Integrating Marine Data with Other Freight Modes: How Do We Get There?

Bill Eisele
Texas A&M Transportation Institute
Senior Research Engineer &
Mobility Division Head

June 19, 2018
Transportation Research Board
Transforming the Marine Transportation System through Multimodal Freight Analytics,
5th Biennial Marine Transportation System Research and Development Conference

Texas A&M Transportation Institute

My Key Messages

I want you to…

- …keep in mind why informed system performance is important – decision-making, accountability, transparency, and *"it's the right thing to do."*
- …understand that data are available (and constantly improving) to help tell the story of person and goods movement (and related investment needs) across modes.
- …understand that supply chain data are the "Holy Grail" of freight data to inform modal data integration.
- …know that there are many on-going successful national, state and local mobility analyses activities (a couple examples are provided) from which we can build.

Why (should we integrate data across modes)?

So we can…

- …identify when, where, how goods (and people) are moving
- …identify congested locations & bottlenecks in the system
- …inform policy, program, and project prioritization/selection
- …identify impacts of situations & solutions
- …inform performance management (system monitoring)
- …*and because it's the right thing to do!*
  - Accountability and transparency

The Evolution of Freight Transportation Data

Travel time runs!

Probe travel time or speed information

Volume (Quantity)

Origin-destination information?

Route (waypoint/breadcrumb) information?

Search engines?

...by mode?

...across modes (supply chain)?

...by commodity

Commodity data sources?

The End Goal: Where, when, how and why do all system users <u>desire</u> to travel/ship goods?

What multi-modal system is needed/desired?

Texas A&M Transportation Institute

Photo source: pixabay.com

Texas A&M Transportation Institute

Freight Fluidity

"Freight Fluidity" focuses on transportation supply chain performance measurement – travel time, travel time reliability, and cost

Key performance measures for moving freight shipments:

- from end-to-end *(*the route - *beyond just origin-destination)*
- of a supply chain (at commodity level)

(Early Freight Fluidity work developed by Transport Canada)

Texas A&M Transportation Institute

Where Can We (Now) Get the Data?

- **Travel Time & Travel Time Reliability ("Easiest")**
  Highway monitoring systems; company/vendor probe datasets; Automatic Identification System (AIS)
- **Cost (using value of time, cost of unreliability) ("Moderately Easy")**
  Business-to-business information; survey input; industry input/trends
- **Volume of goods ("More Difficult")**
  Commodity Flow Survey; Freight Analysis Framework; Economic Census; Highway Performance Monitoring System; Lloyd's Register; industry input

Where Can We (Now) Get the Data?

- **Origin-Destination Data ("Getting Easier")**

  Travel surveys; vendor datasets (QA/QC)

- **Supply Chain End-to-End Data (across modes) ("Difficult")**

  The "Holy Grail"; business-to-business information; supply chain survey input; industry input

What Can We Do Now?
(Some Examples Using Freight Data)

Texas DOT *100 Most Congested Roads (2015 Speed Data)*

Rank	Rank Truck	Roadway	From	To	County	Annual Hrs of Delay per Mile	Annual Hrs of Truck Delay per Mile	TTI	PTI	CSI	Annual Congestion Cost (M)	Annual Truck Congestion Cost (M)
1	2	IH 610	IH 10 / US 90	US 59 / IH 69	Harris	1,112,917	68,89	2.45	3.89	3.25	$90.63	$20.99
2	1	IH 35	US 290 N	SH71	Travis	1,085,136	108,645	2.71	4.73	3.54	$215.22	$72.33
3	3	US 59	IH 610	SH 288	Harris	870,291	51,604	2.12	3.36	2.17	$105.83	$23.64
4	44	Woodall Rodgers Fwy	US 75	N Beckley Ave	Dallas	748,546	14,976	2.03	3.06	2.31	$21.31	$1.81
5	5	IH 10 / US 90	N Eldridge Pkwy	Sam Houston Tollway W	Harris	659,959	48,855	1.95	3.33	2.30	$50.23	$13.43
6	9	IH 45	Sam Houston Tollway N	IH 610	Harris	656,582	39,713	1.69	2.33	2.01	$135.37	$31.08
7	4	IH 635	IH 35E / US 77	US 75	Dallas	584,661	49,538	1.86	2.58	2.34	$112.58	$33.59
8	14	IH 35E / US 77	SH 183	IH 30	Dallas	555,861	32,302	1.72	2.62	2.14	$67.3	$14.81

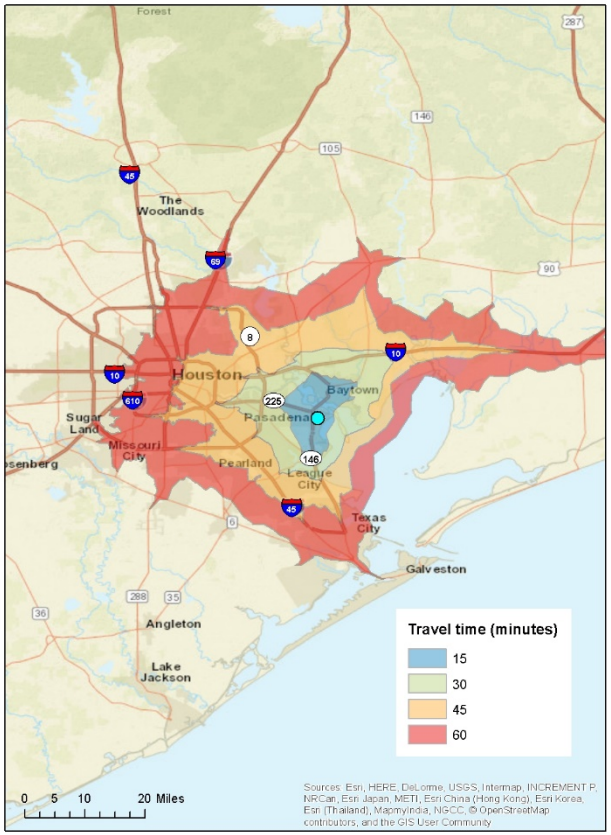
http://www.txdot.gov/inside-txdot/projects/100-congested-roadways.html

Texas A&M Transportation Institute

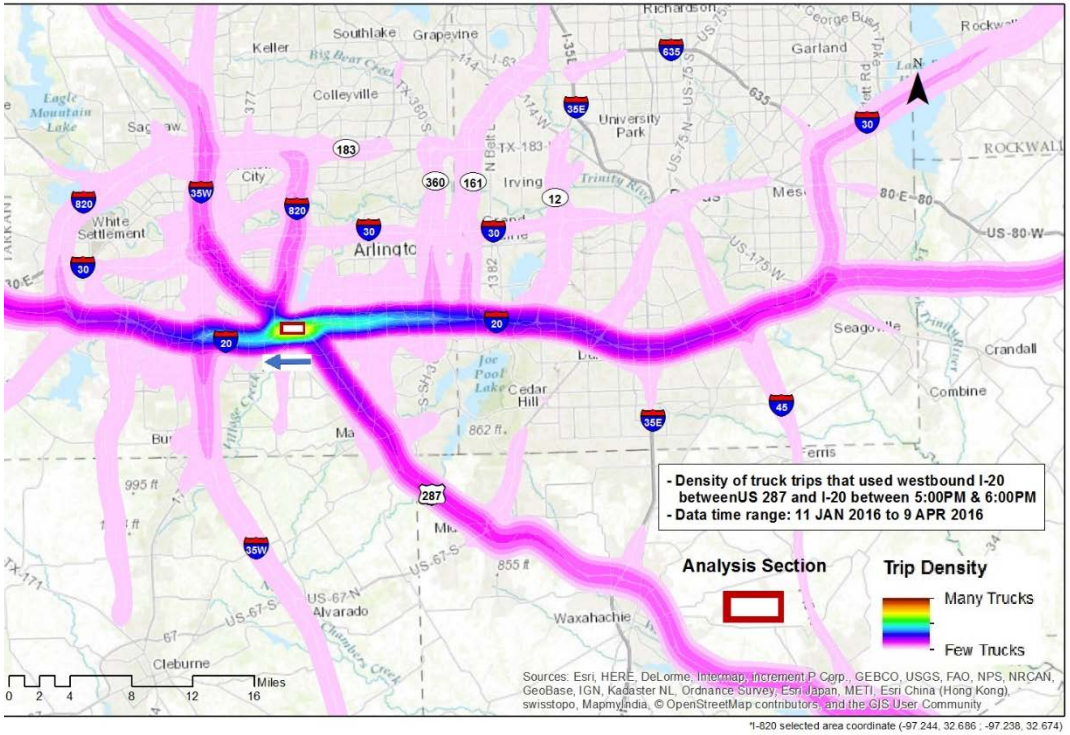
Selected Texas Freight Fluidity Products

To understand freight bottlenecks and inform investment decisions

Weekday 5 PM Travel Time Contour from Barbours Cut Terminal

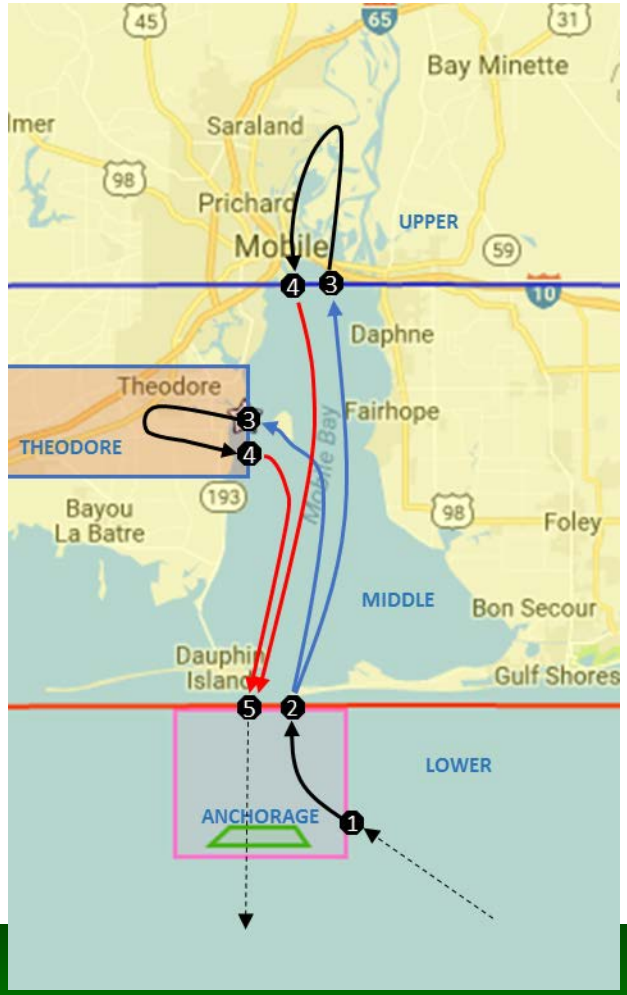


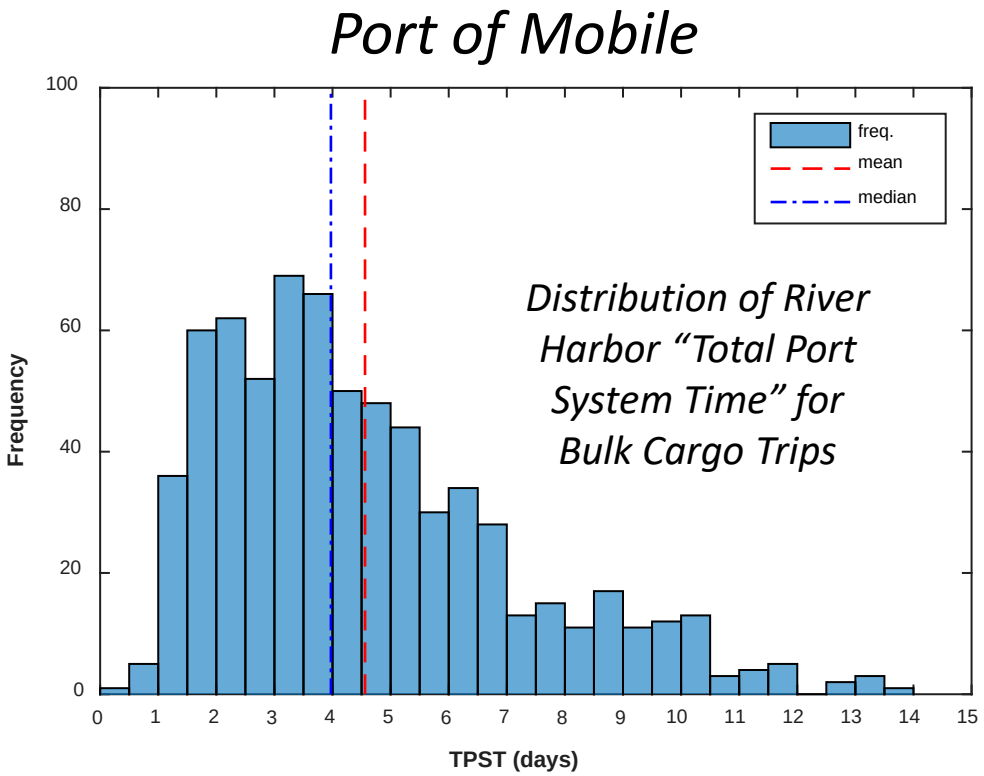
Truck Trip Patterns (for All Trucks Using I-20 Westbound in Downtown Fort Worth)



Texas A&M Transportation Institute

Developing and Implementing a Freight Fluidity Management Framework for U.S. Ports (U.S. Army Corps of Engineers)





Texas A&M Transportation Institute

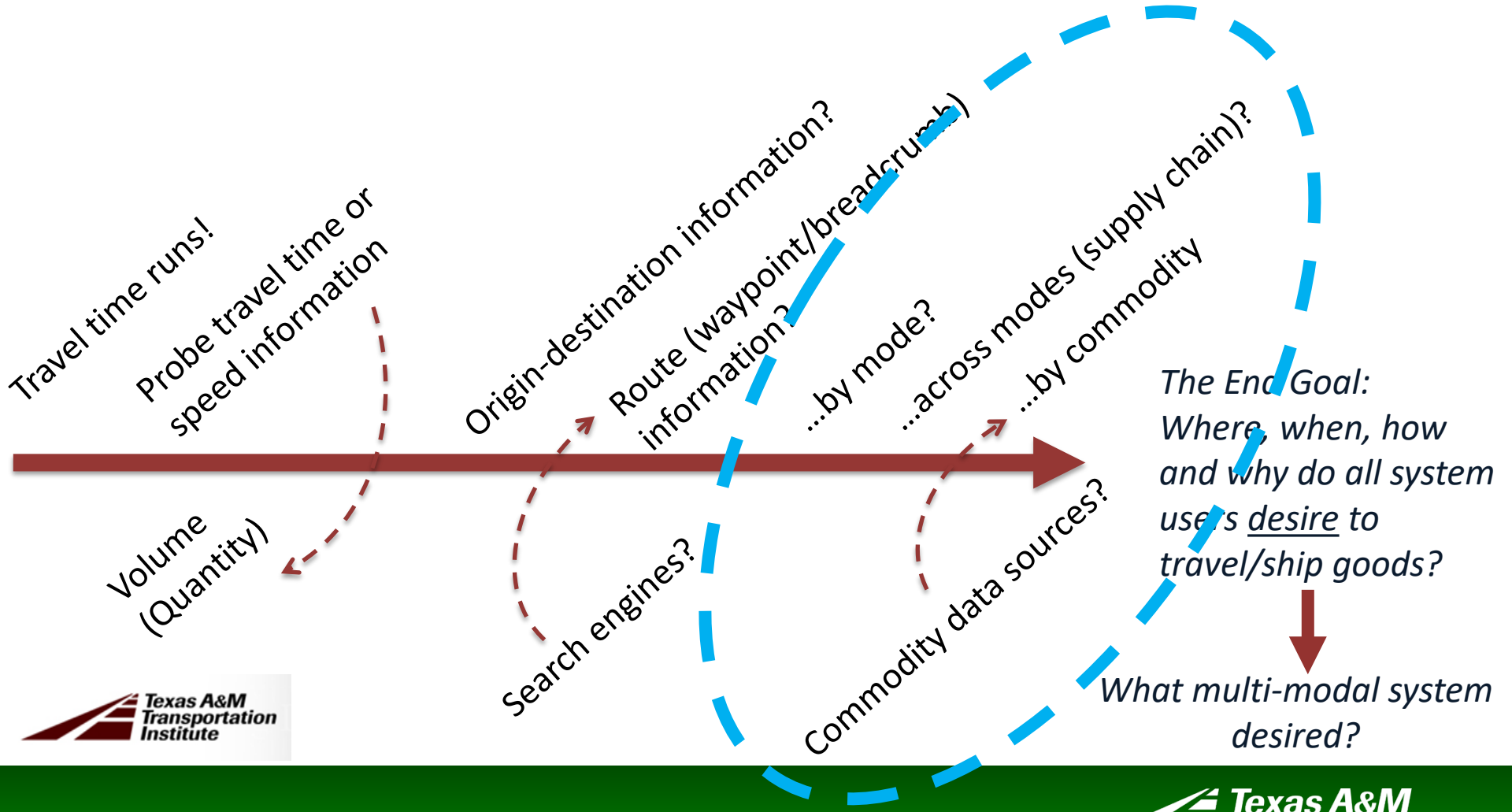
Some Recommendations

- Use supply chain performance information/measures to inform freight transportation policy and target strategic investments in the freight transportation system (across modes)

- Use travel time, travel-time reliability, and cost as the key measures of supply chain performance *(aspirational goal: incorporate productivity/throughput and economic return considerations)*

- Seek public-private partnership opportunities to facilitate data (and information) exchange

The Evolution of Freight Transportation Data



Texas A&M Transportation Institute

Texas A&M Transportation Institute

Freight Big Data Recommendations

- Provide standardized analytical methods and tools to cost-effectively measure end-to-end supply chain performance and identify critical bottlenecks for improvement

- And public agencies need to train/keep data scientists

A Final Thought: Things to Make You Go…. "Hmmm"

- We don't (can't?) monitor what travelers/shippers really want to do – we see what they have to do, given the transport system
- How do we get information on where people/goods truly want to go?
  - Search engines?
  - Bills of lading? Business transactions?
  - Blockchain? IoT?
  - Drones ("as the crow flies")?
  - Mine V2I or V2V?
  - Other?
  - *….Probably "all," plus others currently unknown!*

Bill Eisele

Texas A&M Transportation Institute

(979) 845-8550

b-eisele@tti.tamu.edu

http://mobility.tamu.edu

(Find me on LinkedIn)