephone-based information exchanges. To respond to the needs of the marketplace and to ensure the security of air passengers and cargo shipments, the U.S. Department of Transportation is encouraging the development and use of new tools and processes.

ESCM Field Operational Test

Supported by the Office of the Secretary of Transportation, the Federal Aviation Administration (FAA), the Federal Highway Administration's Office of Freight Management and Operations, and the State of Illinois, the American Trucking Associations Foundation is leading an effort to develop and test the first operational electronic air cargo manifest and security system in the United States. The goal of this test is to demonstrate the efficiency and security of an Internet-based electronic manifest system compared with traditional processes and paper-based manifest systems. Manufacturing, trucking, and airline companies are participating in this operational test at the Chicago-O'Hare International Airport and New York City-JFK International Airport service areas.

This test builds on an earlier FAA test at Chicago's O'Hare Airport. That test used biometric "smart cards" to confirm the identity of the driver using a stored thumbprint and to provide information about the seal on the cargo the driver was transporting. The purpose was to improve security of freight movement into and out of the airport. Using the same security technologies, the ESCM project created a secure multimodal electronic cargo manifest and provided for automated data transfer across transportation modes and political jurisdictions.

The ESCM system is designed to allow only authorized users to enter and monitor cargo movement and access valuable shipment information through the use of a smart card at specific points in time and in the logistics process. However, this system also provides for substantially more freight management functions, all of which differ depending on whether the user is a manufacturer, a motor carrier, an air freight consolidator, or an airline. For example, the ESCM system could provide an airline with advance notice of incoming freight, thereby reducing the time needed in planning specific flight loads. In the unfortunate case of an air transport incident, the cataloging of electronic manifests can provide an immediate audit trail vis a vis access to cargo content records by public sector agencies to aid in incident reconstruction.

The goal of the project is to test the ESCM system with 20 complete distribution chains in the regions surrounding Chicago O'Hare Airport and New York JFK Airport. As of late 2001, there were 10 end-to-end supply chain systems participating at O'Hare Airport and nine at JFK Airport. An intensive recruitment campaign is underway to recruit more industry participants, and the federal government has recently approved expanding the test to two additional airports, possibly Los Angeles International



ESCM biometric smart card.

Airport and the Lester B. Pearson International Airport in Toronto.

Benefits of the ESCM System

The ESCM system provides a technological improvement over traditional paper-based manifest systems. By capitalizing on Internet technologies, it is possible to effectively link distribution chain members together to transfer confidential air cargo information and data in a secure, tamper-resistant environment. The previous related test of biometric smart cards at O'Hare Airport already provided some quantifiable

benefits for several ESCM technologies. From an efficiency standpoint, the system was two to four times faster than the existing manual system—dramatically reducing processing time by electronically storing a CDL and manifest information on an 8K smart card. From a security standpoint, fingerprints stored in the smart card proved to be a very reliable way to confirm driver identity.

The next phase of the project includes the development of a system to allow for automated cargo profiling for security purposes. The system will feature sophisticated scans of electronic cargo manifests and bills of lading in order to expedite the processing of known-shipper cargo. The automatic cargo profiling capability will allow for accurate identification of dangerous goods that require additional inspection and processing. It will also establish a series of procedures to be applied to the handling of cargo and relay information and instructions to cargo handlers specifying the actions that must be taken before a shipment is loaded.

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Expected Benefits of the ESCM System

Stakeholder	Expected Benefit
Manufacturers	Faster and more accurate manifest preparation and transmission to all users in a single secure transmission. Increased security of cargo information along the logistics train through biometrics. Reduction of delays due to manual procedural inefficiencies and processing errors.
Motor Carriers	Reduction in processing times during pickups and deliveries at manufacturers and air cargo facilities. Improve deployment of employees/vehicles with advance logistics knowledge. Confirmation of driver identities and accuracy of cargo information through biometrics.
Air Cargo Carriers	Advance notice of incoming cargo shipments and clarification of cargo contents, allowing for improved planning and resource utilization. Confirmation of driver and cargo to speed unloading and consolidation processes.
Public Sector	Potential early detection of security breaches before cargo arrives at the airport. Enhanced enforcement of safety regulations through previewing incoming loads. Support threat assessment and other security functions.

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