Study Background

- Recommendation from 2012 HGAC Regional Goods Movement Study to directly connect the region’s ports with emerging markets in the region and all points beyond.

- Consideration of other issues:
  - Diverting freight flow away from congested urban core
  - Changes in commodity flows (e.g. foreign crude oil imports versus domestic production)
  - Panama canal expansion
  - Growth in chemical manufacturing
Study Objectives

- Identify freight and goods supply chains that are dependent upon on the region’s port facilities
- Identify improvements to better facilitate port related freight mobility:
  - Infrastructure and facilities
  - Multimodal improvements
  - Operational strategies
  - Policy-level changes
Study Activities

- Port profiles (complete)
- Data gathering and analysis
  - Trade and Cargo flow (complete)
  - Truck Counts (complete)
  - Truck driver surveys (complete)
  - ATRI Truck GPS (complete)
- Supply Chain Analysis (on-going)
- Travel Demand Modeling and Truck Trip Assignment (on-going)
- Improvements/project identification, assessment, prioritization (on-going)

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Port Profiles

• Study identifies port commodities and characteristics
• Based on port interviews & trade commodity analysis
• Report produced
Rail Road Assessment

- Interviews with Class I Rail Roads – UP, BNSF, and KCS
- Interviews with Port Terminal Rail Road Association
Truck Count Locations 1

Legend
- Existing Truck Counts
- Proposed Truck Counts

Port Mobility Study
Count Location Map 1

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Port Mobility Study
Count Location Map 2

Legend
- Existing Truck Counts
- Proposed Truck Counts

Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

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# Truck surveys and counts

<table>
<thead>
<tr>
<th>Location</th>
<th>Trucks</th>
<th>2016 AADT</th>
<th>Truck Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>IH 10 (west of Sam Houston)</td>
<td>28,000</td>
<td>310,000</td>
<td>9%</td>
</tr>
<tr>
<td>IH 69 (north of Sam Houston)</td>
<td>14,000</td>
<td>200,000</td>
<td>7%</td>
</tr>
<tr>
<td>IH 45 (north of Sam Houston)</td>
<td>16,000</td>
<td>265,000</td>
<td>6%</td>
</tr>
<tr>
<td>SH 225</td>
<td>15,000</td>
<td>88,000</td>
<td>17%</td>
</tr>
<tr>
<td>Route 146 Fred Hartman Bridge</td>
<td>8,500</td>
<td>85,000</td>
<td>10%</td>
</tr>
<tr>
<td>Barbours Cut Blvd</td>
<td>8,600</td>
<td>12,000</td>
<td>62%</td>
</tr>
<tr>
<td>Port Rd (Bayport)</td>
<td>8,300</td>
<td>14,000</td>
<td>59%</td>
</tr>
<tr>
<td>SH 288 (outside Freeport)</td>
<td>3,600</td>
<td>30,000</td>
<td>12%</td>
</tr>
</tbody>
</table>
Truck Surveys

• Interview truck drivers entering/exiting port terminals
  • Age of truck
  • Load carried (Load In/Out, Load In/Empty Out etc.)
  • Route taken
  • Origin/Destination
ATRI Data – Houston Container Terminals

To Barbour’s Cut Container Terminal

To Bayport Container Terminal
ATRI Data – Houston Container Terminals

From Barbour’s Cut Container Terminal

From Bayport Container Terminal

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Regional Collaboration • Transportation Planning • Multimodal Mobility
Alternative Evaluation Process

- Port Profiles
- Railway Assessment
- Truck Data ATRI/Counts/Surveys
- Supply Chain Analysis

Forecast

Alternatives

Travel Demand Modeling

Universe of Options

- Multimodal
- Policy, Logistics
- Operations ITS
- Road/Rail Infrastructure

Previous Studies
Stakeholder Inputs
On-going Studies

Qualitative,
Meets Study Goals

Quantitative,
Meets Performance Goals & Objectives

Initial Screening

Project Prioritization

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“Traditional” Projects

- **Road Infrastructure**
  - Team have identified port related projects from plans including:
    - Regional Goods Movement Plan
    - TxDOT Freight & Rail Plans
    - LRTP
    - TIP
    - TxDOT Ports
  - New projects?

- **Rail Infrastructure**
  - Projects limited to what the rail roads want to promote and what is in existing plans e.g. State Freight Rail Plan
  - Potential for rail across different commodities??

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I-69 Bypass

- Relief route around Houston Urban Core
- Connecting Wharton on the southwest to Cleveland/Livingston on the northeast
- Carrying traffic from Port of Freeport, Port of Galveston, Port of Houston to east, northeast and the north
- Grand Parkway and Route 146 as potential alignment

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“Non-Traditional” Strategies

- Operational and Policy
- Demand and Truck Management
- Multi modal/Different Modes
- Land Use Development
- Information Systems

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Example of an Operational Strategy

- Container “Logistics”
- Both import and exports carried in steel boxes called containers
- Empty containers need to be returned to port terminals or collected from port terminals
- What can be done to reduce truck trips carrying empty containers?
Example of an Operational Strategy

- Road network and port system accommodate unproductive truck movement
- 59% of truck visits at one Houston container terminal have only one gate transaction
- 44% of transactions involve an empty container

Gate Transactions by Type
- RE = receive export
- DI = deliver import
- DM = deliver Mty
- RM = receive Mty
- DC = deliver chassis

Truck Visits by Gate Transactions
- Truck Visits with 2 Gate Transactions
- Truck visits with 1 Gate Transaction

Average Transactions per Truck Visit -1.4

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Truck Characteristics

- Truck count information also indicates substantial number of truck trips with tractor unit only or empty dray chassis.

![Truck Characteristics Pie Chart]

- 42% 20 ft Container
- 19% 40 ft Container
- 16% Empty Container Chassis
- 13% Tractor Unit Only
- 10% Other

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Container moves
1 x Import to Walmart
1 x Export from Plantgistix
4 truck trips
- 2 carrying cargo
- 2 carrying fresh air
- 59 truck miles
Solution

- Better manage container transactions
- Dilemma affecting container terminals (not just Houston area)
- Solutions include
  - Street turn (containers transferred between parties outside the port)
  - Virtual container yard (manage container movements through IT solution)
- Study in Southern California found truckers informally doing street turns on 2% of empty containers in the port.
- It happens in Houston – but lack of data to understand scale
- Challenges
  - Lack of knowledge about where containers are
  - Administration
  - Container size, type
  - Different shipping lines – export v import
  - Who co-ordinates?

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Container moves
1 x Import to Walmart
Empty container from Walmart taken to Plantgistix
1 x Export from Plantgistix
3 truck trips
• 2 carrying cargo
• 1 carrying fresh air
• 36.5 truck miles

• 50% reduction of trips to the port terminal
• 38% saving in truck miles

“Street turn” Concept
Future Condition

Virtual Container Yards?
Terminal Gate Appointment System

- Matches truck activity with terminal capabilities
- Reduces queues
- Better planning for truck companies, but some flexibility needed
- Port of Houston JOC Nov 2016 – “We don’t think we really need an appointment system right now. Our truck arrivals are pretty consistent without a lot of surges”
- Enabler for making use of off hours
- Other terminals across the port e.g. grain at harvest time?

Uptake of port terminals using appointment systems

Example ports with appointment systems:
- NY/NJ
- LA/LB
- Port of VA

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Extended Gate Opening/ Off Peak Activity

- Extended gate hours implemented at Bayport 7am to 11pm from October 2017. (previously 7-7)
- Barbours Cut times to be extended – date TBC
- LA Long Beach use a Pierpass fee to subsidize night and weekend gates
- Challenges on terminal productivity, cost, attendance of CPB
- Other incentives to maximize off peak use?
  - Toll reduction off hours? – Pier Pass system to support Off Peak and other initiatives?
Container-on-Barge

- **Intra-regional**
  - Feed Cedar Port from Bayport and Barbours Cut.

Concentration of warehouses that export/import containers
Walmart, Ikea, Katoen Natie (plastic resins)
Container-on-Barge

Significant concentration of container users. Walmart, Ikea, Katoen Natie in close proximity to Cedar Bayou barge facility.
Container-on-barge

- Currently once a week service to each container terminal
  - Low frequency impacts container demurrage, acceptance time for exports, etc
- Significant benefits with Heavy weight containers.
- How can container on barge service attract more volume and increase frequency?
  1. Operations.
     - More reliable operations at the container terminal - Dedicated area/berth within terminals?
     - Cheaper cargo handling methods? – Reach Stacker?
     - Labor agreement to account for handling a barge rather than ocean going vessel
  2. Soft sell
     - Integrate within Shipping Line pricing structure
     - Multi agency approach and business development to potential users
- Could it become a formal service offering at Houston?

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Freight Shuttle

- MOU signed with Port of Houston
- Third party system – similar to rail and pipelines
  - Using air rights above highways
  - Private investment
  - Local, regional, state, federal funding???
- From container ports to origin unknown?
  - Routes?
  - Potential to integrate with new highway projects?
- Freight Shuttle be investigated as part of PAMS