Exploring A Green Alternative for Container Transport

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The SAFE Freight Shuttle
21st Century Freight Transportation Challenges

- Public Safety
- Environmental Impact
  - Air
  - Noise
- System Capacity
- System Maintenance & Preservation
- Adverse Impact on Quality of Life
- Oil Dependency
- Security
- Funding
Maintaining Freight Movement: The Public Agency Challenge

Find a Balance Between:

• Environmental soundness
• Affordability
• Effectiveness
  – Capacity
  – Cost-effectiveness
• Commercial viability
  – Financing / construction by the private sector
  – Sustainable – revenues exceed costs
Goods Movement

• Types of Freight
  – Bulk
  – Manifest
  – Intermodal

• Growth in Intermodal

• Pacific Rim
  – LA/LB
    • Landbridge Services
    • National Market Share approximately 44%

Global Containerized Trade in Million TEU

Year 2001 - 2011 (source: Global Insight, Inc.)
Maintaining Freight Movement:
The Challenge at the Ports

- Significant levels of national and regional trade
  - Significant percent of import containers are destined for the regional economy
  - Results in chronic truck traffic problems on local/regional highways
  - Impact on jobs
Freight Transportation System Requirements

Freight Transportation is a Cost Minimizing Industry
VIABLE FREIGHT TRANSPORTATION SYSTEMS MUST BE:

• Low-cost and have a long operating life – rugged and simple
• Based on known-understood technology
• Well-suited to the task at hand
• Reliable – reduce supply-chain uncertainty
• High Capacity – increases throughput
• Interconnected with the existing intermodal system
• Environmentally sound
  – Air
  – Noise
• Segregated; freight from passenger traffic
  – Reduces roadway congestion
  – Improves safety
• Secure

Freight Transportation is a Cost Minimizing Industry
The SAFE Freight Shuttle

- A new approach to regional Intermodal Freight transport
  - Concept developed over the last 6 years at the Texas Transportation Institute
  - Based on known and understood technology
  - May effectively address both community and commercial needs

*Combines technology and innovation to meet basic freight transportation requirements in an environmentally responsible manner*
The SAFE Freight Shuttle

- Secure
- Automated
- Fast
- Environmentally-sound

Hybrid System Combining the Best Features of Rail and Trucks
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The SAFE Freight Shuttle

- Automated Freight Shuttles
  - Single-container transports
  - Linear induction motors (LIMs)
  - Designed for steel wheels-on-steel running surface
  - Dedicated, small footprint guide way
  - Surface operations, elevated, or subterranean

24/7 operations offer an option that may overcome throughput, capacity, and impact issues affecting local communities
The SAFE Freight Shuttle
Technical Elements

• Four systems interact to provide functionality:
  – 1. Vehicle
  – 2. Guide way
  – 3. Communications/ command/ control
  – 4. Terminal layout and design
Technical Elements

1. Vehicle
   - Automated
   - Aerodynamic leading and trailing ends
   - Moderate speeds (30-70 mph)
   - Electric LIM propulsion
   - Design simplicity
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- High reliability
  - LIM – linear motion from vehicle-track interaction
  - Small number of moving parts
  - Steel-on-steel for low rolling friction/low cost
2. Guide way
- Prefabrication
- Concrete track bed
- Steel running surface
- Small footprint
- Rail expansion joints
3. Communications Command Control (C3)

- Automated vehicles
- Centralized control
4. Terminal Layout and Design

- Highway access considerations
- Warehousing
- Crane configurations
- Acreage
- Services
  - Fueling
  - Maintenance
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The SAFE Freight Shuttle

• Design features enhance system viability
  – Single unit transports
  – Prefabricated infrastructure / Small footprint / Low cost
  – High capacity / Continuous operation
  – Simplicity of design / System reliability
  – Energy efficiency / Low operating cost
  – Commercially viable – Private sector involvement

• And mitigate the most pressing adverse impacts of high levels of truck traffic
  – Grade separation of alignment
  – Segregation of freight from passenger traffic
  – Non-polluting propulsion system
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- Security
  - Operates on a secure corridor
  - Inspect-in-motion
  - Vehicle tracking
  - Container tags/locks
  - Vehicle design precludes tampering

DHS initiatives will support approaches that enhance security
Inspect-in-Motion Concept within a Secure SAFE Freight Shuttle Corridor