



*Center for Transportation Analysis  
Research Brief*

# Oak Ridge National Laboratory

## Freight Analysis Framework (FAF)

Center for Transportation Analysis  
(CTA) Research Areas

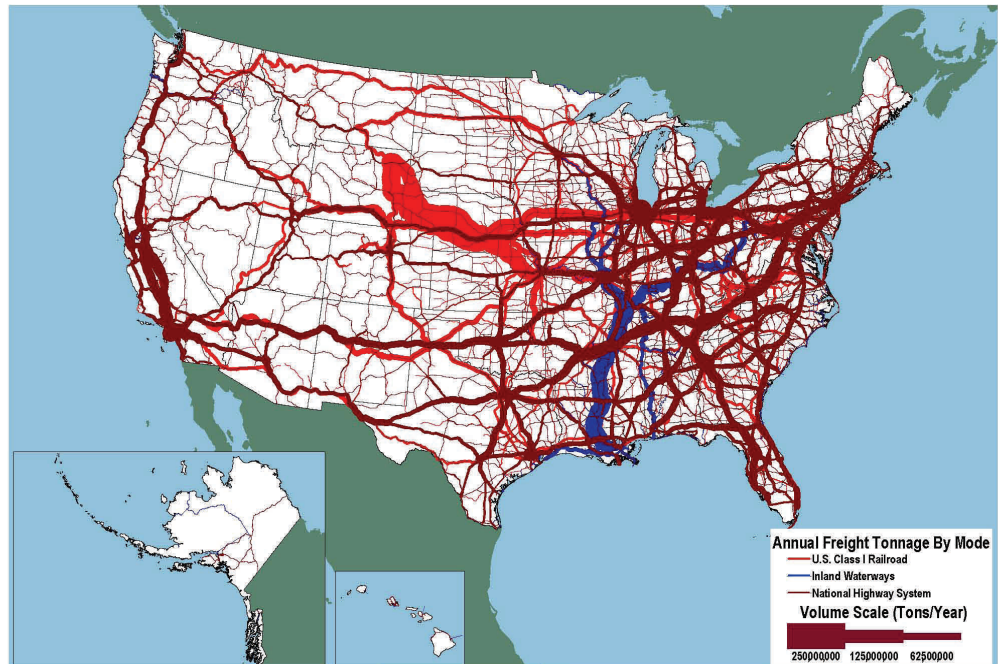
- Aviation Safety
- Air Traffic Management Analysis
- Data, Statistical Analysis
- Geo-Spatial Information Tools
- Defense Transportation
- Energy Policy Analysis
- Environmental Policy Analysis
- Highway Safety
- Intelligent Transportation Systems
- Logistics Management
- Supply Chain Management
- Modeling and Simulation
- Transportation Operations
- Planning and Systems Analysis
- Transportation Security

The Center for Transportation Analysis (CTA) assisted the Federal Highway Administration (FHWA) with the design and development of an improved multi-commodity freight database and analysis tool, known as the Freight Analysis Framework (FAF). The resulting 2002 Freight Analysis Framework (FAF) covers all freight flows to, from, and within the United States except shipments between foreign countries that are transported

(FHWA, U.S. Department of Transportation (USDOT)). In addition to the 2002 FAF or FAF2, CTA also participated in 1997 FAF1 and the harmonization of 2002 data with the 1997 FAF.

The FAF database and analytical tool is useful in the planning, operation, and management of the nation's freight transportation system. This information helps the public and private section to better understand the structure and

Tonnage on Highways, Railroads and Inland Waterways: 2002



Sources: Highways: U.S. Department of Transportation, Federal Highway Administration, Freight Analysis Framework, Version 2.2, 2007. Rail: Based on Surface Transportation Board, Annual Carload Waybill Sample and rail freight flow assignments done by Oak Ridge National Laboratory. Inland Waterways: U.S. Army Corps of Engineers (USACE), Annual Vessel Operating Activity and Lock Performance Monitoring System data, as processed for USACE by the Tennessee Valley Authority; and USACE, Institute for Water Resources, Waterborne Foreign Trade Data, Water flow assignments done by Oak Ridge National Laboratory.

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through the United States. This important piece of national freight data development was performed by CTA for the Office of Operations, Freight Management and Operations, within the Federal Highway Administration

dynamics of the multi-modal and intermodal freight transportation system; and is essential information for the development of capacity solutions for the U.S. highway, rail, water, and air freight systems.

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The FAF estimates commodity flows and related freight transportation activity among states, sub-state regions, and major international gateways. The FAF design is highly dependent on CTA's development of complex algorithms for the allocation of estimates of freight movements to specific routes and transportation corridors. The weight and value of commodity movements by origin, destination, commodity, and mode are estimated for the most recent Economic Census year, 30-year forecasts, and a network database in which tons are converted to truck payloads and assigned to specific routes on the highway network.

The FAF covers all modes of transportation. The truck, rail, and water categories include shipments transported by only one mode. Air includes shipments weighing more than 100 pounds moved by air or by air and truck. Intermodal includes all other shipments transported by more than one mode, such as bulk products moved by water and pipeline and mixed cargo hauled by truck and rail. Intermodal also includes courier and postal shipments weighing less than 100 pounds transported by any mode. Pipeline includes a small

quantity of shipments moved by unknown modes.

The CTA constructed a set of commodity class and mode specific annual origin-to-destination flows for the entire United States, covering to the extent feasible all domestic as well as all imported and exported goods. This task began with the 2002 U.S. Commodity Flow Survey and a number of supplemental data sources out of which a single commodity flow matrix is constructed. The product of this effort was a four dimensional matrix of flows that can be reported in annual tons, annual dollar value, and annual ton-miles, with the principal dimensions being:

- shipment origination region (O)
- shipment destination region (D)
- the class of commodity being transported (C), and
- the mode of transportation used (M)

The complete FAF 2002 U.S. Commodity Flows Matrix contains 138 x 138 origin-to-destination (O-D) region shipments, broken down by 43 commodity classes and by seven major mode combinations.

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