TRANSPORTATION RESEARCH
CIRCULAR

Number E-C158 September 2011

# Commodity Flow Survey Workshop

November 16, 2010
Washington, D.C.

TRANSPORTATION RESEARCH BOARD
*OF THE NATIONAL ACADEMIES*

TRANSPORTATION RESEARCH CIRCULAR E-C158

# Commodity Flow Survey Workshop

**November 16, 2010**
**Keck Center of the National Academies**
**Washington, D.C.**

September 2011

**Transportation Research Board**
**500 Fifth Street, NW**
**Washington, DC 20001**
**www.TRB.org**

**TRANSPORTATION RESEARCH CIRCULAR E-C158**
ISSN 0097-8515

The **Transportation Research Board** is one of six major divisions of the National Research Council, which serves as an independent adviser to the federal government and others on scientific and technical questions of national importance. The National Research Council is jointly administered by the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The mission of the Transportation Research Board is to provide leadership in transportation innovation and progress through research and information exchange, conducted within a setting that is objective, interdisciplinary, and multimodal.

The **Transportation Research Board** is distributing this Circular to make the information contained herein available for use by individual practitioners in state and local transportation agencies, researchers in academic institutions, and other members of the transportation research community. The information in this circular was taken directly from the submission of the authors. This document is not a report of the National Research Council or of the National Academy of Sciences.



**Transportation Research Board**
**500 Fifth Street, NW**
**Washington, DC 20001**
**www.TRB.org**

Javy Awan, Production Editor; Jennifer Correro, Proofreader and Layout; Jennifer J. Weeks, Layout

# Preface

The Commodity Flow Survey (CFS) is a key data source for a myriad of freight planning activities. The TRB standing Committee on Freight Data initiated a workshop to provide a forum for discussion and input to the next application of the survey. The workshop, convened after the release of detailed CFS data and coinciding with planning for the 2011 CFS, offered an interactive format for a diverse set of users to engage in productive dialogue.

A planning group chaired by Bruce Lambert of the Institute for Trade and Transportation Studies carried out the detailed planning for the workshop. These proceedings consist of individually attributed summaries. No language should be construed as consensus findings or recommendations on the part of conference participants, the planning team, the sponsoring committees, or TRB.

The planning group included CFS producers, analysts, and modelers. The 122 persons attending reflected organizational diversity as follows:

| | |
|---|---|
| U.S. Department of Transportation | 27% |
| Census Bureau | 11% |
| State government | 7% |
| Local, regional, port | 5% |
| Consultant, private sector | 15% |
| University | 16% |
| Other | 19% |

Funding provided by the Research and Innovative Technology Administration to help support this event is gratefully acknowledged.

# Contents

**APPENDICES**

# Introduction

**BRUCE LAMBERT**
*Institute for Trade and Transportation Studies*

The importance of the Commodity Flow Survey (CFS) to the freight data community cannot be emphasized enough. The CFS was envisioned as a baseline for establishment-level outbound transportation movements that could be used to understand the flows of goods underlying the U.S. economy, and by extension, assist planners in understanding freight shipments. The first CFS was completed in 1993, with additional surveys completed in 1997 and 2002 before the latest release in 2007.

The CFS represents one of the largest primary data collection efforts for national and regional freight activities, including the only publicly available data source of freight moving on highways, which is the largest freight transportation mode in the United States. Its role in providing benchmarks related to the multimodal freight transportation system remains critical for its users and provides a cornerstone for existing freight transportation planning activities as indicated in the panel and poster summaries later in this report. Explaining why these data remain relevant to transportation decisions is essential for continuation of the survey.

Federal, state, and private sector all utilize the CFS dataset. The dataset is the same for all users. Confidentiality is maintained for all survey establishments.

Since 1993, the CFS has undergone many changes in scope, processing, funding, etc., and the procedure for improving the next survey has become more established. This established procedure benefits everyone because consistency in survey methodology provides a steady platform for future refinements and enhancements as well as a more mature and knowledgeable user community, which can recommend and use these improvements.

This workshop represents the second meeting where the Bureau of Transportation Statistics (BTS) and the U.S. Census Bureau partnered with TRB to engage the CFS user community. The first meeting, held in 2005, provided meaningful suggestions to the CFS development team for the 2007 CFS. This workshop was convened to identify potential improvements for the 2012 CFS.

To elicit feedback, this workshop used three types of interactions: (*1*) panel presentations from key stakeholders intimately involved with the CFS, (*2*) interactive sessions focused on discussing potential improvements to the design for the 2012 Survey and its products, and (*3*) an opportunity to see current applications through a poster session. To ensure active and focused discussions, the workshop included seed questions for each session as well as the results of an informal survey that was sent to registered participants prior to the meeting. This report contains prepared statements, summaries of poster sessions, and reports on panel discussions.

Attendance exceeded expectations, and the comments were engaging and diverse. Suggestions from participants ranged from simply adding a new question to the CFS survey to finding ways to report more average information by establishment type or geography, to providing more tables and charts.

This report serves as the bridge between the meeting and the user community at large. While the opportunity for providing comments to the BTS and Census Bureau for the 2012 CFS is finite, that team is committed to its mission of providing the best product, given existing resources, and encourages ongoing discussions with the user community. This conference also

represents a series of meetings, ranging from the first CFS meetings, through several TRB conferences and NCHRP programs to explore better availability and use of freight data.

Finally, the workshop committee appreciates the comments received during the session at the 2010 TRB summer meeting hosted by the Committee on Freight Data (Strengthening the Value of the Commodity Flow Survey—Users Show the Way). The presentations by Joe Bryan of Halcrow and Catherine Lawson of the University of Albany, State University of New York, while not included in this document, provided important insights used in preparing for the CFS workshop.

# Understanding Freight Transportation and the Role of Commodity Flow Survey

**PETER APPEL**
*Research and Innovative Technology Administration*

The CFS is a flagship of the work performed at the BTS and is critically important to transportation decision making across both the private and public sectors. Because the country is in a period of constrained resources, the transportation decisions that affect billions of dollars need to be prioritized. Decisions need to be made on where to apply these very limited resources to have the most impact on a transportation system that is integrated and complex. These transportation decisions cannot be made effectively without looking at the entire transportation network and the effect those decisions will have. Underlying facts, based on a solid core of data, are necessary to make decisions about how to relieve bottlenecks in the system, how and where to bolster the country's network, and how to make the kind of transportation investments that will have the most impact on trade flow, economic growth, building the manufacturing base in the United States, and getting goods to market in the most effective way possible. That solid base is the CFS.

A recent example of the need for and effective use of data occurred in the Transportation Investment Generating Economic Recovery (TIGER) grant program which was overseen by the U.S. Department of Transportation (DOT). Discretionary grants were awarded to applicants from across the country for their potential for significantly impacting the national transportation system. One such grant supports a significant enhancement to the CREATE (Chicago Region Environmental and Transportation Efficiency) Program which is targeted to relieve rail congestion around the Chicago area. The CREATE Program is not just a Chicago project even though it involves building overpasses and rail lines in Chicago. It is a national program because rail congestion through Chicago impacts the flow of commodities throughout this country as demonstrated by information from the CFS.

The current CFS has been in existence for several iterations since its 1993 release. It is continually being reevaluated and improved, taking advantage of current technologies, current ways of doing business, and improved understanding of the ways in which shippers and carriers store and transmit their data, always with the goal of obtaining the best possible high-quality data using the best tools in the most cost-effective way. This workshop is the most recent effort to solicit important feedback from the user community as plans for the next survey proceed. Input from this workshop in combination with results and lessons learned from the 2007 CFS provides the basis for these improvements.

The CFS that is currently in use is the result of a dedicated team at U.S. DOT, the Census, and elsewhere. The resulting data and products are a masterful effort that involved very different entities and information from a multitude of different sources which were pulled together to define the important story about the state of commodity flow in this country today.

Moving forward, the team will build upon what was done right this time and upon the technologies that are now available as well as input from users on what to improve, identification of gaps and places where the CFS could provide more granularity and detail about commodities, modes, or locations. This information is important for identifying ways in which the survey can

be bolstered moving forward, keeping in mind that not only are resources constrained for transportation investments, resources are constrained for the survey itself.

It is critically important to make knowledgeable data-driven transportation decisions in this constrained economy. Models that are built based on the CFS, such as the Freight Analysis Framework and private sector models, are always being refined and are getting better as the data gets better. As the modeling techniques get better, they can be used to make much more sound decisions. With this improvement comes greater assurance that the CFS will move forward with the support of the user community and their continued input on what is needed. This applies to not just the CFS but to all programs in the BTS.

# The Role of the Commodity Flow Survey in Understanding the U.S. Economy

**THOMAS MESENBOURG, JR.**
*U.S. Census Bureau*

The Census Bureau's mission is to serve as the leading source of quality data about the nation's people and economy. The CFS, as an important component of the Economic Census, provides much needed information about the structure and performance of the U.S. economy including benchmark statistics about transportation flows and the functioning of the transportation sector. This comprehensive snapshot of commodity flows and other key components of the transportation system every 5 years helps businesses, policy makers, and analysts assess the overall health of the economy.

The CFS program is a joint project between the U.S. DOT and the Census Bureau that serves as the primary source of information on the transportation of goods. The CFS provides detailed commodity information as well as information on mode of transport for different levels of subnational geography. As the survey name suggests, the CFS also estimates the volume of freight moving from one geographic area to another by mode of transport and by commodity.

## USING THE CFS ESTIMATES

These CFS estimates have become an important means to understanding the structure and functioning of our economy. There is a close link between growth in freight transportation and growth in the economy of the United States. Changes in economic activity and conditions can positively or negatively impact the demand for freight services. The tremendous richness and detail available from the CFS make it an indispensable data source for both the private and public sectors. Policy makers, analysts, businesses, and researchers use CFS data for (*a*) assessing the demand for transportation facilities and services, (*b*) studying energy use, (*c*) evaluating safety risk, and (*d*) assessing environmental concerns.

The CFS estimates are used to conduct national, regional, and sectoral economic analyses. State and local government use the CFS to measure the nation's reliance on various transportation modes and to better understand the economic impact of unexpected events, such as an earthquake or a hurricane, to the transportation infrastructure. These estimates are used to develop models and analytical tools that extend the usefulness of CFS data for policy analyses. For example, using the CFS, government organizations and researchers developed the National Interstate Economic Model to study the impact of possible changes in highway freight movements on individual states and industries.

The CFS estimates are also used to make management and investment decisions. For example, the State of Delaware used an earlier CFS to develop their Delaware Freight and Goods Movement Plan technical report in 2004. In addition, benchmark commodity flow estimates have been used to forecast future demand for goods movement and associated infrastructure and equipment needed to transport goods. For example, the State of Alabama used the CFS to develop a statewide intermodal model that showed the possible impact of new relocated industries and the movement of their goods on the state's existing transportation infrastructure.

From a national economic accounts standpoint, the CFS is used by the Bureau of Economic Analysis (BEA) to improve current measures of economic activity as measures by gross domestic product estimates balance of payment accounts and national input–output accounts, and the regional accounts also use CFS information. More specifically, BEA used the CFS estimates to determine transportation costs for the 2002 benchmark of the input and output accounts. In addition, the BEA has used the CFS to develop regional input–output multipliers and for analysis of gross state product.

## FREIGHT AFFECTED BY THE ECONOMY

The CFS also provides benchmark measures of freight tonnage and ton-miles which can be sensitive to economic conditions. Before the recent recession began, the demand for freight transportation had been increasing. A look at some of the Census Bureau's other economic statistics programs helps to shed light on developments in the transportation system.

From the Census Bureau's annual surveys, strong growth is seen in retail and wholesale trade between 1992 and 2007. From 1992 to 2007, retail trade sales grew at an annual rate of 5.4% and the wholesale trade sector sales grew at an annual rate of 5.9%, while over the same period manufacturing shipments grew annually by 4.0%. Contributing to this growth was an increase in international trade and a shift to outsourcing and off shoring. From 1992–2007, U.S. imports for goods increased an average of 9.3% annually while exports for goods increased an average of 6.9% annually.

The advent and growth of electronic shopping combined with more efficient and reliable freight delivery methods also increased demands for freight transportation. In the current global, flatter, and more connected economy, more transactions are being performed electronically. From 1999 to 2009 the percent of electronic commerce sales in the retail sector increased sevenfold from 0.6% of total retail sales in 1999 to 4.1% in 2009. In manufacturing, e-commerce shipments increased from 18% of total manufacturing shipments in 2000, to 39% or $2.2 trillion in 2008. Merchant wholesalers increased from 7.7% of their total sales to almost 21% or $1.3 billion.

The change in demand for goods has had a profound effect on the characteristics of freight movement. For example, the demand for high-value low-weight products such as laptops, cell phones, and other handheld personal computing devices has increased over the last decade. These goods are more likely to be moved by truck or air and travel further than lower value goods such as wood products.

Several organizations measure the current change in freight movement. For example the BTS produces monthly transportation services indices that measure the movement of freight. The Association of American Railroads produces annual estimates on the amount of containers moved by rail. Fitch Ratings produces an annual analysis of freight transportation and projections for the upcoming year.

The U.S. economy is a mosaic consisting of many interlocking pieces. To truly understand it requires many different data sources. The CFS plays a central role in understanding commodity flows and the substantial improvements that were introduced in the 2007 survey have played an important role in its usefulness. This workshop continues the commitment to improve the content, usefulness, scope, classification, geographic detail, and products of the CFS.

# What Is New with the 2007 Commodity Flow Survey?

**RONALD DUYCH**
*Bureau of Transportation Statistics, RITA*

The 2005 TRB CFS (*1*) conference provided many excellent ideas for enhancing the 2007 CFS. Several creative and practical ways to leverage the data and information were presented and a variety of observations were offered for immediate short-term actions while others were more strategic. Suggestions were divided into three general categories; coverage, survey methods, and data products. The following sections summarize the suggestions that were implemented and the results of those implementations.

## COVERAGE

First and foremost, the sample size was increased to 102,000 out of approximately 754,000 establishments that were considered shippers. Although an attempt was made to capture third-party logistics providers (3PL), the survey captured only about 12%. Similarly, an effort was made through precanvassing to identify auxiliaries resulting in an estimated universe of 14,800 establishments. Reporting of hazardous materials was substantially improved through the precanvass and a focus on six groupings: ammonium nitrate, ethanol, explosives, hydrogen, toxic–inhalation, and all other. Even with changes to the survey that attempted to clarify containerized–intermodal movements, the CFS did not capture this category well.

## SURVEY METHODS

Suggestions regarding use of advanced technologies and providing a continuous survey were not practical for the 2007 CFS nor was the use of the Internet for respondent reporting. However, work has begun to provide the latter for the 2012 survey. Several activities were undertaken to improve response rate including a precanvass operation and a detailed study using a presurvey of 75 establishments. The precanvass covered 80,000 establishments and was used to eliminate nonshippers and to verify contact information. The presurvey study was performed to understand steps taken by responders, identify problems that responders had in completing the survey, understand how responders interpreted instructions, and evaluate their ability to provide additional information such as costs. Based on a detailed postsurvey evaluation, the top reasons for nonresponse included inability to recall information, information sensitivity, inability to readily access needed information, and awkward question format. Figure 1 provides a graph of the most common nonresponse items from this study.


**FIGURE 1 Nonresponse items from postsurvey study (2,875 surveys).**

## DATA PRODUCTS

The Census Bureau implemented the American FactFinder (AFF) and incorporated the 2007 CFS. This provides users with a flexible and powerful tool to extract both predefined and customized tables and products.

- Census Bureau's American FactFinder: http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml and
- 2007 Commodity Freight Survey: http://www.bts.gov/publications/commodity_flow_survey/index.html.

## ENHANCEMENT OVERVIEW AND RELATION TO 2012

Table 1 summarizes 2007 CFS enhancements and improvements. Data by industry North American Industry Classification System (NAICS) classification was provided for the first time in the 2007 CFS. Nine additional metro-area metropolitan statistical areas (MSAs) that represent freight gateways were added to the MSAs that were sampled in 2002. Coverage of hazardous materials was expanded in 2007 by oversampling hazardous materials shippers. This resulted in 5.6% of the 4.9 million shipment records in the 2007 CFS being classified as involving a hazardous material versus 4.9% of the 2.6 million shipment records in the 2002 CFS. A shift occurred in some estimates increasing multiple mode and decreasing water mode in the 2007

**TABLE 1 2007 CFS Enhancements and Improvements**

| Apparent Improvements | Nonapparent Improvements |
|---|---|
| Data Dissemination: AFF and data by type of industry (NAICS). | Dedicated BTS staff in involvement in planning and operations of 2007 CFS. |
| Expanded coverage of freight gateways: growing ports and border crossing. | Developed GeoMiler, a geographic information system software routing tool. |
| Expanded coverage for hazardous materials. | Improved data quality by correcting problematic shipments more consistently and systematically. |
| 3PLs questions on the fourth-quarter questionnaire. | Expanded editing process. |
| Increased sample size and improved sample design. | Joint investigative teams (BTS–Census). |
| "Noise" added in an effort to publish a greater number of data cells. | Lessons learned documented from 2002 CFS, used in planning for the 2007 CFS. |
| Drayage included in mileage calculation processing–modal assignment. | Precanvass for improving CFS frame. |
| | National constraints added for improved estimates. |
| | Conducted cognitive interviews of potential respondents. |

NOTE: AFF = American Fact Finder; NAICS = North American Industrial Classification System; BTS = Bureau of Transportation Statistics; 3PL = third-party logistics provider.

CFS. The cause of this shift was a result of the mileage calculation methodology that more accurately considered drayage in the 2007 CFS.

Eighty-thousand establishments were sent precanvass questionnaires for the 2007 CFS. For the 2012 CFS, the estimated precanvass will be sent to over 100,000 establishments. Improvements to the design of the questionnaire occurred as a result of conducting cognitive interviews during planning for 2007 which is also planned for the 2012 CFS.

## ADDITIONAL CONSIDERATIONS

The CFS is a large data collection program and given the long lead time needed to implement such a program—3 years to set up a major survey program, 1 year to collect the data, 1 year to process the data, and 1 year to review and release the data—it takes about 5 years from initiation to final products. In addition, federal data collection requires a regulatory and rule making process, with notice publication in the *Federal Register* and public meetings. This is also a 4- to 5-year process. Given this time commitment, data from the current CFS represents a substantial amount of what users have to work with in the near term and for several years to come. Information, knowledge, and understanding from working with the CFS serves as a basis for designing and implementing future freight data collection efforts. A lot has been learned from working on the CFS over the years.

The CFS was created at a time when very few other data programs existed and users relied on it to provide everything. Now, supplemental data sources and new tools are available through the National Cooperative Freight Research Program (NCFRP) which allows the CFS to focus on the aspects that it covers well. It was targeted towards shippers rather than carriers because shippers were more likely to know what was in the box, where it was ultimately going, and the modes it might use to get there. The advent of 3PLs and multimodal carriers has reduced

the ability of the shippers to know how goods get to their destination, but they still know what was shipped and where it was shipped to. Carriers know how they carried the goods and which route they used, but are less likely to know what is in the box. For the complete picture, information from both sources is necessary.

The CFS also provides a national picture. Getting that picture to a local level with accuracy is beyond the scale of the national survey and raises confidentiality issues even if the sample is increased. An NCFRP project is developing data collection strategies to meet local needs within the national picture provided by the CFS and the Freight Analysis Framework (FAF). Another NCFRP project is developing a freight data architecture to link data sets across topics and across national and local scales.

Perhaps the focus should be on designing hooks in the CFS to supplemental surveys, administrative records, and analytical models to achieve the comprehensive picture of freight transportation instead of adding questions to the CFS to cover new topics. These hooks, possibly based on providing generalized averages for various elements that do not violate the confidentiality of the survey, would provide a critical link from the national to the local story.

## REFERENCE

*Transportation Research Circular E-C088: Commodity Flow Survey Conference* (K. Hancock, ed.). Transportation Research Board of the National Academies, Washington, D.C., 2006. http://onlinepubs.trb.org/onlinepubs/circulars/ec088.pdf.

# Questions and Comments from Individual Participants at the Opening Session

## CONTENT AND USES

- The Census, as part of the Economic Survey and the Business Survey, is subject to both Title 13 and Title 26 provisions.
- The parcel sector generates large traffic activity in the urban area, which may not necessarily be accurately captured in the CFS as it is considered mail in the CFS.
- The CFS approach assumes that shippers know more about the total origin and destination of the shipment than the carrier.
- Shippers may understand the mode due to the nature of intermediary relationships.
- How does the budget influence the sample size in 2012?

## SCOPE, CLASSIFICATION, AND GEOGRAPHY

- Truck trip generation tables may be useful for certain types of applications.
- Some information about the type of establishment either being surveyed or receiving the cargo would be useful.

## PRODUCT TOOLS AND FUNCTIONALITY

- Some other data collection or surveys may be able to supplement some of the gaps in the CFS in areas outside the current CFS scope.
- A mechanism for local groups who want to increase their local CFS dataset by supplementing the survey, financially or in kind, would be useful.
- The link between the FAF and CFS sometimes blurs the discussion about the value of the two datasets.
- The CFS cannot be all things, but can be better at the things it does.
- Access or analysis of the microdata would enhance CFS usefulness.

## USE AND USERS

- Since no formal requirement for feedback regarding the CFS exists, users can simply contact CFS staff with additional comments or suggestions.
- Emerging trends in data needs could be identified if a mechanism to collect at the requests from the user community existed.
- While the freight data and modeling world would suffer from a loss of the CFS, clarification about who are the real users of the CFS would make demonstrating value easier. It serves as a federal, state, and local dataset, research, and other users

## RESEARCH

- Research ideally can solve identified problems, not necessarily address "academic" issues.
- Other programs, such as NCFRP, could be utilized to develop information on the use and uses of CFS.

# Content and Uses

**JOY SHARP**
*Bureau of Transportation Statistics, RITA, Presiding*

**MICHAEL MARGRETA**
*Bureau of Transportation Statistics, RITA, Recorder*

A panel consisting of Daniel F. Beagan from Cambridge Systematics, Inc., and Rolf R. Schmitt of the FHWA was given the following points to consider.

- Provide a better understanding of the core items in the CFS; how survey content has changed over the years; and identify possible new areas of information gathering in future collections.
- In view of new DOT goals and reauthorization legislation, identify potential CFS questions that could be of benefit in assisting DOTs and policy makers in developing performance measures or answering new policy questions.
- To understand the changing complexity of freight transportation logistics, identify areas that might require revision, updating, or offer an opportunity to collect new data.

Daniel Beagan provided a discussion from the perspective of data users and private sector model builders and users. The FAF and the TRANSEARCH database, both of which include CFS data in their products, provide the preferred survey data for modal information for modeling. Increased granularity of the origin-destination (O-D) information would be helpful as would the collection of containerized shipments in intermodal transport. This information is used in travel demand models, such as for state transportation agencies in Georgia and Tennessee, to estimate trip generation and mode choice relationships. In addition, volume of trucks is of interest as is the identification of the types of freight moved by type of transportation facility.

Comments and questions from workshop attendees included:

- Truck trip generation rates or some type of freight trip generation might be more valuable than the current CFS output. Interest was expressed in using O-D estimates to derive outbound and inbound freight trip rates.
- Understanding additional characteristics of items being shipped could be obtained by capturing equipment type, such as dry van not requiring temperature control, container, reefer or refrigerated truck for hauling perishables, flatbed, etc.
- Capturing commodity packaging, such as palletized, roll on/roll off, bulk liquid/bulk solid, drum, etc. would also improve understanding commodity movement.

Rolf Schmitt discussed the evolution and current status of the FHWA's FAF, which is in its third iteration. It uses CFS data as a base, which provides 68% of the weight and 71% of the

shipment values. The FAF calculates provisional estimates for non-CFS collection years. The estimates in FAF3 are not directly comparable to FAF2 because of

1. Out-of-scope categories;
2. How 2007 CFS collects and classifies information about water modes used for FAF3 as compared to the method for the 2003 CFS used in FAF2; and
3. Ability to adequately collect container-on-rail-flat-car (COFC)/trailer-on-rail-flat-car (TOFC) information

For instance, shipments with multiple water modes (river, ocean, Great Lakes) need to be isolated in the CFS and counted as waterway travel by FAF; otherwise, a shortfall of about 107 million tons in waterway shipments must be corrected by other means. The ability to accurately collect COFC–TOFC information remains a problem and a challenge for the survey.

Comments and questions from workshop attendees included the following.

- Within SCTG Code 08—Alcoholic Beverages two issues complicate the use of this classification. Currently, SCTG 08 includes denatured ethyl alcohol, such as rubbing alcohol. Also, biofuels, which are hazardous materials such as ethanol used in gasoline products, are often grouped into SCTG 08. These types of items should be removed from SCTG 08 and placed in another code.
- It would be useful if the CFS could distinguish bulk and time-sensitive shipments.
- The FAF would benefit if the CFS could better classify commodities from an inland port destined to a foreign country.
- The CFS metric distance shipped by mileage categories: less than 50 mi, 50 to 99 mi, etc., would be more useful at the three-digit SCTG level. A metric for average miles per ton would be useful.

Other information requested by workshop attendees includes the following:

- Time characteristics. What is the travel time? For freight, important questions include when does the shipment need to arrive and was the commodity delivered on time.
- Specific commodity shipping characteristics. Is it bulk or perishable or refrigerated (for example, Valentine's Day chocolates)? Is it containerized?
- Establishment characteristics. Who shipped the commodity (specific establishment or distribution center)? What type of establishment received the commodity at the final destination? Did the shipment originate as an import? What is the size of the shipper's establishment in terms of number of employees and volume of sales?
- Cost characteristics. What is the delivery cost? What is the cost of shipment transportation? In response to cost characteristics, the shipper usually does not have this information—especially on a per-shipment basis. In addition, this estimate is not considered to be reliable from shippers because, in the absence of industry standards, there are varying ways of accounting costs.
- Distance characteristics. Could BTS mileage calculation provide modal miles per shipment by state, for Census roll-up into ton-miles per state?

- Is there a seasonality effect to truck travel in certain areas, which leads to traffic bottlenecks (for example, truck traffic prior to the December holiday season)? Is there a seasonality effect by specific commodities?
- How about providing growth rates or measures of growth extending out 30 to 40 years?
- Can commodity movement be tied to economic activity?

WORKSHOP SUMMARIES

# Scope, Classification, and Geography

**RONALD DUYCH**
*Bureau of Transportation Statistics, RITA, Presiding*

**JOHN BARRETT**
*IHS Global Insight, Recorder*

A panel consisting of Gregory A. Harris from the University of Alabama, Huntsville, and Frank Southworth from Oak Ridge National Laboratory was provided with the following points to consider:

- Identify any gaps or inaccuracies that currently exist in the scope, geography, and classification systems of the CFS and propose solutions to address them.
- Determine what operational aspects of current transportation and logistical practices are affecting the scope, geography, and classification of the CFS and how we can better understand them in the next cycle.
- Determine what modifications can be implemented to the CFS scope, geography, and classification systems to better use CFS in performance measures and other quantitative metrics being proposed and developed to measure the effectiveness and justify transportation programs.

In addition, Ron Duych charged the attendees to consider the following questions as they listened to the panelists and provided their input:

- Scope:
  — What sectors or types of shippers could be oversampled to provide meaningful improvements in the 2012 CFS?
  — Would specific oversampling of some hazardous materials (hazmat) shippers (e.g., explosive shippers) provide significant improvement to the CFS estimates?
  — Should oversampling air shippers to improve the CFS air estimates be attempted and how can it be done?
- Classification:
  — Should collapsing the codes in the SCTG coding manual be considered given that there are 499 five-digit codes, 283 four-digit codes, 132 three-digit codes, and 41 two-digit codes. Currently, up to the three-digit code level are published but some five-digit codes are useful to verify hazmat ID numbers.
  — The SCTG manual needs to be updated. Bio fuels need to be added. At what level should this be done, two-digit with multiple three-digit entries?
  — Corrections need to be made to the SCTG manual such as denatured alcohol which comes under SCTG 08 Alcoholic Beverages. Are there other corrections or modifications that should be made?
- Geography:

— Should adding (oversampling) additional metropolitan areas to the CFS sample be considered? How well has adding freight gateways that are metropolitan areas worked out in the 2007 CFS?
— What other local areas can be considered for the 2012 CFS instead of MSAs? Is moving to Census Statistical Areas (CSAs) a possibility, and what are the drawbacks?

Gregory Harris discussed the use of FAF in Alabama where FAF values were disaggregated to the local level using local surveys and truck conversions. The city of Mobile helped in developing trip purposes, O-D pairs, and through-traffic volumes and the project team obtained information from the port on goods that stay locally and goods that leave the state. The team then filled in missing products in the FAF, such as forestry products, using other Census products and BEA data to obtain variables such as personal income. Of these, waste and scrap and recyclables were probably the most problematic to account for in trip estimation. Truck counts from Alabama DOT were used to validate trip generation results.

As a long-time partner in providing critical factors for the CFS and FAF, Frank Southworth provided unique insight into several aspects. Within the water transportation community, waterway trips have been redefined as intermodal trips, which more closely represent reality. With this shift, coordinating data definitions between sources such as the CFS and the U.S. Army Corps of Engineers would improve the ability of users to work across multiple data sources. Particularly for metropolitan planning organizations (MPOs), O-D detail is important to route traffic. Inclusion of gateways in the 2007 CFS provided some improvement in this area. One possible idea would be to take out geography detail to provide more detail on other dimensions such as three- or four-digit level SCTGs.

Comments and questions from workshop attendees included the following:

- Shippers do not necessarily have information about carriers.
- As a result, more than one survey may be necessary to obtain desired information and not rely on the CFS to cover all needs.

Comments and questions related to SCTG were as follows:

- A desire was expressed for a need for a concordance between NAICS and SCTG to anchor and guarantee consistency.
- Do we need to produce a five-digit manual? SCTG has 499 five-digit codes and 41 two-digit codes. Commodity detail is only useful for modeling purposes if it ties to economic activity. A problem may occur where a commodity code spans two industries. If possible, the ability to maintain consistency between industry and commodity code was considered important.
- SCTG classification needs to do two things:
  — Provide attributes to allow linkages to economic data and
  — Separate commodities by common transportation characteristics.
- Oversampled hazmat flows in the last survey is an example of improvement in scope. Could air freight be oversampled to accomplish a similar benefit?
- Census is considering moving from MSAs to CSAs to standardize geographies so users can pull data from lots of different databases and be on the same basis. This will probably result in redefining some of the large MSAs in CFS to CSAs. If this happens many of the current

MSAs and gateways could be dropped. How the CFS will account for this change would be an issue.

- Problems occur when MSAs cross state lines, but it is the best available and it allows aggregating up to the state level which is very important. Doing away with this would cause a real problem.

WORKSHOP SUMMARIES

# Product Tools and Functionality

**JOHN FRITTELLI**
*Congressional Research Service, Presiding*

**SCOTT DRUMM**
*Port of Portland, Recorder*

A panel consisting of Donna Hambric and Andrew Hait from the U.S. Census Bureau was provided with the following points to consider:

- Which predefined 2007 tools and functionality are the most useful and how should the tools and functionality be changed for the 2012 CFS?
- Which AFF 2007 tools and functionality are the most useful and how should the tools and functionality be changed for the 2012 CFS?
- How should the organization of data be modified? Was the 2007 organization useful? Is more or is less consolidation needed? In 1997 and 2002, CFS estimates were disseminated in more than 400 files. In 2007, the number of files has been consolidated to 42. For example, national, regional, divisional, state, and metropolitan areas were consolidated into one file for each topic.

This session focused on how to make the CFS data more accessible to users. Andy Hait walked participants through the products and data options currently available through AFF. The use of AFF to disseminate CFS 2007 data was a major change from CFS 2002. For the CFS, AFF is structured to provide predefined tools for quick and easy access to data and to provide user-defined queries for more detailed analysis of the data.

## PREDEFINED TOOLS

The predefined data products available through AFF are (*a*) quick reports, (*b*) thematic maps, and (*c*) tables. Quick reports provide summary-level data tables by industry, geography, hazmat, or commodity. Although users have some limited options with quick reports, these are mostly basic tables that AFF produces very quickly. Thematic maps offer several map options to show how states vary on a number of different attributes related to commodity movement. Accessing the data through the BTS website also allows users to display a variety of predefined tables that would typically appear in a printed report.

Concurrent with the release of the 2010 Census data, the Census Bureau is scheduled to release an update of AFF—AFF2.0. This new version will contain a number of improvements over the current tool, and CFS 2007 data will eventually be uploaded as the current version is phased out.

Comments and questions from workshop attendees regarding the predefined CFS tools included the following:

- AFF 2.0's ability to allow users to pull data in from other sources. This is currently under consideration, but the best way to handle this merging of databases will continue to be to download AFF data and then pull data from other sources into that downloaded file.
- Determination and design of predefined tables and queries based on use. Census tracks what is used and factors that into the design of these tools. One suggestion was that a "most frequent query" list be added to the website as had existed in an earlier version of AFF.
- Not all users were familiar with quick reports and often used printed reports instead. Users new to quick reports stated that they wanted more flexibility than printed reports and that they would begin to use the online tool.

## USER-DEFINED TOOLS

Using user-defined tools within AFF allows users to access very detailed levels of data and filter, save, load, and send data, as well as bookmark queries. In addition to some of the more basic filters, such as geography and industry, the filter tool allows users to hide or re-order columns, sort by individual attributes, and create their own calculated variable columns. The download center within AFF includes both metadata and a read me file.

Based on feedback, most participants appeared to be more familiar with the user-defined tools as evidenced by their comments. Individual participants' comments included the following:

- User-defined queries provide the best way to become familiar with the available data.
- The tool allows queries to extract data for only the highest ranked areas. Often users are interested in states or metropolitan areas that are not included in this list. Allowing a full ranking would allow all users to find what they need.
- Clearer and easier-to-use origin and destination tables would be helpful. More or multiple downloadable file formats would benefit users.

In addition to usefulness of the AFF, users provided input on hard copy versions of tables and data:

- While web-based tools are helpful, some users still preferred access to a hard copy or a searchable PDF file, while others still prefer CD-ROM-based data access.
- Most users did not object to phasing out hard copy, though hard copies are still highly valued by some.

# Key Observations on Improving the 2007 Commodity Flow Survey

**DONALD LUDLOW**
*Cambridge Systematics, Inc.*

The 2010 CFS workshop was designed to facilitate a discussion of experiences among CFS users and to serve as a forum on potential future improvements. The workshop organizers recruited panelists to provide key insights on the ability of the CFS to respond to emerging transportation industry trends and the data needs of business leaders and policy makers. Reacting to these objectives, the workshop panelists and participants provided valuable and detailed insight on the state of the CFS—its history, its relevance, and its future. This section summarizes the key themes of workshop proceedings and culminates with some ideas that could shape the future of the CFS program.

## STATE OF THE COMMODITY FLOW SURVEY

Workshop panelists characterized the CFS as a balanced data set that continues to improve over time and that serves as an increasingly relevant source to answer current policy and investment questions.

### Balanced and Historic

Through iterative improvements since 1993—including a battery of recent improvements to the 2007 survey—the CFS has arrived at a state of relative equilibrium. This point of balance means that no single major attribute of the CFS can be significantly improved within current CFS budget and scope without potentially upsetting the reliability of other major attributes of the CFS. For example, the geographic granularity of the CFS could be improved but at a cost to some other aspect—including the sample size or commodity detail. The CFS also has great historic value because its structure and composition has remained relatively constant since 1993. This consistency provides a rich source of information to monitor changes in transportation demand and economic sectors across the United States.

### Getting Better

The Census Bureau and BTS have instituted a number of improvements to the 2007 CFS while maintaining the dataset's balance and historic value. Recent improvements include the following:

- Improvements to survey methods, including doubling of sample size, precanvassing and interviews to focus questions and improve response rate, and improved editing and systematic corrections of survey information. These improvements have produced more accurate and reliable results.

- Enhanced granularity to improve the level of detail on hazmat movements, multimodal moves, movements from important international freight gateways, and routing through the use of more sophisticated routing software (GeoMiler) to improve accuracy of flow characteristics.
- Broader dissemination of the data through the Census AFF webpage (for direct access to CFS data) and through FHWA's FAF website and query tools. These improvements have made CFS data more widely available and accessible to a larger audience of users.
- Incorporating user suggestions to adapt the CFS to changing user needs. The Census Bureau and BTS have asked the user community to provide feedback on improvements and data needs. Recent and ongoing CFS improvements reflect these comments.

### Relevance

As transportation agencies seek ways to sharpen decision making with better data and tools, the panelists concluded that CFS is more relevant than ever. With a continued emphasis on data to drive decision making—especially federal and state policy and grant-making activities—the participants at today's conference extolled the value of the CFS as the principal underlying source of information on freight transportation. For example, the CFS data were highly valuable in evaluating applications for federal funding through U.S. DOT's TIGER grant program. Panelists repeatedly stated that CFS and other data sources that assist in project evaluation and prioritization in a budget-constrained economy are highly relevant.

## PRIMARY APPLICATIONS

The workshop reaffirmed the value of the CFS to a wide range of users. The CFS helps businesses, government agencies, and legislative bodies answer questions about the performance of the U.S. economy and the transportation system. The panelists and participants cited a broad set of applications of the CFS data and its derivatives (e.g., FHWA's FAF), including but not limited to

- *Transportation planning and policy applications* to assess transportation demand, to identify economic impacts of transportation network investments, to identify and visualize flows, and to prioritize capital improvements;
- *Business applications* to guide investment decisions (e.g., site selection) and operations (e.g., routing and fleet utilization);
- *Economic applications* to assess the health of the economy at the national, state, and metropolitan level over time, to conduct sector analysis, and to develop regional tools (e.g., input–output multipliers and gross state product); and
- *Safety and security applications* to analyze safety risks, hazmat flows, energy flows, and emergency management impacts.

According to the panelists and participants, these applications constitute a growing and increasingly valuable set of tools to diagnose the changing dynamics of transportation and economic activity. For example, the CFS has allowed policy makers and researchers to

understand how the growth in demand for higher value and time-sensitive commodities has affected the transportation system by driving growth in trucking.

## KEY THEMES FOR IMPROVEMENT

While the CFS continues to serve as the bedrock of national freight data for the United States, panelists identified several areas of improvement. These improvement themes fall under three broad areas: (*a*) institutional challenges (CFS program dimensions); (*b*) survey methods (technical and methodological approaches); and (*c*) discovery (ability of the CFS to answer policy, planning, and investment questions).

### Institutional Challenges

Workshop panelists and participants discussed a broad range of institutional challenges related to the way in which the CFS is improved over time; the degree to which it is valued and appreciated; and ways in which the transportation industry's shift to performance measurement could affect CFS development:

- *Improvement process*. Many workshop participants reported that stakeholders would like a more formal process to provide feedback to the CFS developers at the Census Bureau and BTS. While both bureaus encourage ad hoc comments and suggestions on an informal basis, no formal mechanism currently exists to provide feedback for such comments.
- *Value proposition*. Workshop panelists and participants repeatedly emphasized the need to improve the way in which the user community expresses the "value proposition" of the data. The value proposition is evidence—either written, verbal, or graphic—that demonstrates the ability of the CFS to answer important public or private policy or investment questions. The user community can help preserve or enhance the CFS program by finding ways to demonstrate its value to policy makers.
- *Performance measures*. As transportation agencies integrate performance-based management and planning techniques into a wide range of programs, these agencies will seek increasingly reliable data to help focus scarce resources. The development of performance measures that accurately monitor transportation or economic system performance will depend on the robustness of the CFS data and other related data sets As a consequence, future CFS revisions will be important for the needs of the transportation agencies that define the performance goals and measures.

## SURVEY METHODS

The CFS has become more technically sound and accurate over time, but according to panelists and workshop participants, several lingering issues with the CFS are important to consider in the future including the following:

- *Accuracy of flows*. Users of the CFS data, especially those engaged in network modeling of flows, use a variety of sources and methods to validate the accuracy of CFS flows.

This exercise becomes more important in studies focused on specific industries or state and local flows. No officially recognized method of assessing the accuracy of flows currently exists, but expert practitioners generally "triangulate" between available traffic count, surveys or interviews with select industries, and other information such as Global Positioning System data. This process requires intuition, judgment, and skill. Frank Southworth of the Oak Ridge National Laboratory noted that "no textbook in the world will tell you how to do this." In the future, research efforts might document existing methods or develop new ones to assist with this process.

- *Weaknesses in data*. Workshop panelists and participants acknowledged continuing weaknesses in the CFS data that are important to consider in future versions. Two broadly cited weaknesses include
  - The inability of the current CFS to properly account or separate emerging renewable energy commodities, including biofuels; and
  - The inability of the CFS to accurately trace the movement of intermodal commodities, especially for domestic flows of international trade.

To address the first area, developing a way to separate out commodities of emerging national significance could substantially benefit stakeholders. While some improvement has been made to more fully track multimodal commodities through the supply chain, the second area could be improved through additional efforts to use telemetric data sources to follow cargo across modes. Other improvement efforts might seek ways to more fully leverage the knowledge and data of 3PLs and other transportation agents which arrange most multimodal freight moves.

**Discovery and Rediscovery**

Workshop panelists and participants discussed in detail many of the questions they routinely seek to answer with the CFS data. During the course of these conversations the participants cited the desire for greater access to core CFS data and the establishment (or dissemination) of methods to extend the usefulness of the CFS. Based on panelist input, the primary discovery activities of the user community are data mining, including access to microdata, and the development of methods to add value to the CFS through linkages to other data sets. In some cases, user questions have already been solved through existing research. In these situations, better education and dissemination could help the user community rediscover the methods pioneered by others.

- *Data mining and microdata*. Panelists and participants emphasized that the existing CFS data set can be a rich source if properly "mined" through queries of the microdata and other activities. For example, if the geographic detail of the CFS were suppressed, researchers could use the most detailed commodity flow information to develop other useful and broadly applicable tools such as average mileages by mode and commodity, or profile of industry type. Because the CFS data—at a granular level of geography—contain confidential establishment information, access to the microdata has been restricted. To help meet the demand for data mining and microdata access, the Census Bureau is establishing 11 regional centers for microdata analysis. Researchers gain access to the microdata through the development of research proposals submitted to Census.

- *Data linkages*. Users of the CFS data are enriching the commodity flow data by linking it to other related databases, including state or substate O-D survey data and regional economic data. Just as there are no formally established methods for validating the accuracy of CFS flows, there are no formal protocols for linking CFS and other datasets. Instead, researchers, businesses, transportation agencies, and consultants are developing customized tools and models to append, disaggregate, and leverage the CFS database. In response to the desire to extend usefulness of the data, the CFS program sponsors, TRB, and the user community are partnering on a number of research projects to document preferred methods that extend the usefulness of CFS. In the future, through TRB's Cooperative Research Programs, the body of literature and guidance will help "institutionalize" some of these methods to guide a wider circle of users.

## THE FUTURE

The Census Bureau and BTS are actively planning several improvements to the 2012 CFS. One of the major planned improvements is the use of optical character recognition and electronic data collection to improve the quality of the data from the shippers. Both bureaus are engaging users of the CFS to make suggestions for the 2012 version; this workshop is one of those efforts. Because of the limited time to adapt the approach before official 2012 data collection begins, this workshop and its proceedings provide timely information to the 2012 CFS process. In addition to other suggestions by the panelists, the workshop participants discussed the following improvement areas in the closing session.

### Data Needs Assessment

Panelists and participants renewed the call to develop a comprehensive needs assessment to help identify specific questions and gaps in the data that future CFS and other data sets might address. In response to this interest in data needs, participants suggested that research be conducted to synthesize the considerable work conducted by TRB and others to identify freight data needs. For example, through a series of focused freight data conferences and research projects including the 2005 and 2010 CFS Workshops, TRB has amassed a significant amount of information about freight data needs and how these needs could help shape future research and data development. Synthesizing and updating this to reflect emerging needs in a comprehensive needs assessment could provide important information for the development of CFS and other data programs.

### Data Enhancement

Advanced technologies—including the widespread use of telemetric data—is already providing immense volumes of new data that could be integrated into CFS and other freight data programs. These data have the ability to supplement the CFS to correct some of the lingering issues—including the tracking of cargo from mode-to-mode and the ability to provide seasonal or continuous data. Exploring the feasibility of obtaining and conflating large data sets to form part or all of a next generation CFS to harness the potential of these data streams could help address many current concerns. Because the success of these efforts will depend on the motivated involvement of the shipper and freight community, developing a business model to integrate new data sources, could provide a strong basis for expanding dialogue with these stakeholders.

## Stakeholder Engagement

The successful future of the CFS will rely in part on the ability of its user community including the private and federal sectors, academic researchers, and state and local officials to collaboratively improve the CFS over time. While the CFS program has made great strides in its outreach efforts through workshops like this and through other efforts, the user community is calling for a more formal process to bring ideas for potential improvements to the table. Perpetuating the program will involve building an informed and capable corps of users and partners by engaging the next generation of CFS users.

# Concluding Remarks

**MARK E. WALLACE**
*Service Sector Statistics Division, Census Bureau*

**ROBERT BERTINI**
*Research and Innovative Technology Administration*

**ROLF SCHMITT**
*Federal Highway Administration*

From the perspective of the Census Bureau, this workshop has been very effective in reaching CFS users, providing information about why the CFS is important, how it is used in practice, and understanding how effectively it meets user needs. Most importantly, it has identified many opportunities for improving the CFS in the future.

The Census Bureau is committed to improving the 2012 CFS and several improvements are already underway. The BTS and the Census Bureau have worked together over the past year to design a CFS that will provide the highest quality ever, incorporating technological changes while remaining within current economic constraints. This cooperation has identified numerous lessons learned from the 2007 CFS and has developed a plan for moving forward effectively on the 2012 CFS. Anticipated improvements include the use of new data collection technologies that were not available in the past such as optical character recognition for data collection and electronic data collection for respondents. Use of these technologies is important for improving the quality of data received from shippers by keeping the survey cost down, reducing respondent burden, raising data quality, and, ultimately, delivering higher quality CFS data faster than ever before.

The time schedule for the 2012 CFS is an important factor in delivering the final product and requires the team to maintain close adherence to the design and implementation plan. The precanvass will take place in early 2011, followed by an evaluation and modification phase. The first quarter of the CFS data collection will then start in January 2012. As noted during the workshop, the window for changes and improvements is small and the team will make the most of the input from attendees during this process.

The workshop has generated many good ideas that will be evaluated by the team. These include new data tables, new data products, enhancements to methodologies, and new considerations for presenting geographic data, just to name a few. This workshop has been a valuable way of pulling together user input.

In the final analysis, the team will put together a 2012 CFS that will be better than the 2007 CFS. The working relationship between the Census Bureau and its cosponsor, BTS, has never been better. As new modernized data collection techniques, editing techniques, and other improvements are implemented, the team believes their relationship with respondents will improve as well, with an end result being that the 2012 CFS will be the best yet.

*—Mark E. Wallace*

It is important that the user community communicate the importance of this foundational freight survey and to work with the U.S. DOT and the Census Bureau to continue the process of suggesting good ideas and ways to improve it. The world of freight is very complex and dynamic and the CFS is always in need of ideas to better measure that complexity in ways that are useful to decision-makers in the transportation community. This is especially true with today's emphasis on measuring performance. Performance measurement and performance measures are all dependent on data. The collection and analysis of quality freight data is essential to understand how and where freight moves as well as for measuring the performance of those movements.

As the home of the Intelligent Transportation System Joint Program Office, Research and Innovative Technology Administration (RITA) is particularly aware of the role of technology such as the new vehicle-to-vehicle and vehicle-to-infrastructure communications that will potentially play such an important role in the safe and efficient movement of people and goods. These technologies will create a wealth of new data that should help better inform decision-making in many areas of transportation, including the movement of freight.

This workshop has brought together an amazing group of experienced individuals who are involved with freight data collection and analysis including planners and academics as well as a number of young attendees. Freight data, like all transportation activities, needs to continually replenish its source of experienced practitioners. Through the University Transportation Centers (UTC) program, which is managed by RITA, students are provided with the opportunity to work directly with state DOTs and in doing so, interact directly with transportation professionals on a daily basis. Bringing students and young people into the transportation community, including the freight data community, through UTC, internships or other venues is important to the long-term viability of programs like the CFS.

This workshop provided many ideas for enhancing the CFS. RITA, in partnership with the Census Bureau and the user community, is committed to making the CFS the best possible national-level source of freight flow data within which state and local agencies can provide local detail.

In this era of continuing close review of federal programs, it is important that the users of the programs like the CFS demonstrate its application and value. The input from this workshop is fundamental in continuing to improve this critical freight survey.

*—Robert Bertini*

While participants of this workshop have discussed many problems, potential additions, and changes to the CFS, it is important to remember how far this effort has come. During the TRB Annual Meeting that became snowbound in the 1990s, the first CFS data disk was released and a product was delivered after 13 years of planning. Now, planning and delivery occur in regular 5-year cycles with provisional annual updates between surveys. The last decade has seen many meetings where participants discussed ways to save the CFS from extinction, including the meeting in Boston 5 years ago. Now the assumption is that the CFS will happen and discussions focus on improvements.

These changes represent tremendous progress. Many people, including Tom Mesenbourg and a vocal data user community, are responsible for keeping the CFS alive and getting it to

where it is today. Now efforts are on achieving a better understanding of freight transportation through the CFS and other data and research activities that are designed to complement the CFS.

—*Rolf Schmitt*

# Improvements to the 2007 Commodity Flow Survey Data Quality
## *Mileage Estimation of Shipping Distances*

**MICHAEL MARGRETA**
*Bureau of Transportation Statistics, RITA*

**M. ADHI DIPO**
*MacroSys Research and Technology*

## PROJECT DESCRIPTION

The BTS continues to seek improvements to the quality of the information produced from its flagship vehicle for data collection, the CFS. A critical measurement, calculated from the CFS data, is the mileage traveled by each shipment, used in estimating modal ton-miles of freight.

BTS developed an innovative software tool, called GeoMiler, to calculate the distance traveled by mode, in miles to one decimal place, from the origin to the destination of any given shipment for which valid and consistent origin, destination, and modal information were provided by the CFS respondent. If for any reason modal mileage calculations are not obtainable for a given shipment, GeoMiler includes the ability to set prearranged codes that explain the problem(s) for possible correction. This new tool for distance estimation uses geographic information system (GIS) technology and a robust spatial data network to create a unique and effective routing tool.

## METHODOLOGY

Improvements in the routing logic—particularly for highway, railway, and airway—were built into the GeoMiler software. Through the use of GeoMiler, distance calculations for freight transportation have been refined to better estimate the actual shipment mileage in the following ways:

- The estimate for highway mileage considers the functional class of highway so that the "best path" is now the quickest path, based on the likely use of Interstate and other major roadways, and not necessarily the shortest path.
- The estimate for railway mileage now selects a "single best path" from those calibrated with route density information obtained from rail waybills, assigns a specific railroad company at shipment origin, and considers interlinings, ownership, and trackage rights.
- Likewise, the airway mileage estimate now selects a "single best path" from those calibrated with BTS air route information, and chooses airway hubs from the three closest to origin and three closest to destination, considering cargo lifts at hubs and nonstop routes.
- The mileage estimate on an export shipment via airway or waterway now includes the travel distance over domestic airspace, or on domestic waters, up to the U.S. territorial border.

- The mileage estimate on a waterway shipment now includes the drayage mode and distance into the loading dock, thereby converting a shipment that travels primarily waterway into a multiple mode.
- A finer distinction is now provided between inland river and ocean on waterway shipments.

## FINDINGS AND OBSERVATIONS

The use of innovative software and revised selection criteria, coupled with a more extensive multimodal transportation network, resulted in the following:

- Slightly higher (about 3%) mileages on shorter-haul highway shipments;
- Slightly higher (about 3%) mileages on railway shipments;
- Somewhat lower (about 10%) mileages on airway shipments;
- Mileages calculated to the U.S. border for all modes of transportation on all export shipments;
- Inclusion on waterway routings of the modal means (railway drayage or truck drayage) by which the commodity arrived at, and departed from, the waterside dock;
- A finer distinction between where a river ends and an ocean begins, causing river–ocean routings to be classified in other multiple modes.

# Commodity Flow Survey Findings in FAF2.2 Results and FAF3 Update for Phase 2 of the I-70 Dedicated Truck Lanes

**BRAD DIGRE**
**MARK BERNDT**
**PAUL BINGHAM**
*Wilbur Smith Associates*

## PROJECT DESCRIPTION

Congestion along the four-state portion of I-70 has lead to a study of alternatives for new capacity, including truck lanes. FAF2.2 and now FAF3 analysis summaries are, in part, being used to help profile and quantify freight movements to, from, within, and across the corridor region. The context of these summaries includes the corridor region in its entirety, as well as from the context of unique metropolitan areas that intersect the I-70 corridor. These regions are defined by selected aggregations of FAF zone geographies. The flow summaries and related map output allows the visualization of directional proportional flow volumes in terms of value and tonnage, by commodity, mode, and combinations thereof. This information is deemed important to better understand, visualize, and contribute to the quantification of need, capacity, and sustainability of developing and maintaining a successful dedicated truck lane system along the I-70 corridor.

## METHODOLOGY

The 2002 CFS serves as the foundation of the FAF2.2 Commodity Origin–Destination Database and related geography. While complete data dictionaries, user guides, and documentation of methods and sources for FAF3 are forthcoming, FHWA notes that FAF3 concepts are similar to those used in FAF2.2. For the I-70 project, FAF2.2 and now FAF3 (v3.0.1) are organized into a GIS database system to measure, report, and visualize freight flows to, from, within, and across the I-70 region. The context of these measures can be shifted from a "Corridor" encompassing region of aggregation to select "Metro Area" regions of aggregation. Phase 1 of the study reported that while the metropolitan area zones are generally consistent with the defined corridor, and represent the bulk of freight movements within the corridor, several other limitations regarding the resulting FAF summaries are recognized. The coarseness of the extra-territorial "out-state" FAF geography zones (i.e., remainder of state zones) can encompass numerous small, medium and sometimes large cities and towns as well as distributed decentralized freight generating developments. Accordingly, those areas where CFS–FAF zones extend far beyond the defined corridor can be assumed to overstate tonnages and values of flows to and from the intersecting portions of the I-70 corridor.

## FINDINGS, LESSONS LEARNED, AND OBSERVATIONS

Where CFS–FAF geography is largely unchanged between 2002 and 2007, initial findings show consistency between total flow quantities. An improved ease of summarizing the share of modal movement types for region to region (foreign and domestic) movement chains is noted, including in-transit movements. These details afford improved discretization of freight mode share for internal and external (inbound and outbound) corridor movements. FHWA FAF3 planning needs include the development of inventory methods to disaggregate FAF region-to-region flows. Recent research has focused on various methods to disaggregate the information contained within the coarse extra-territorial out-state zones. Estimating county-to-county flows by incorporating a prescribed set of locally collected supplemental data or low-cost commercial data sources is being explored. Development of a successful method would improve understanding of rural area freight demands and culminate in more effective and efficient freight profiling, project identification, design, and development.

# A Freight Data Architecture Application at the Local Level Using Commodity Flow Survey Data

**CATHERINE LAWSON**
**SREEKUMAR NAMPOOTHIRI**
**OMAR J. PETERS**
*University at Albany*

## PROJECT DESCRIPTION

The need for a freight data architecture has prompted several major studies, including NCFRP 12 Specifications for Freight Transportation Data Architecture, (http://144.171.11.40/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=2408). The establishment of such an architecture will make it possible to link a variety of existing freight data, and other related datasets, together to create a more robust understanding of freight activities. Previous research, using a special tabulation of the 2007 CFS, revealed a set of associations between the four-digit NAICS codes and the five-digit SCTG codes. These associations were found to be very simple, simple, complex and very complex. For those industry groups where the association between industry group (NAICS) and commodities (SCTG) is very simple, or simple, it should be possible to "crosswalk" the NAICS–SCTG codes to the Land Based Classification Standards (LBCS) system and provide local planning agencies with a clearer picture of freight activity at the local level.

## METHODOLOGY

To test our hypothesis, we used local administrative and primary survey data collected in Albany, New York by the Capital District Transportation Committee (CDTC), the MPO for the Capital District, as part of one of their Linkage Studies—the Railroad Avenue Transportation and Revitalization Plan (funded 2009–2010). The study area has historically been an industrial district that was served by freight rail with spurs currently lying abandoned in some locations. Today, the area contains several abandoned and/or perceived brownfield sites. However, it is within close proximity to I-90, I-87, Albany NanoTech, and the University at Albany, and has potential for redevelopment from support industries that may look towards the area once it has been revitalized.

The initial mapping of the land uses relied upon tax property classifications that delineated parcels into industrial, retail services, storage/warehouse, etc. However, this was found to be too general to develop improvements to cater to particular activities on parcels. As part of the study's outreach, CDTC staff made multiple visits to the site to invite business owners and tenants to a public meeting. During the visits, staff took anecdotal notes of each business' apparent business or service type. This information was then used to create a more detailed dataset. The next step was the application of the LBCS by the designation of the five dimensions of land: activity, function, structure, site, and ownership (see http://www.planning.org/lbcs/).

In a few cases, multiple addresses were found to be located in a single parcel, particularly in buildings with more than one business or tenant. The issue of multiple activities on a single site requires a modification of the LBCS methodology, including the use of colored stripes or dotted symbols to display parcels with multiple classifications.

To build crosswalks between NAICS–SCTG and LBCS, we first matched the LBCS codes already developed to the four-digit NAICS codes with similar land-use and activity descriptions. Once the corresponding NAICS codes were generated, we used the previous crosswalk between NAICS codes and the five-digit SCTG codes to identify the commodity flows for each parcel. The NAICS–SCTG crosswalk was originally created by the Census Bureau staff as an audit tool for validating the 2007 CFS dataset. The tool was useful in identifying mis-matches between economic activities and commodities generated during the data collection phase. The data was then visualized to display a relationship, by number of five-digit SCTG designations per four-digit NAICS code. These relationships were characterized as: very simple, simple, complex, and very complex associations. These associations were then mapped in GIS with different symbols for each of the four association types.

## FINDINGS

MPOs can use these relationships to target their effort when collecting data for freight modeling or activity-based modeling. They can focus their efforts and financial resources primarily on parcels displaying the “complex and very complex” relationships, while directly applying the five-digit SCTG commodity descriptions to those designated as “very simple and simple,” as indicated through the use of the crosswalk. Future work will require a strategy for validation, including follow-up interviews or data gathering via the Internet.

The techniques used in this process will be applicable to any other MPO or local municipalities using the same methodology. Using the advantages of a freight data architecture (e.g., standardized coding schemes, crosswalks for connecting datasets, and explicit modifications, where necessary) at the local level, will facilitate the incorporation of freight into mainstream transportation planning efforts.

# How to Utilize and Improve Commodity Flow Databases in National Supply Chain Model

**QING LIU**
**DENVER TOLLIVER**
*North Dakota State University*

## PROJECT DESCRIPTION

In this proposed 2-year research, we want to utilize FAF–CFS databases to determine a typology or systematic classification of supply chains and their relationships to commodity flows. Freight flow models like FAF predict freight flows among regions based on commodity forecasts. The commodity forecasts and predicted flows may reflect many different supply chains—some global and some domestic. A better understanding of supply chain factors will help in understanding the forces underlying trade and product flows and mapping commodity forecasts to interregional freight flows.

## METHODOLOGY

This study will focus on the national supply chains and intermodal shipment of commodities, and the interrelationship among the supply chain factors. We hope to conduct the research in 2 years. The U.S. furniture industry has been chosen to be studied. The product of furniture is coded as SCGC 39 in FAF2/3, which only has one three-digit subgroup (SCGC 390). Products listed under this code are "furniture, mattresses and mattress supports, lamps, lighting fittings, and illuminated signs." The industry's supply chain systems both internationally and nationally are continuingly changing because of the increasing competition from oversea manufacturers in the last decades. This supply chain character will sufficiently fulfill our purpose to show the relationship between shipment flows and supply chain factors.

As the following step, we examined this industry. The increasing import from overseas is one biggest character of the industry and will directly affect its supply chain network. For example, according to the U.S. Department of Commerce, U.S. furniture imports have grown 107.7% with exports increased 40.4% from 1999 to 2007. The top import country in 2007 is China, which accounted for 54.4% of imports. And the following top four importing countries are Canada, Mexico, Vietnam, and Italy. As a result, many U.S. furniture manufacturers are choosing to have their furniture made in China and other low-cost countries, and the traditional supply chain is also shifting. Another noticeable character is the industry's fragmented distribution geographically. Top 12 producing states manufacture about two-thirds of the furniture and kitchen cabinets produced in the United States, according to a report on U.S. furniture industry by Al Schuler and Steve Lawser in 2005. But our study is not complete yet. For example, we are still trying to find which regions have the highest furniture production values, and which have the highest consumption values.

Even if our focus is only limited to domestic supply chain part for now, we still need to pay attention to the import and export part. The reason is obvious: If a large percentage of furniture sold by major U.S. furniture manufacturers is actually manufactured oversea, a certain shipment pattern would be implied in the shipment data recorded by FAF–CFS, and should match with industry facts. But how to interpret shipment data also largely depends on the FAF–CFS constructions.

Thus our next task is to analyze the shipment data recorded in FAF3 for 2007. For example, the total furniture import into United States recorded by FAF3 is $39.747 billion for 2007, while total export is $8.196 billion. Since the value of the flow into a region "A" plus its production value will always equal to the value of flow out of "A" plus its consumption, we can calculate the value of furniture consumed minus furniture produced in "A" using FAF3 data. Our first test with FAF3 data showed most states consume more furniture than they produce, with the total surplus of $31.551 billion, which is consistent with the fact of large amount of import surplus. These values will be compared with the real statistics reported by the industry.

## APPLYING THE RESULTS

Once we fully understand the industry and the FAF–CFS database constructions, we will start from the most concentrated manufacturing regions in the United States and propose a method to analyze the furniture supply chain systems for the manufacturers within the region. As proposed, the result can then be used to better understand and improve commodity flows in CFS–FAF databases. We also hope in the end to propose a standard approach in studying supply chain models by utilizing commodity flow databases.

In the poster presentation, we present the research idea and potential difficulties in matching furniture shipment flows in FAF–CFS with the supply chain networks. We also discuss the best ways to utilize available information contained in FAF and CFS and share about the experience.

# Development of Statewide Freight Plan for Alabama Using Integrated Freight Planning Framework

**MICHAEL ANDERSON**
**GREGORY HARRIS**
*University of Alabama in Huntsville*

## PROJECT DESCRIPTION

The need to integrate freight traffic into transportation planning has become more prominent in recent years, although its inclusion in most transportation plans and models has predominantly been limited in scope. The Alabama DOT recognizes the need for research in freight transportation and the associated interrelationships between economic growth and transportation infrastructure. Identifying freight related constraints and potential improvements to the state's transportation system can facilitate freight mobility. This in turn may support economic development initiatives at the state and local level.

To this end, Alabama DOT initiated the Alabama Statewide Freight Study and Action Plan in April 2009. Current and future multimodal freight movements into and out of the state, as well as the condition, operations and safety of the multimodal system, were analyzed. All modes of freight movement—truck, rail, air, and water—were examined as a part of this study. Freight transportation operations are unique in that they are composed of both public and private system ownership supporting a multimodal network. Of the four modal elements, only highway infrastructure falls under the direct responsibility of Alabama DOT. Due to its significance with regard to share of overall freight movement and impact on the general traveling public, truck freight movement underwent analysis at an additional level of detail.

This study reviewed freight movements and commodities that travel Alabama's Interstates and major freight routes. A review of specific commodities and routes taken is helpful in understanding deficiencies along a route. Similarly, using criteria to determine congestion, safety and truck concentrations on the Alabama highway network assists in identifying deficient locations in the freight highway network. Understanding the total character of freight movements along a corridor—its prevalent commodities and potential safety and operational constraints—is helpful in refining possible suggestions and improvements for increasing system efficiency and safety.

Alabama DOT has a proactive program of projects in its Comprehensive Project Management System (CPMS), with projects identified for many locations where freight system deficiencies were found. Freight is a primary customer of the highway network and the state's program to improve safety and intermodal connections is reflected in the current program of projects that address many of the freight transportation needs. In locations where rail, ports and inland river ports, and air cargo facilities are located in proximity to highways, there is additional opportunity to consider highway improvements to facilitate intermodal freight options and/or mode switch.

## FINDINGS AND RECOMMENDATIONS

The study findings are intended to provide information to a number of parties—decision makers at Alabama DOT, other agencies and the private sector—as they continue looking for ways to accommodate the ever increasing volume of freight on the state's highways. Alabama DOT will take a lead role in ensuring the accumulated data on freight movement is maintained for use by the department and others. In particular, Alabama DOT will be able to use the information regarding existing and future needs in developing its construction program. Because freight movement is heavily driven by the private sector, the role of public agencies, including Alabama DOT, is primarily supportive of the objectives. Freight mobility is a multifaceted transportation challenge, and improving its efficiency and safety represent similar hurdles for public and private stakeholders. Ultimately, market factors drive mode choice decisions in freight movement.

The following steps outline recommended actions for Alabama DOT and others in the continued future use and maintenance of the freight information prepared during this study.

1. Regularly update/maintain data used in the analysis. Alabama DOT's established monitoring programs provide a wealth of information reflecting the State's road system, its operations, condition and safety. The value of this information is recognized in planning and programming improvements. These existing data sources were applied during the freight study effort to develop a "freight sensitivity module" that recognized the level and type of freight transportation in identifying and evaluating freight transportation needs. The department's incorporation of a freight sensitivity component in its assessment of transportation needs will maintain awareness of freight needs as an ongoing part of Alabama DOT's transportation program.
2. Coordinate Alabama DOT's schedule for updates of the CPMS and development of the statewide transportation improvement plan. In addition, freight transportation assessments should be incorporated as a distinct element of annual assessment processes regarding prioritization and selection of programmed projects. In doing so, planning input and findings would reflect the most current freight transportation data regarding safety and systems operations.
3. Continue coordination with MPOs and rural planning organizations (RPOs), on any particular freight related issue (specific to Alabama) for their modes, facilities, and organizations. Feedback is informative of trends and future directions being considered or in development by freight transportation operators.
4. Make a directory of the data available to non-Alabama DOT users, including the MPOs and RPOs. Freight movements are a key element of safe and efficient transportation in local areas, in addition to being important to the local economy. Making this data available to local planning partners and interested stakeholders will help improve local planning and result in better local transportation decision making. Freight modal operators are continuously assessing options for improving their operating efficiency and competitive advantage. Sharing information with the private sector modal operators will improve their understanding of current conditions in the state's transportation network. In addition, it will facilitate their assessment of available options for the most efficient use of that network. Private sector modal operators are a major user of the road network; the more informed the user, the better the working relationship and system operations. Alternate routing, modal shifts/linkage, and identification of new opportunities are all

examples of potential improvements to freight transportation which benefit from the involvement of all users, public and private.

# Freight Knows No Bounds

## *The Issue of Cross-Border Metropolitan Areas and the Accuracy of Freight Activity Data*

**DEREK JAEGER**
*Port of Portland*

## PROJECT DESCRIPTION

Data from the CFS of the United States is a helpful tool for understanding metropolitan-level freight movement. The survey data provides information not readily available elsewhere, such as dollar value of shipments by commodity. Further, as a Bureau of Census product, the data is widely recognized as legitimate, giving analysis using the data credibility.

CFS data, though collected on a very detailed geographic level, is richest at the national level. As one drills down towards metropolitan areas, data availability begins to limit the CFS' usefulness. Often times when cell sizes are small data is suppressed. Further, data released by Census breaks metropolitan areas on state boundaries and ignores economic realities. Thus the issue of cross-border metropolitan areas is created and the accuracy of freight activity data for cross border metropolitan areas is in question.

## BACKGROUND

Portland, Oregon, is situated on the Oregon–Washington border marked by the Columbia River. Though this massive river clearly marks the separation of two states, two major freeways cross the river and the region's international airport and many of its deep-water marine terminals are located on the river. The freight corridor along the Columbia is the heart of the metropolitan area and creates an economic operating region of approximately 2.2 million people in the Portland–Vancouver MSA.

As mentioned, reporting of CFS data at the metropolitan level is bounded by state borders and makes data useless for many of the multistate metropolitan areas (MSMs). This inability to answer questions accurately regarding infrastructure use, trade lanes, and market definition significantly handicaps the potential use of the data.

Portland–Vancouver is just one example of CFS data shortcomings for metropolitan areas due to geographic reporting and suppression. MSMs account for 11.5% of the total number of MSAs in the United States. Even more astounding is that they account for 15 of the Top 50 Metropolitan areas by population. That's roughly 30% of the 50 largest MSAs in the United States.

## TOP 10 MULTISTATE METROPOLITAN AREAS: PORTLAND IS NOT ALONE

1. New York–Northern New Jersey–Long Island;
2. Chicago–Joliet–Naperville;
3. Philadelphia–Camden–Wilmington;
4. Washington–Arlington–Alexandria;
5. Boston–Cambridge–Quincy;
6. Minneapolis–St. Paul–Bloomington;
7. St. Louis;
8. Portland–Vancouver–Hillsboro;
9. Cincinnati–Middletown; and
10. Kansas City.

## METHODOLOGY

At the Port of Portland we have firsthand experience using the CFS data and realizing the shortcomings of the data in our multistate metropolitan area. When querying metropolitan shipment characteristics by origin geography by destination geography, only the Oregon part of the Portland–Vancouveris available. Vancouver is tied to the "remainder of Washington" section of the data. When trying to size our air cargo market, as an example, we are not able to use CFS data. Several of the region's air cargo shippers are located in Vancouver, closer to the airport than many of their counterparts on the Oregon side of the Columbia. Yet, all of that volume is attributed "Rest of State—Washington." This data gap forces local agency to spend additional resources to accurately portray commodity movement. In the most recent Portland Commodity Flow Forecast, local agencies were required to hire outside consultants to collect data, build a baseline, and create estimates for a forecast that could be done with data already collected by census.

## FINDINGS

1. Understatement of total value/weight shipped;
2. Unable to accurately define market O-D; and
3. Organizations are spending additional money to create products that accurately represent regional commodity flow (i.e., Portland–Vancouver Commodity Flow Forecast).

## IMPACT OF SPLITTING PORTLAND–VANCOUVER ON STATE BOUNDARY

| *CFS Total Portland Outbound Tonnage* | | *Estimated Actual Portland Outbound Tonnage** | |
|---|---|---|---|
| Destination | Tons (thousands) | Destination | Tons (thousands) |
| United States | 99,037 | United States | 109,619 |
| California | 2,538 | California | 3,212 |

SOURCE: U.S. Census Bureau, 2007 CFS.
*Note: Estimates based on Clark County population percentage to remainder of Washington State CFS data.

If these data were made available, then the port's marketing, business outreach, and community relations staff could identify markets opportunities and service improvements, educate the public and elected officials on freight issues, and use jointly with the business community to advocate for public investments in freight-related infrastructure. Other uses of the data would include the following:

1. Prioritization of major infrastructure projects;
2. Applications for grant funding; and
3. Understanding the impact of freight on the transportation system and the environment.

## LESSONS LEARNED

1. Located along the Oregon–Washington border, Portland's MSA, as defined by Census, includes Clark County, Washington. The CFS definition excludes Vancouver and the rest of Clark County because of its location in Washington side.
2. What does Vancouver mean to Portland? Vancouver makes up roughly 20% of the 2.2 million people living in the Portland–Vancouver MSA. Approximately 10% of employment in Portland is comprised of people who drive across the border to work in Portland from Vancouver each day. Nearly all of the region's freight handling facilities are located on the Oregon side of the MSA, though a number of large marine terminal facilities are on the Vancouver side.
3. Data for the Vancouver, Washington, part of the metropolitan area are available though unreported and not available for use in the CFS datasets.
4. We are training potential users that accurate data are not available and CFS metropolitan area data are not reliable for use.

## OBSERVATIONS

There may be ways to make more of the data already collected available to users thereby increasing the value and relevance of the CFS. As can be the case in some states, certain state-collected data are made available to other government agencies for their use (as long as not reported externally in a disaggregated manner) when a request is made and justified. Breaking data on state boundaries are out of alignment with current practice in other federal datasets and with market realities.

In summary,

1. Data are already collected, why not report them in aggregate for MSMs?
2. Increasing the size and scope of the reported region could potentially remove suppression and improve data accuracy.
3. Other data sets, including other Census data sets, already include full MSM data:
    a. Population;
    b. Employment/unemployment/labor force; and
    c. International trade:
        i. Metropolitan area exports and
        ii. Customs district.

# Overview of the FAF3 Freight Flow Matrix Construction Process

**MICHAEL SPRUNG**
*Federal Highway Administration*

**FRANK SOUTHWORTH**
**DIANE DAVIDSON**
**HO-LING HWANG**
**BRUCE PETERSON**
**S.-M. CHIN**
**DAVID VOGT**
**J.-M. LI**
*Oak Ridge National Laboratory*

## PROJECT DESCRIPTION

The FAF3 is a FHWA freight data product which provides a national O-D matrix of commodity flows to, from, and within the United States. FAF3 freight flows are reported in terms of both annual tons and annual dollars of freight moved by mode of transportation. Based largely on the 2007 CFS, FAF3 utilizes domestic freight flow characteristics, geographic regions, and the SCTG commodity coding system from CFS.

However, many freight flows were not captured by the 2007 CFS due to scope and sample size limitations. Approximately 100,000 establishments were sampled out of some 754,000 freight moving establishments in 2007 and imports are out of scope entirely. To estimate missing data values, the approach taken in FAF3 was to use a combination of a novel Log-linear modeling approach (LLM) with an iterative proportional fitting (IPF) routine that also uses additional data inputs to fill in the missing pieces. The complete FAF3 O-D–Commodity–Mode database is made up of 131 Origins x 131 Destinations x 43 Commodity Classes x 8 Modal categories, for annual tons and dollars. This poster illustrates how the 2007 CFS data were integrated with several additional data sources using LLM and IPF to create a comprehensive FAF3 national freight flow matrix.

More detailed documentation on the sources and methods utilized in the development of FAF3 are available from the FHWA website at the following website: http://www.ops.fhwa.dot.gov/freight/freight_analysis/faf/index.htm.

# Using Aggregated Federal Data to Model Freight in a Medium-Size Community

**GREGORY HARRIS**
**MICHAEL D. ANDERSON**
*University of Alabama in Huntsville*

## PROJECT DESCRIPTION

The efficient movement of freight within and through a region is vital to its growth and economic development. Transportation planning involves the development of travel demand models to support a region's infrastructure investment decisions but modeling professionals face limitations in obtaining accurate freight data. This problem originates from issues with gathering and utilizing data that are at the appropriate granularity. Freight data at the local level are considered proprietary and companies are reluctant to share. One approach in overcoming this limitation is to use a nonproprietary, national freight flow database however; the high level of aggregation of the national freight flow data presents challenges for determining freight movements at the substate level. The publicly available data have to be supplemented by local information to provide reliable transportation demand forecasts suitable for planning purposes.

Investigating future freight flows requires a deep understanding of the economic and industrial base of a region. For Alabama, this includes major manufacturing industries, agriculture, logging, and mining. Retailing, wholesaling, and warehousing activity also creates freight traffic. The base year for the economic database is 2002, the year corresponding to the FAF2 and also when the U.S. Census Bureau surveyed industries for its series of state economic censuses.

## METHODOLOGY

Traditionally, freight forecasting models have used employment to generate forecasted freight flows. However this factor does not take into account productivity improvements that allow a company to increase production without increasing employment. Thus, value of sales–shipments is a better predictor of freight activity since it accounts for productivity improvements. In determining freight generated by households or wholesale to retail business, population and employment do not accurately reflect increases in goods–services purchased generated by greater spending power. Growth in personal income was chosen for inclusion in the database as an indication of growth of household consumption and consequently should give a more accurate forecast.

Value of sales data for manufacturing are published in the Census of Manufacturing produced by the U.S. Census Bureau. They are available at the county level but data points are suppressed to protect the privacy of companies if there are very few firms, which was the case in 19 out of the 67 Alabama counties. Estimates were used in this case.

Value of sales for agricultural commodities was estimated from the Census of Agriculture. The U.S. Geological Survey produces the geological survey, and supplemented with data from the Census of Mining, was used to determine value of sales for the mineral industry. Sand and gravel operations are located in almost every county in Alabama and can be found using County Business Patterns from the U.S. Census Bureau. The Alabama Forestry Commission releases data on logs harvested by volumem and these data were used with pricing data from the University of Georgia to determine value of sales for the logging industry. Personal income by county is released annually by the BEA.

The data extracted from the FAF2 provide an estimate of the freight activity in the two Alabama zones and the Port of Mobile for the base year 2002 and the 2035 forecast year. The compilation of value of sales data in the economic database provides an indication of the level of freight activity in Alabama counties. There are comparability issues between the datasets; economic data are classified by the NAICS and commodities in the FAF2 database are identified by an abbreviated commodity name based on the two-digit level of the SCTG. Of the 43 two-digit SCTG codes, only 14 have identical counterparts at the three-digit level of the NAICS classification system. A cross-reference was developed to align the SCTG codes, NAICS codes, and FAF2 commodity abbreviations.

The county value of sales data provided the input necessary to determine each county's contribution to the freight generation–attraction aspects of its FAF zone. A county's freight for each SCTG commodity was determined by dividing its value of sales by the total value of sales for all counties in its zone. Once the initial calculations were completed, the values were examined to identify any inconsistencies with industrial activity known to exist within the counties. Inconsistencies were resolved with supplemental data from the county business patterns, state and local reports, and expert knowledge of the area.

The commodity flows from the FAF2 database for Alabama were apportioned to the 67 counties based on value of sales weight. Flows through the Port of Mobile posed additional challenges as there were questionable freight flow entries. Examination of results of the first iteration with port personnel revealed several weaknesses in the dataset. Some O-D pairs seemed unlikely to use Mobile's port when there are other more convenient gateways available. Some mode choices also seemed unlikely for certain commodities based on preferences known to exist at the port, as provided by port personnel. For example, the FAF2 data showed relatively large tonnages of coal transported by truck to and from the port whereas this commodity is known to travel to the port mostly by rail and from the port mostly by water. Adjustments were made in a second iteration to overcome those weaknesses and refine the data.

Examination of the results led to one additional adjustment, as there was considerable tonnage of SCTG 41, Waste and Scrap, imported through the Port of Mobile. This does not refer to garbage but includes iron–steel and precious metal scrap, glass scrap, paper, and other recyclables. Waste and scrap flows were combined with SCTG 42, Mixed Freight, and added to Mobile County's flows to ensure port traffic was accounted for within the county. The result was a set of matrices with county-level freight O-D commodity tonnages for the State of Alabama.

This research has shown that, with the proper adjustment, local economic and industrial data can be employed to allocate freight flows to substate regions from the commodity volumes provided by highly aggregated national databases. This methodology can easily be replicated by other states and MPOs.

# Validating the Commodity Flow Survey with TRANSEARCH

**PAUL CIANNAVEI**
*IHS Global Insight*

## PROJECT DESCRIPTION

TRANSEARCH is an independent, proprietary data base of national freight flows that can be used to validate the findings of the CFS. While TRANSEARCH does make some limited use of CFS information in its annual construction, the 2007 version was developed and completed 2 years ago, well before the most recent CFS. Consequently, the results can serve as a completely independent cross-check. TRANSEARCH has a time-proven methodology that was established over 30 years ago, and has been refined and utilized on an annual basis over this entire time span.

While the overall nature of the two datasets is quite similar, portraying market-to-market freight flow volumes by mode and commodity, there are differences in scope, coverage, commodity, and modal identification that need to be accounted for in order to make accurate comparisons. Highlighting these distinctions, and making necessary adjustments to the data, will be a key component of the presentation. Preliminary findings show that there appears to be a very high level of correlation between the two sets of freight flow volume data, with the correspondence being more pronounced at more aggregate levels of geographic market and commodity detail.

## PRESENTATION

The presentation will explain where the two data sets differ in terms of coverage, such as the handling of import and cross-border traffic; modal definitions, particularly in the multimodal categories, such as the CFS's "truck and rail mode" versus how TRANSEARCH portrays each portion of this multimodal movement in the appropriate but distinct "truckload" and "rail intermodal" mode categories; and commodity identification, where the CFS uses SCTG and TRANSEARCH uses Standard Transportation Commodity Code. As practitioners, IHS Global Insight has a significant level of experience and expertise in making the appropriate translations and adjustments to the data to facilitate accurate comparisons.

The poster presentation will be heavily graphic, with tables, charts and graphs that illustrate the results of the comparisons. The presentation will first explain and highlight where and how adjustments need to be made to address the issues and differences of scope of coverage, modal identification, and commodity definitions. The analysis will begin by looking at more aggregate level comparisons, such as national mode and commodity tonnages, and will then delve into more detailed assessments, such as looking at individual state level results. Because the TRANSEARCH development process is geared towards accurately capturing tonnages, the presentation will focus on this particular unit of measure.

Specific adjustments that need to be made in order to get an accurate comparison of the two data sets include the following:

- Coverage of imported goods;
- Coverage differences in the handling of waste and scrap;
- Pipeline activity;
- Format of rail highway intermodal activity;
- Format of rail water intermodal activity;
- Format of truck air intermodal activity;
- Coverage of air mail; and
- Format of warehouse–secondary traffic coverage.

# 2007 Commodity Flow Survey Hazardous Materials Report Highlights

**RON DUYCH**
**CHESTER FORD**
**HOSSAIN SANJANI**
*Bureau of Transportation Statistics, RITA*

## BACKGROUND

When the U.S. Secretary of Transportation finds that the transportation of a particular quantity and form of a material poses a certain level of risk to the safety or property of the public, these types of commodities are designated as a hazardous material.

The CFS compiles a robust dataset of hazmat shipment estimates by asking hazmat shippers to enter a four-digit United Nations/North America identification code on the CFS questionnaire. These data allow for the identification of hazmat flows and the quantification of exposure—the risk proportionate to the level of activity—by mode of transportation. CFS hazmat data are used in policy development, the rule-making process, and program planning. CFS hazmat data are the only publicly available source of hazmat flow data available for the highway and air modes.

Other uses of hazmat data from the CFS include addressing public safety concerns by providing denominator data for conducting risk analyses, conducting security assessments, and identifying emergency response and preparedness needs. The CFS hazardous materials data are the only publicly available source of hazmat flow data available for the highway and air modes.

## FINDINGS AND OBSERVATIONS

The 2007 CFS doubled the overall sample size to approximately 100,000 establishments from 50,000 in the 2002 CFS. Further increased targeting of hazmat shippers (also called oversampling) resulted in 5.6% of records being for hazardous materials in 2007, whereas the rate was 4.9% in 2002. (Percentages are prior to weighting of the data.)

In 2007, the nation's transportation system carried 2.2 billion tons of hazardous materials worth $1.4 trillion for 323 billion ton-miles.

Over half of hazmat tonnage is transported by highway mode. The 2007 CFS recorded 1.2 billion tons of hazmat transported 104 billion ton-miles over our nation's highways. Private trucking carried 32% of hazmat tonnage, and for-hire trucking carried 22% of hazmat tonnage. Pipeline transported 28% of all hazmat tonnage reported in the 2007 CFS, water carried 7%, and rail transported 6% of tonnage. However, rail carried 28% of hazmat ton-miles, and single-mode water carried 11% of the ton-miles.

Industries that shipped the most hazmat tonnage in 2007 were Petroleum and Coal Products Manufacturing (NAICS 324)—with 931 million tons, and Petroleum and Petroleum Products Merchant Wholesalers (NAICS 4247)—with 804 million tons. The Petroleum and Coal

Products Manufacturing industry shipped 56% of its hazmat tonnage by pipeline and 21% of its tonnage by truck. The Petroleum and Petroleum Products Merchant Wholesalers industry shipped 91% of its hazardous shipment tonnage by truck. The chemical manufacturing industry (NAICS 325) loaded 40% of hazardous shipment tonnage onto trucks, 25% onto rail cars and tanks, and 20% of its tonnage into pipelines.

Most of the hazmat transported are flammable liquids (Hazard Class 3). Of the 2.2 billion tons of hazmat shipped overall, 1.8 billion tons are flammable liquids, consisting primarily of refined petroleum products. This class also accounts for 182 billion of the 323 billion total hazmat ton-miles generated. There were 251 million tons of gases (Hazard Class 2) transported, generating 55 billion ton-miles. Corrosive materials (Hazard Class 8) shipments totaled 114 million tons, generating 44 billion ton-miles.

Single-mode trucking carried more than 45% of tonnage for each hazard class except Class 6 (toxic materials and infectious substances), which has roughly half of its tonnage transported by rail.

The hazmat category of toxic by inhalation (TIH) includes TIH gases and volatile liquids that are toxic when inhaled. In 2007, shippers sent 27 million tons of TIH materials that accounted for 10 billion ton-miles.

Packing Group I designates materials that require the most rigorous standards of preparation for transport. (The packing group designation reflects the level of hazard associated with the material being shipped.) In 2007, shippers sent 586 million tons of Packing Group I materials, generating 72 billion ton-miles.

The estimated total tonnage of hazardous materials shipped in the 2007 CFS is not statistically different from the tonnage shipped in the 2002 CFS. However, the value of hazmat shipped more than doubled from $660 billion in 2002 to $1,448 billion in 2007, principally due to an increase in price of petroleum products and basic commodities classified as hazmat.

Texas is both the largest shipper and largest receiver of hazmat tonnage in both the 2002 and 2007 CFS, primarily due to the concentration of the petro-chemical industry there. Louisiana and California represented the next two states that had the greatest amount of tonnage of hazmat shipments as measured by the 2007 and 2002 CFS.

The distribution of modes used to transport hazardous materials in 2007 was similar to 2002. In 2007, 54% of hazmat tonnage was carried by truck, which is not statistically different from a 53% share in 2002. For pipeline, the share of 28% of tonnage in 2007 was not statistically different from the share of 30% in 2002.

Due to methodological changes, much of the tonnage that was previously identified as single-mode water has shifted to multiple mode combinations that have water as part of the mode combination.

APPENDIX A

# Abbreviations and Acronyms

| | |
|---|---|
| 3PL | Third-party logistics providers |
| AFF | American FactFinder |
| BEA | Bureau of Economic Analysis |
| BTS | Bureau of Transportation Statistics |
| CDTC | Capital District Transportation Committee |
| CFS | Commodity Flow Survey |
| CPMS | Comprehensive Project Management System |
| CSA | Census Statistical Area |
| CREATE | Chicago Region Environmental and Transportation Efficiency |
| DOT | Department of Transportation |
| FAF | Freight Analysis Framework |
| FHWA | Federal Highway Administration |
| GIS | Geographic information system |
| IPF | Iterative proportional fitting |
| LBCS | Land Based Classification Standards |
| LLM | Log-linear modeling |
| MPO | Metropolitan planning organization |
| MSA | Metropolitan Statistical Area |
| MSM | Multistate metropolitan area |
| NAICS | North American Industrial Classification System |
| NCFRP | National Cooperative Freight Research Program |
| O-D | Origin–destination |
| RITA | Research and Innovative Technology Administration |
| RPO | Rural planning organization |
| SCTG | Standard Classification of Transported Goods |
| TIGER | Transportation Investment Generating Economic Recovery |
| TIH | Toxic by inhalation |
| TRB | Transportation Research Board |
| UTC | University Transportation Centers |

APPENDIX B

# Preconference Survey

| **1. Which of the following BEST DESCRIBES the business sector in which you work? (Select one.)** | | |
|---|---|---|
| U.S. Department of Transportation | 9 | 17% |
| U.S. Census Bureau | 1 | 2% |
| Other federal agency | 4 | 8% |
| State government | 7 | 13% |
| Local government | 0 | 0% |
| Education (college/university faculty, student, etc.) | 12 | 23% |
| Research or consulting firm | 10 | 19% |
| Trade or professional association | 1 | 2% |
| Individual (other person with no business affiliation) | 0 | 0% |
| Other, please specify | 8 | 15% |
| **Total** | 52 | 100% |

| **2. Have you ever used the CFS estimates?** | | |
|---|---|---|
| Yes, go to question 3. | 41 | 79% |
| No, go to question 9. | 11 | 21% |
| **Total** | 52 | 100% |

| **3. Which methods have you used to access CFS? (Select all that apply.)** | | |
|---|---|---|
| Direct use of CFS products. | 30 | 73% |
| Indirect use through the Freight-Analysis-Framework (FAF). | 28 | 68% |
| Third party product (such as a consultant study or model). | 12 | 29% |
| Other, please specify. | 0 | 0% |

| **4. Which CFS release have you used? (Select all that apply.)** | | |
|---|---|---|
| Commodity Flow Survey 2007 | 35 | 85% |
| Commodity Flow Survey 2002 | 31 | 76% |
| Commodity Flow Survey 1997 | 18 | 44% |
| Commodity Flow Survey 1993 | 15 | 37% |

| **5. Have you used the CFS estimates to (select all that apply)** | | |
|---|---|---|
| Conduct economic analyses? | 16 | 39% |
| Develop models and/or tools for policy analyses? | 21 | 51% |
| Evaluate economic development impacts? | 6 | 15% |
| Forecast infrastructure needs, energy consumption and/or environmental impact? | 18 | 44% |
| Analyze patterns of commodity and/or vehicle flows? | 33 | 80% |
| Complete descriptive reporting on commodity and/or transportation activities? | 29 | 71% |
| Other, please specify | 4 | 10% |

| **6. How do you access CFS estimates? (Select all that apply.)** | | |
|---|---|---|
| American FactFinder (online interactive system via Census.gov) | 15 | 38% |

| | | |
|---|---|---|
| Excel tables (via BTS.gov website) | 28 | 70% |
| CSV files (via BTS.gov website) | 22 | 55% |
| HTML tables (via BTS.gov website) | 9 | 22% |
| PDF tables | 12 | 30% |
| Printed publications | 10 | 25% |
| CD-ROM | 8 | 20% |
| Transtats | 4 | 10% |

| **7. What dimensions of the CFS are important to you? (Select all that apply.)** | | |
|---|---|---|
| Geographic detail (state, metropolitan area, rest of state) | 38 | 93% |
| Commodity detail | 41 | 100% |
| Industry detail (NAICS) | 33 | 80% |
| Distance shipped detail breakout (less than 50 mi, 50–99 mi, etc.) | 28 | 68% |
| Shipment weight detail breakout (less than 50 lbs, 50–99 lbs, etc.) | 27 | 66% |
| Mode detail breakout (truck, for-hire truck, private truck, truck, and water, etc.) | 36 | 88% |
| Hazmat shipment characteristics (commodity, mode, hazardous class, etc.) | 20 | 49% |
| Export shipment characteristics (commodity, mode, state, etc.) | 22 | 54% |
| Other, please specify | 4 | 10% |

| **8. What dimension of the CFS is MOST important to you? (Select only one.)** | | |
|---|---|---|
| Geographic detail (state, metropolitan area, rest of state) | 14 | 34% |
| Commodity detail | 9 | 22% |
| Industry detail (NAICS) | 1 | 2% |
| Distance shipped detail breakout (less than 50 mi, 50–99 mi, etc.) | 1 | 2% |
| Shipment weight detail breakout (less than 50 lbs, 50–99 lbs, etc.) | 0 | 0% |
| Mode detail breakout (truck, for-hire truck, private truck, truck, and water, etc.) | 9 | 22% |
| Hazmat shipment characteristics (commodity, mode, hazardous class, etc.) | 4 | 10% |
| Export shipment characteristics (commodity, mode, state, etc.) | 0 | 0% |
| Other, please specify | 3 | 7% |
| **Total** | 41 | 100% |

| **9. What has prevented you from using the CFS estimates? (Select all that apply.)** | | |
|---|---|---|
| Unfamiliar with the dataset | 5 | 24% |
| New to freight analysis requirements | 5 | 24% |
| Lack of time or research goals | 5 | 24% |
| Use other databases that are CFS derivatives | 4 | 19% |
| Mostly use other databases for research needs | 2 | 10% |
| Never heard of the CFS until this conference | 4 | 19% |
| Other, please specify | 3 | 14% |

APPENDIX C

# List of Attendees

| First Name | Last Name | Company | City | State |
|---|---|---|---|---|
| Bala | Akundi | Baltimore Metropolitan Council | Baltimore | MD |
| Walker | Allen | DVRPC | Philadelphia | PA |
| Michael | Anderson | University of Alabama | Huntsville | AL |
| Peter | Appel | U.S. DOT/RITA | Washington | DC |
| Pierre | Bahizi | USDA | Washington | DC |
| John | Barrett | IHS Global Insight | Lexington | MA |
| Daniel | Beagan | Cambridge Systematics | Cambridge | MA |
| Mark | Berndt | Wilbur Smith Associates | Vadnais Heights | MN |
| Robert | Bertini | U.S. DOT/RITA | Washington | DC |
| Rebecca | Binder | PHMSA | Washington | DC |
| Paul | Bingham | Wilbur Smith Associates | Arlington | VA |
| Jason | Bittner | University of Wisconsin | Madison | WI |
| Tom | Bolle | U.S. DOT/RITA | Washington | DC |
| William | Bostic | U.S. Census Bureau | Suitland | MD |
| Felicia | Boyd | U.S. DOT | Washington | DC |
| Michael | Bronzini | George Mason University | Washington | DC |
| Steven | Brown | Port Auth of New York and New Jersey | New York | NY |
| Chris | Caplice | Massachusetts Institute of Technology | Cambridge | MA |
| Promod | Chandhok | RITA/BTS | Washington | DC |
| Cheng Chieh | Chen | MacroSys | Arlington | VA |
| Shih-Miao | Chin | Oak Ridge National Laboratory | Knoxville | TN |
| Paul | Ciannavei | IHS Global Insight | West Hartford | CT |
| Alison | Conway | City College of New York | New York | NY |
| Peter | Cook | Cook Consultants | Olympia | WA |
| Bob | Costello | American Trucking Associations | Arlington | VA |
| Scot | Dahl | U.S. Census Bureau | Washington | DC |
| Carole | DAoust-Martin | CN | Concord | ON, Can |
| Diane | Davidson | Oak Ridge National Laboratory | Knoxville | TN |
| Christopher | DeHaan | North Dakota State University | Fargo | ND |
| Bruce | Dembroski | U.S. Census Bureau | Washington | DC |
| Marina | Denicoff | USDA | Washington | DC |
| Ruth | Detlefsen | U.S. Census Bureau | Washington | DC |
| Ron | DiGregorio | PHMSA | Washington | DC |
| Adhi | Dipo | PB Americas, Inc. | Washington | DC |
| Rick | Donnelly | PB Americas, Inc. | Albuquerque | NM |
| Scott | Drumm | Port of Portland | Portland | OR |
| Ronald | Duych | U.S. DOT/RITA | Washington | DC |
| Hossain | Eftekhari-Sanjani | RITA/BTS | Washington | DC |
| Nathan | Erlbaum | New York State DOT | Albany | NY |
| Bingsong | Fang | MacroSys | Arlington | VA |
| Chester | Ford | FHWA | Washington | DC |
| Garvin | Forrester | Calmar Telematics | Liverpool | NY |
| David | Franklin | FHWA | Matteson | IL |
| John | Frittelli | Library of Congress | Washington | DC |

| | | | | |
|---|---|---|---|---|
| John | Fuller | University of Iowa | Iowa City | IA |
| Tony | Furst | FHWA | Washington | DC |
| John | Gray | Association of American Railroads | Washington | DC |
| Ryan | Grube | U.S. DOT | Washington | DC |
| Andrew | Hait | U.S. Census Bureau | Washington | DC |
| Donna | Hambric | U.S. Census Bureau | Washington | DC |
| Charlie | Han | MacroSys | Arlington | VA |
| Kathleen | Hancock | Virginia Tech | Alexandria | VA |
| Gregory | Harris | University of Alabama | Huntsville | AL |
| Gabriel | Hill | U.S. Census Bureau | Suitland | MD |
| Mark | Hodges | Arizona DOT | Phoenix | AZ |
| Jennifer | Holcomb | Dewberry | Fairfax | VA |
| Cynthia | Hollingsworth | U.S. Census Bureau | Washington | DC |
| Ho-Ling | Hwang | Oak Ridge National Laboratory | Knoxville | TN |
| John | Isbell | Starboard Alliance Company, LLC | Beaverton | OR |
| Barbara | Ivanov | Washington State DOT | Olympia | WA |
| Derek | Jaeger | Port of Portland | Portland | OR |
| Erik | Johnson | Virginia DOT | Richmond | VA |
| Mark | Johnson | FMCSA | Washington | DC |
| Nicole | Katsikides | Maryland DOT | Hanover | MD |
| Becky | Knudson | Oregon DOT | Salem | OR |
| Thomas | Kornegay | Kornegay & Co., LLC | Houston | TX |
| Angela | Ladetto | Detroit Regional Chamber | Detroit | MI |
| Bruce | Lambert | Inst for Trade & Transportation Studies | Mandeville | LA |
| Steve | Lavrenz | Iowa State University | Ames | IA |
| Catherine | Lawson | State University of New York | Albany | NY |
| David | Lehman | PHMSA | Washington | DC |
| Mark | Lepofsky | Visual Risk Technologies | Arlington | VA |
| Li | Leung | RITA/BTS | Washington | DC |
| Steve | Lewis | U.S. DOT/RITA | Washington | DC |
| Yuh Wen | Ling | U.S. DOT | Washington | DC |
| Qing | Liu | North Dakota State University | Fargo | ND |
| Donald | Ludlow | Cambridge Systematics | Bethesda | MD |
| Judah | Lynam | Federal Railroad Administration | Washington | DC |
| Doug | MacIvor | California DOT | Sacramento | CA |
| Mike | Margreta | RITA/BTS | Washington | DC |
| William | McDonald | NuStats | Austin | TX |
| Thomas | Mesenbourg | U.S. Census Bureau | Washington | DC |
| Bill | Murray | West Virginia DOT | Charleston | WV |
| Dan | Murray | ATRI | Roseville | MN |
| Sreekumar | Nampoothiri | Capital District Transportation Comm | Albany | NY |
| John | Nelson | U.S. Census Bureau | Suitland | MD |
| Joseph | Nicklous | PHMSA | Washington | DC |
| Diana | Olney | IHS Global Insight | Washington | DC |
| Shawna | Orzechowski | U.S. Census Bureau | Suitland | MD |
| Barbara | Ostrom | MACTEC Engineering and Consulting | Beltsville | MD |
| Joel | Palley | Federal Railroad Administration | Washington | DC |
| Thomas | Palmerlee | TRB | Washington | DC |
| Eric | Peltz | RAND Corporation | Santa Monica | CA |
| Shardul | Phadnis | Massachusetts Institute of Technology | Boston | MA |

| | | | | |
|---|---|---|---|---|
| David | Plazak | TRB | Washington | DC |
| Ann | Purdue | TRB | Washington | DC |
| Cesar | Quiroga | Texas Transportation Institute | San Antonio | TX |
| Randolph | Resor | U.S. DOT | Washington | DC |
| Steven | Riesz | U.S. Census Bureau | Washington | DC |
| Stephen | Ritchie | University of California | Irvine | CA |
| Bill | Rogers | TRB | Washington | DC |
| A.J. | Romanelli | GIS Solutions, Inc. | Springfield | IL |
| Veronica | Scarlett | PHMSA | Washington | DC |
| Douglas | Scheffler | U.S. Coast Guard | Washington | DC |
| Rolf | Schmitt | FHWA | Washington | DC |
| Joseph | Schofer | Northwestern University | Evanston | IL |
| Gang | Shao | U.S. DOT | Washington | DC |
| Joy | Sharp | RITA/BTS | Washington | DC |
| Ross | Sheckler | Calmar Telematics | Liverpool | NY |
| Keith | Sherman | Illinois DOT | Springfield | IL |
| Huajing | Shi | Port Auth of New York and New Jersey | New York | NY |
| James | Simmons | PHMSA | Washington | DC |
| Scott | Simmons | PHMSA | Washington | DC |
| Raymond | Smith | FMCSA | Washington | DC |
| Steve | Smith | U.S. DOT | Washington | DC |
| Frank | Southworth | Oak Ridge National Laboratory | Knoxville | TN |
| Michael | Sprung | FHWA | Washington | DC |
| Nanda | Srinivasan | TRB | Washington | DC |
| Patricia | Thompson | U.S. Census Bureau | Washington | DC |
| Denver | Tolliver | North Dakota State University | Fargo | ND |
| Adie | Tomer | The Brookings Institution | Washington | DC |
| Katherine | Turnbull | Texas Transportation Institute | College Station | TX |
| Anant | Vyas | Argonne National Laboratory | Argonne | IL |
| Mark | Wallace | U.S. Census Bureau | Washington | DC |
| Bruce | Wang | Texas A&M University | College Station | TX |
| Rosalyn | Wilson | Delcan Corporation | Vienna | VA |
| Kin | Wong | U.S. DOT | Washington | DC |
| Yuanchang | Xie | South Carolina State University | Orangeburg | SC |
| Tom | Zabelsky | U.S. Census Bureau | Washington | DC |
| Yan | Zhou | Argonne National Laboratory | Argonne | IL |

APPENDIX D

# Final Program

This is the final program for the 2010 CFS Workshop containing details on sessions, speakers, and presentations.

TRB **FINAL PROGRAM**

## Commodity Flow Survey Workshop

**November 16, 2010**

**The Keck Center of the National Academies**
**Washington, D.C.**

***Organized by***
Transportation Research Board

***Supported by***
Research and Innovative Technology Administration
Bureau of Transportation Statistics

**www.trb.org/Conferences/CFS2010.aspx**

**Planning Team**

Bruce Lambert, Institute for Trade and Transportation Studies, *Chair*
John Barrett, IHS Global Insight
Thomas G. Bolle, RITA
Scott Drumm, Port of Portland
Ronald Duych, RITA–Bureau of Transportation Statistics
John Frittelli, Congressional Research Service
Donna Hambric, Census Bureau
Kathleen L. Hancock, Virginia Polytechnic Institute and State University
Donald B. Ludlow, Cambridge Systematics, Inc.
Rolf R. Schmitt, Federal Highway Administration
Joy Sharp, RITA–Bureau of Transportation Statistics
Thomas M. Palmerlee, Transportation Research Board

TRANSPORTATION RESEARCH BOARD
*OF THE NATIONAL ACADEMIES*

## An Invitation to Join the Dialogue


*Lambert*

The Commodity Flow Survey (CFS) workshop will facilitate a discussion of experiences among CFS users and serve as a forum on future improvements. Issues of interest include the following:

- Impacts of changes in transportation services and practices on the CFS;
- Improvements and methodological changes that can be implemented in the near term to improve the CFS;
- CFS support for the development of performance measures; and
- Future evolution of the CFS.

Experienced users of the CFS and derivative products and applications, such as the Freight Analysis Framework (FAF), should join the dialogue on improving the next survey.

—Bruce Lambert
*Workshop Planning Team Chair*
*Institute for Trade and Transportation Studies*

## Tuesday, November 16, 2010

7:30 a.m.–8:30 a.m., *outside Keck 100*
**Breakfast**
(*table seating available in 3rd floor atrium*)

8:30 a.m.–10:00 a.m., *Keck 100*
**Opening Session**
Bruce Lambert, Executive Director, Institute for Trade and Transportation Studies, *presiding*

**Understanding Freight Transportation and the Role of CFS**
Peter Appel, Administrator, Research and Innovative Technology Administration

**The Role of CFS in Understanding the U.S. Economy**
Thomas L. Mesenbourg, Jr., Deputy Director, U.S. Census Bureau

**Summary of the Results of the 2005 TRB CFS Conference**
Kathleen L. Hancock, Virginia Polytechnic Institute and State University

**What's New With the 2007 CFS**
Ronald Duych, RITA–Bureau of Transportation Statistics

**Workshop Charge**
Bruce Lambert, Executive Director, Institute for Trade and Transportation Studies

10:00 a.m.–10:30 a.m., *outside Keck 100*
**Break**
(*table seating available in 3rd floor atrium*)

November 16, 2010

Commodity Flow Survey Workshop 2

10:30 a.m.–noon, *Keck 100*
**Panel on Content and Uses**
**Joy Sharp, RITA–Bureau of Transportation Statistics, presiding**
Mike Margreta, RITA–Bureau of Transportation Statistics, *recorder*

**Panelists**
**Daniel F. Beagan, Cambridge Systematics, Inc.**
Rolf R. Schmitt, Federal Highway Administration

- Gain a better understanding of the core items in the CFS, how survey content has changed over the years, and identify possible new areas of information gathering in future collections;
- In view of new DOT goals and reauthorization legislation, identify potential CFS questions that could be of benefit in assisting DOTs and policy makers in developing performance measures or answering new policy questions; and
- To understand the changing complexity of freight transportation logistics, identify areas that might require revision, updating, or—offer an opportunity to collect new data.

Noon–1:00 p.m. *Keck 100*
**Poster Session with Lunch**
(*table seating available in 3rd floor atrium*)

**Development of Statewide Freight Plan for Alabama Using Integrated Freight Planning Framework**
Michael Anderson and Gregory Harris, University of Alabama

**Validating Commodity Flow Survey (CFS) with Transearch**
Paul Ciannavei, IHS Global Insight

**Impact of CFS in Supply-Chain Models for Freight Planning**
Chris Dehaan, Subhro Mitra; and Poyraz Kayabas, North Dakota State University

**CFS Findings in FAF2.2 Results and FAF3 Update for Phase 2 of the I-70 Dedicated Truck Lanes Project**
Brad Digre, Mark Berndt, and Paul Bingham, Wilbur Smith Associates

**2007 CFS Hazardous Materials Report Highlights**
Ronald Duych, Chester Ford, and Hossain Sanjani, U.S. Department of Transportation, Research and Innovation Technology Administration, Bureau of Transportation Statistics

**Using Aggregated Federal Data to Model Freight in a Medium-Size Community**
Gregory Harris and Michael Anderson, University of Alabama

**Freight Knows No Bounds—The Issue of Cross-Border Metro Areas and the Accuracy of Freight Activity Data**
Derek Jaeger, Port of Portland

**Freight Data Architecture Application at Local Level Using CFS Data**
Catherine Lawson, State University of New York, Albany; and Sreekumar Nampoothiri, Capital District Transportation Committee

**How to Use and Improve Commodity Flow Databases in National Supply Chain Model**
Qing Liu, North Dakota State University

**Improvements to 2007 CFS Data Quality: Mileage Estimation of Shipping Distances**
Michael Margreta, U.S. Department of Transportation, Research and Innovation Technology Administration, Bureau of Transportation Statistics

**SHRP 2 Project C20: Freight Demand Modeling and Data Improvement Strategic Plan**
David Plazak, Transportation Research Board, SHRP 2; and Keith Chase, Gannett Fleming, Inc.

**Integrating Freight Considerations in Highway Capacity Planning**
David Plazak, Transportation Research Board, SHRP 2; and Donald Ludlow, Cambridge Systematics, Inc.

**Overview of the FAF3 Freight Flow Matrix Construction Process**
Michael Sprung, U.S. Department of Transportation, Federal Highways Administration; and Frank Southworth and Bruce Peterson, Oak Ridge National Laboratory

1:00 p.m.–2:30 p.m., *Keck 100*
**Panel on Scope, Classification, and Geography**
Ronald Duych, RITA–Bureau of Transportation Statistics, *presiding*
John Barrett, IHS Global Insight, *recorder*

**Panelists**
Gregory A. Harris, University of Alabama, Huntsville
Frank Southworth, Oak Ridge National Laboratory

- Identify any gaps or inaccuracies that currently exist in the scope, geography, and classification systems of the CFS and propose solutions to address them;
- Determine what operational aspects of current transportation and logistical practices are affecting the scope, geography, and classification of the CFS and how we can better understand them in the next cycle; and
- Determine what modifications can be implemented to the CFS scope, geography, and classification systems to better use CFS in performance measures and other quantitative metrics being proposed and developed to measure the effectiveness and justify transportation programs.

2:30 p.m.–3:00 p.m., *outside Keck 100*
**Break**
(*table seating available in 3rd floor atrium*)

3:00 p.m.–4:30 p.m., *Keck 100*
**Panel on Product Tools and Functionality**
John Frittelli, Congressional Research Service, *presiding*
Scott Drumm, Port of Portland, *recorder*

**Demonstration of CFS Products**
Donna Hambric and Andrew Hait, Census Bureau

- Determine which predefined 2007 tools and functionality are the most useful and how the tools and functionality should be changed for the 2012 CFS;
- Determine which American FactFinder 2007 tools and functionality are the most useful and how the tools and functionality should be changed for the 2012 CFS; and
- Determine how the organization of data should be modified. Was the 2007 organization useful? Is more or is less consolidation needed? In 1997 and 2002 CFS estimates were disseminated in more than 400 files. In 2007 the number of files has been consolidated to 42. For example, national, regional, divisional, state, and metro areas were consolidated into one file for each topic.

4:30 p.m.–5:30 p.m., *Keck 100*
**Closing Session**
Bruce Lambert, Executive Director, Institute for Trade and Transportation Studies, *presiding*

**Key Points from the Panels**
Donald B. Ludlow, Cambridge Systematics, Inc.

**CFS Sponsor Remarks**
Mark E. Wallace, Chief, Service Sector Statistics Division of the Census Bureau; and
Robert L. Bertini, Deputy Administrator, Research and Innovative Technology Administration

5:30 p.m.–6:30 p.m., *Keck 213*
**Planning Team Debrief** (invitation only)

THE NATIONAL ACADEMIES™
*Advisers to the Nation on Science, Engineering, and Medicine*

The nation turns to the National Academies—National Academy of Sciences, National Academy of Engineering, Institute of Medicine, and National Research Council—for independent, objective advice on issues that affect people's lives worldwide.
www.national-academies.org

TRANSPORTATION RESEARCH BOARD
*OF THE NATIONAL ACADEMIES*
500 Fifth Street, NW
Washington, DC 20001
**www.TRB.org**

# THE NATIONAL ACADEMIES

*Advisers to the Nation on Science, Engineering, and Medicine*

The **National Academy of Sciences** is a private, nonprofit, self-perpetuating society of distinguished scholars engaged in scientific and engineering research, dedicated to the furtherance of science and technology and to their use for the general welfare. On the authority of the charter granted to it by the Congress in 1863, the Academy has a mandate that requires it to advise the federal government on scientific and technical matters. Dr. Ralph J. Cicerone is president of the National Academy of Sciences.

The **National Academy of Engineering** was established in 1964, under the charter of the National Academy of Sciences, as a parallel organization of outstanding engineers. It is autonomous in its administration and in the selection of its members, sharing with the National Academy of Sciences the responsibility for advising the federal government. The National Academy of Engineering also sponsors engineering programs aimed at meeting national needs, encourages education and research, and recognizes the superior achievements of engineers. Dr. Charles M. Vest is president of the National Academy of Engineering.

The **Institute of Medicine** was established in 1970 by the National Academy of Sciences to secure the services of eminent members of appropriate professions in the examination of policy matters pertaining to the health of the public. The Institute acts under the responsibility given to the National Academy of Sciences by its congressional charter to be an adviser to the federal government and, on its own initiative, to identify issues of medical care, research, and education. Dr. Harvey V. Fineberg is president of the Institute of Medicine.

The **National Research Council** was organized by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the Academy's purposes of furthering knowledge and advising the federal government. Functioning in accordance with general policies determined by the Academy, the Council has become the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering in providing services to the government, the public, and the scientific and engineering communities. The Council is administered jointly by both Academies and the Institute of Medicine. Dr. Ralph J. Cicerone and Dr. Charles M. Vest are chair and vice chair, respectively, of the National Research Council.

The **Transportation Research Board** is one of six major divisions of the National Research Council. The mission of the Transportation Research Board is to provide leadership in transportation innovation and progress through research and information exchange, conducted within a setting that is objective, interdisciplinary, and multimodal. The Board's varied activities annually engage about 7,000 engineers, scientists, and other transportation researchers and practitioners from the public and private sectors and academia, all of whom contribute their expertise in the public interest. The program is supported by state transportation departments, federal agencies including the component administrations of the U.S. Department of Transportation, and other organizations and individuals interested in the development of transportation. **www.TRB.org**

**www.national-academies.org**

TRB

**TRANSPORTATION RESEARCH BOARD**
**500 Fifth Street, NW**
**Washington, DC 20001**