Freight on BART

Concept Briefing

for FedEx & DHL

November 28, 2007
Government Interest: Movement of Goods

- Congestion Management / Economic Viability
  - Metropolitan Transportation Commission
  - California Department of Transportation
  - Federal Highway Administration
  - Alameda Co. Congestion Management Agency

- Environmental Sustainability
  - Bay Area Air Quality Management District

- Private/Public Partnerships: New Project Paradigm?
BART’s View of Freight On BART

A POTENTIAL DEMONSTRATION OF A WAY TO EXPLOIT SYNERGIES BETWEEN PUBLIC INFRASTRUCTURE AND PRIVATE BUSINESS

• BART operates publicly financed transportation system

• FedEx/DHL is a private business with a profit making motive that may be able to benefit from efficiencies of publicly owned and operated infrastructure
The Business Case (from BART’s Perspective)

Operating Costs
Subsidies
Fares

Additional Costs
Operating Costs
Subsidies
Fares

Additional Revenues

Forecast Trend

Project Impacts
The Business Case (cont.)

Logistic Planning
Operating Labor
Infrastructure Modifications
Station Mods
Vehicle Mods
Security Screening

Operating Expenditures
Additional Costs

Additional Revenues
Subsidies
Fares

?
The Business Case

- Operating Cost/Passenger Mile: $0.318

- Net Rail Passenger Revenue/Passenger Mile = $0.196

- Passenger Service is subsidized (59.9% fare recovery)

- District subsidies for Cargo Service are unlikely
Passenger Revenue Service Hours

- 365 days a year
- 4am – Midnight (Weekdays)
- 6am – Midnight (Saturdays)
- 8am – Midnight (Sundays and Holidays)
- 7 to 15 Minute Frequencies from 4am – 7pm
- 15 Minute Frequencies from 7pm – Midnight (beginning 01/01/08)
Rail Vehicle Specifications

- Approximately 70’ Long x 10’6’’ Wide x 7’ High (~ 5100 cu. ft.)
- Volume Without Vehicle Mods:
  - ~ 70’ x 2.5’ x 7’ = 1,225 cubic feet
- Door Cutouts: 4’6” Wide x 6’6” High
- Carrying Capacity: 30,000 lb.
- Propulsion: 600 hp/car
- Acceleration/Deceleration: +/- 2 mph/sec
- Max Speed: 80 mph
Some Possible Scenarios

• Scenario 1 (low volume):
  – Unmodified Car(s) added to current consists
  – Carts loaded/unloaded at passenger platforms

• Scenario 2 (high volume):
  – Train consist with multiple (3 – 10 cars if available) modified cars made in the yard
  – Containers loaded/unloaded at yards
More construction will be conducted which will good for freight use in a long run;

The UP tracks further down could be used for intermodal movement;
UP train can be seen close to BART system.
Freeways is congested.
Yard Accessibility (Trucks, etc.)
BART Maintenance Platform at Richmond Yard
Seats Removed in a BART Car
Cargo on BART: Integration

Existing Container Dimensions are either too wide are too tall to fit through the doorways

New Design and/or Modifications

- Container Modifications
- Vehicle Modifications
Container Modifications

1) Modifying an Existing Container

2) Creating a New, Smaller Form-Factor that can Fit Inside Existing Containers
Vehicle-side Modifications

1) Modifying an Existing BART Vehicle

2) Specific-Use Vehicle (e.g. Flat-car)
Consist Configurations

1) Modified BART Cars

2) Flatcar used as a Control Car

3) Flatcar without Control Elements
Infrastructure Issues

- Availability of Facilities and Rolling Stock

- Capital Assets must be able to accommodate retro-fitting

- Costs for retro-fitting is coverable without using traditional District resources
Logistical Issues

• Freight rail vehicles can travel through the BART System without interfering with scheduled passenger service

• Cargo service does not interfere with non-revenue hour track maintenance

• Qualified Personnel for Planning and Operation of Cargo Service.
Security Issue

- A “Closed System” must be maintained:
  - Screening and/or Pre-screening
  - Yard Security
  - Vehicle Security
Use Case: Immediate detection of security breach (e.g. intrusion) from all six sides of the container

1. Intrusion attempt in sea/air container or truck

2. Silent alarm even prior to the actual intrusion

3. Appropriate notification of law enforcement

4. Prevention of theft or easy recovery of stolen cargo through embedded GPS
Kirsen smart container modules

**Features**

- **Customized** MEMS and solid-state sensor suite that can monitor or determine:
  - **Basic features:**
    - GPS positioning (accurate to 25 meters)
    - Geo-fencing
    - GPRS communication
    - Door sensors
    - Movement inside container (IR)
  - **Optional:**
    - 6-side intrusion detection
    - Full/empty control
    - Movement of container
    - RFID reader
    - Light/Humidity sensor
    - Smoke sensor
    - Tilt detection
    - Shock detection
    - Temperature
    - Etc.
- **Small** form factor and lightweight
- **Worldwide** coverage for wireless communication and tracking

**Modular Open Architecture** – allowing for cost-effective customization to satisfy each clients’ requirement
Planned Next Steps

- Identify and Apply for Grants and Incentives to help study the Cargo Scenario
- Perform Preliminary Feasibility Assessment based on key requirements and needs
- Determine if Business Case Exists
- Work with sponsors to demonstrate the concept assuming feasibility is confirmed