Investigating the Possibility of Using BART for Air Freight Movement

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Outline

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- Stakeholder Perspective
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  - Carriers
  - BART
- Project Review
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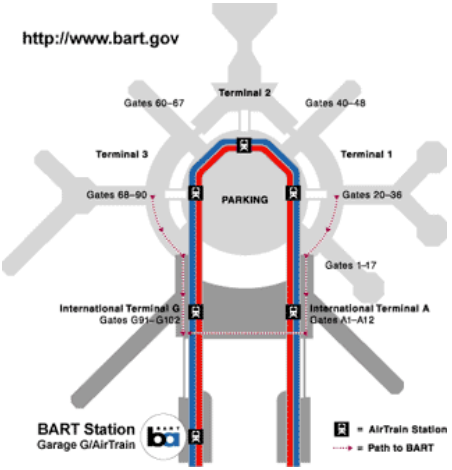
- Scope of Feasibility Study
- Concept of Operation
- Challenges



Overview

- ***Safety:***

  As reported in previous research, 80% of the victims killed in crashes involving trucks are occupants of smaller vehicles.

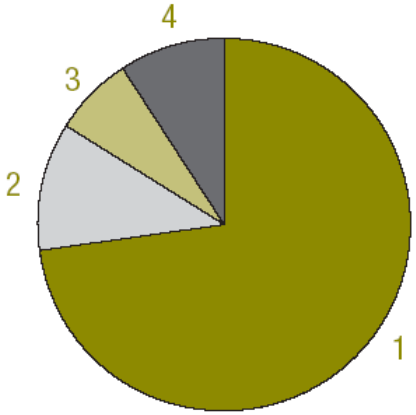
- ***Traffic Congestion:***

  Trucks contribute more to the congestion in those corridors because they use more capacity per vehicle than autos;

- **Air Quality**

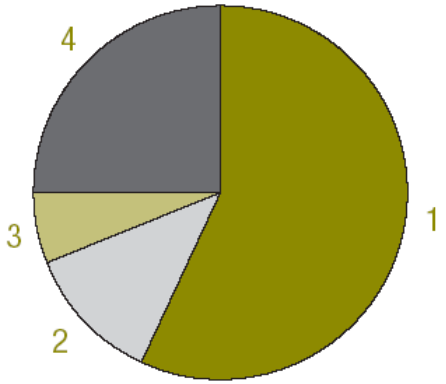
Overview

Nitrogen Oxide (NOx) Emissions in the Bay Area by Mode



1. Truck	73%
2. Air	11%
3. Rail	7%
4. Marine	9%

Particulate Matter (PM) Emissions in the Bay Area by Mode



1. Truck	57%
2. Air	12%
3. Rail	6%
4. Marine	25%

Source: Bay Area Air Quality Management District

Public/Government Perspective

For the public, Regional, State and Federal Government:

- **Improve highway user safety**
- **Relieve traffic congestion**
- **Reduce emissions**
- **Reduce or change the need for costly investments**
- **Achieve better land use efficiency**

Carriers Perspective

- **Increase revenues while maintaining a high quality of service**
- **Reduce cost for truck delivery due to**
  - **Fuel Prices**
  - **Traffic congestion**
  - **Labor**
  - **Lost Revenue due to delay or products lost/damage**

Carriers Perspective

- **Reduce the delay and uncertainty caused by traffic congestion in limited-time-window delivery service.**

- **Move towards a more sustainable/integrated air freight movement system**

BART Perspective

- **Sustain a high quality rail passenger service and increase the rate of return on farebox revenues**
  - **Possibility of gaining new business opportunities ➔ reduce public subsidies**
  - **To utilize unused capacity and use BART facilities more efficiently**

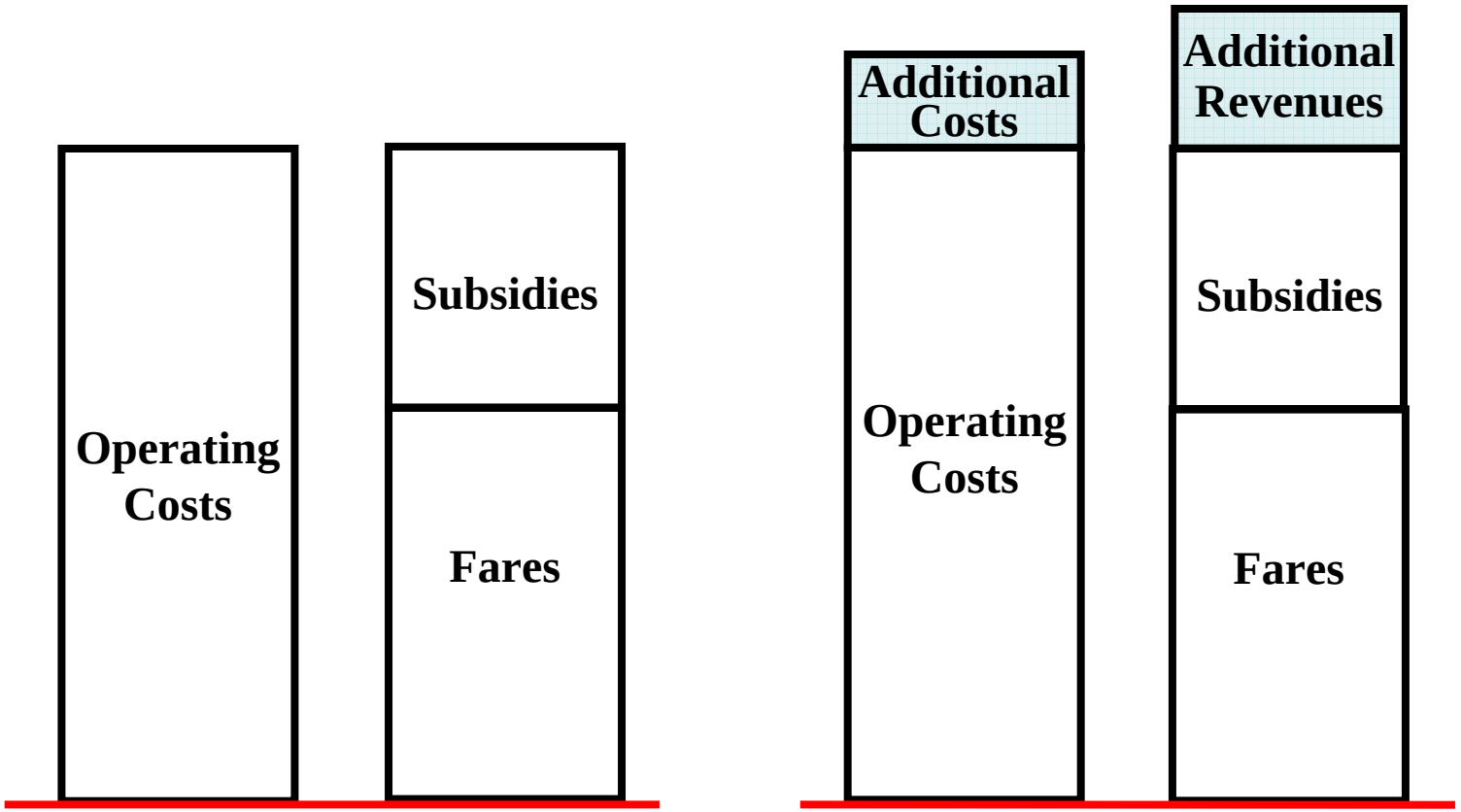
BART Perspective – High Level Requirements

- **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.**

BART Perspective – 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**

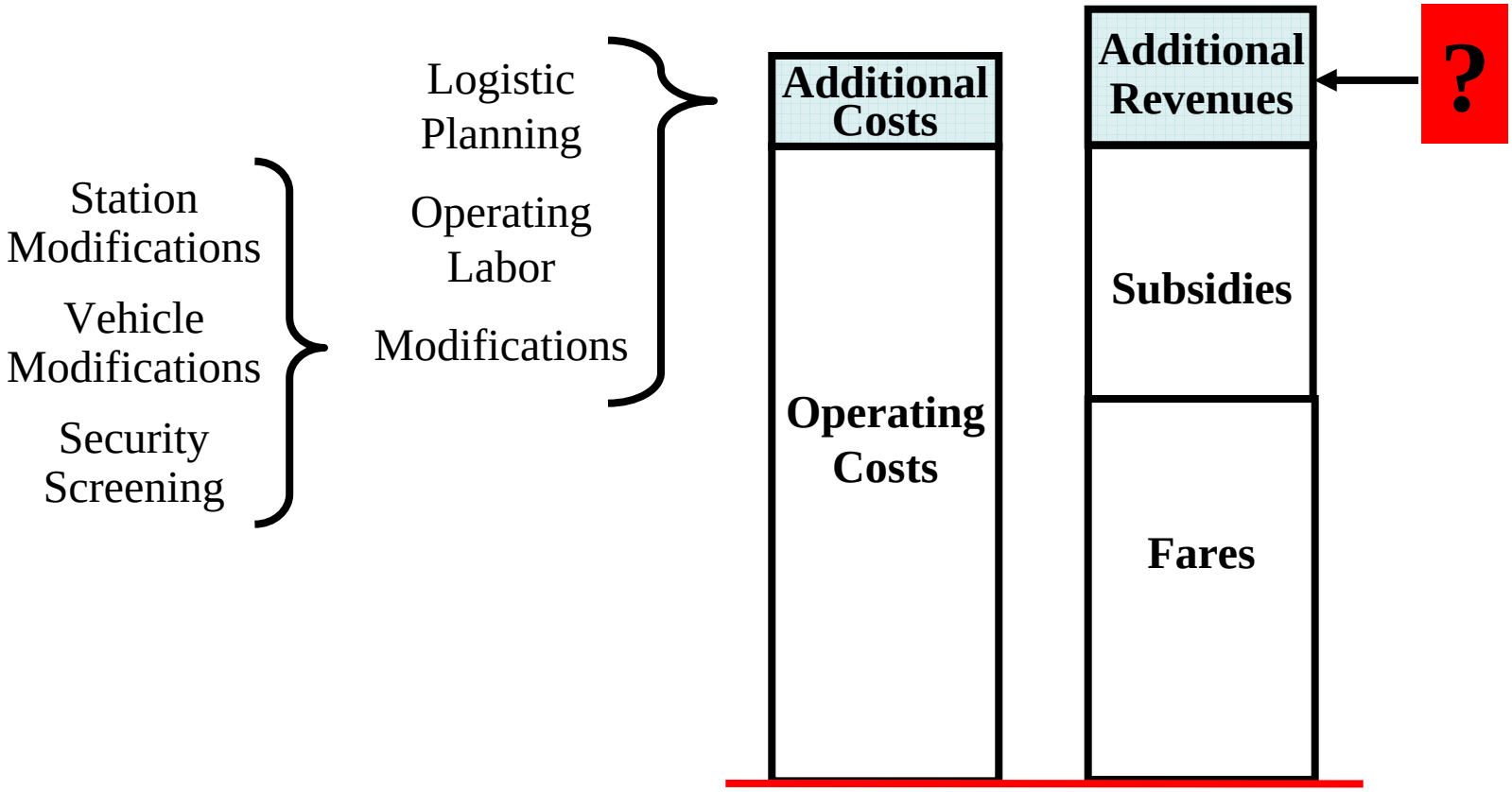
BART Perspective – Business Case



Forecast Trend

Project Impacts

BART Perspective – Business Case



Project Review

- **Activities**
  - **Started from June 2005**
  - **Direct and indirect participants:**
  - **Many informal discussions through phone, email and meeting**
  - **Site visit to BART yard**
  - **Meeting with BART Divisions: Operation, Procurement, Safety**
  - **Visiting FedEx Western Regional Hub operation line to understand operation scenarios**
  - **Bringing all integrated carriers on board: UPS, and DHL**

Project Review

- **Funding Application**
  - **Proposal to Caltrans and White paper to FTA, FHWA**
- **Preliminary feasibility consideration**
  - **Infrastructure**
    - **Container size and high level demand etc**
    - **Location of collection/distribution center**
  - **Products and Demand**
  - **Possible Scenarios**
  - **Operation: Truck activities and time frames**

Objectives of Study

- **Phase I: Feasibility Study**
  - **UCTC – funded PATH study**
  - **FHWA – funded an independent case study: evaluation and tracking (by a Third Party)**
- **Phase II: To bring it to Tier I Project for Demo to show it is doable as a baby step;**
- **Phase III: Building access point near OAK ➔ Large scale operation; all three integrated carriers have regional hub at OAK or use it as major airport**

Scope of Feasibility Study

- **Business case for Integrated Air Freight Carriers**
  - **Cost benefit analysis for carriers (FedEx, UPS, DHL)**
    - **Line based demand for different products: containerized vs. non-containerized**
    - **Timeframe based demand**
    - **Operational cost: fuel, driver, vehicle, toll lane, emission cost penalty**
    - **Fixed investment cost**
    - **Limited time window delivery and traffic congestion**
    - **Intermodal transportation using rail, truck and aircraft**
  - **Business expansion: short, medium and long term, agricultural products**

Scope of Feasibility Study

- **Business case for BART: Capacity and Demand from multiple possible customers**
  - **Cost benefit analysis for BART**
    - **To cover cost of operation**
    - **To reduce public subsidies**

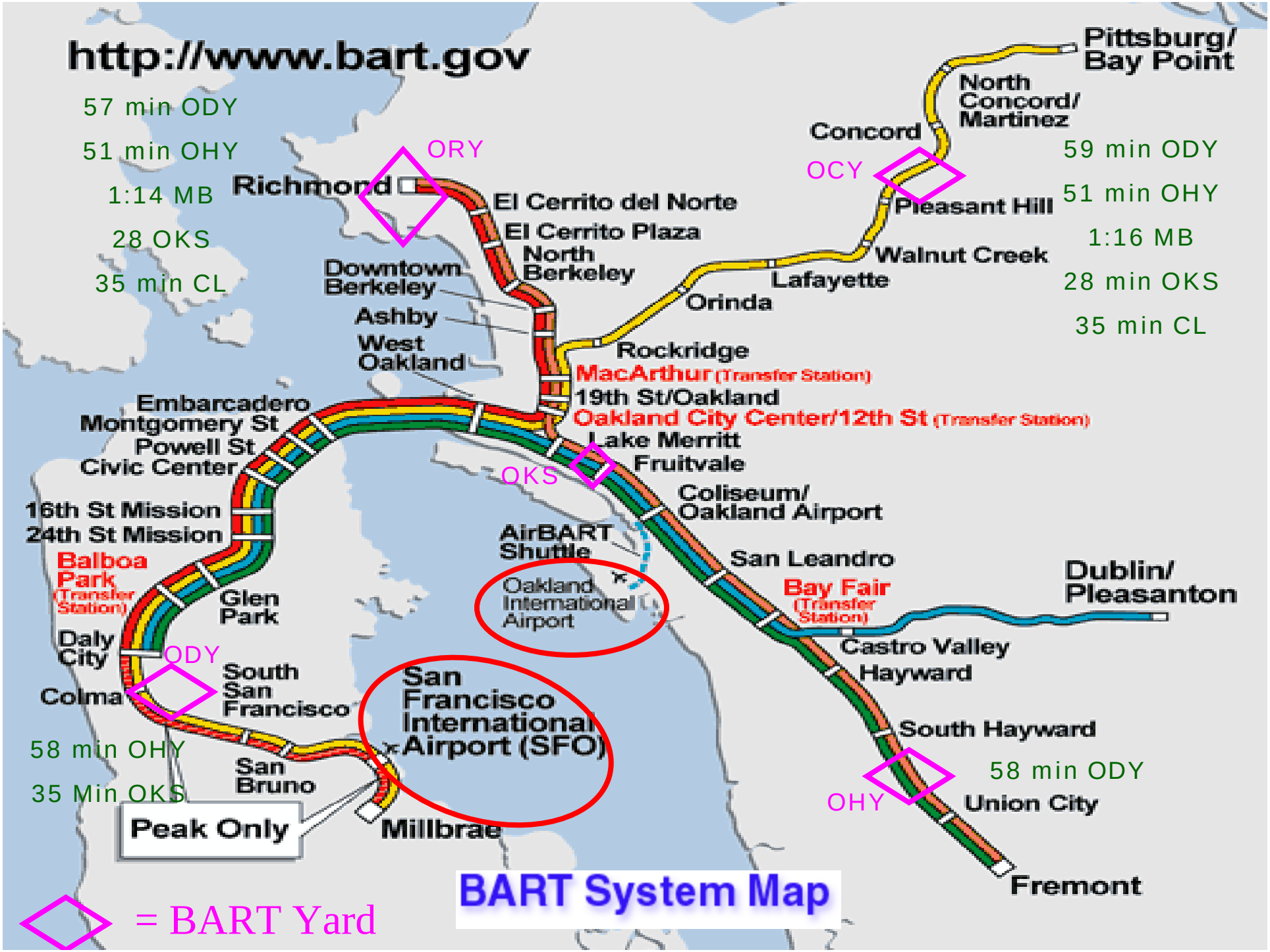
Scope of Feasibility Study

- **Infrastructure feasibility**
  - **BART**
    - **Lines**
    - **Access point (Yards or Stations – depending on products)**
    - **Car and consist**
  - **Integrated Air Freight Carriers**
    - **Collection and distribution centers location**
    - **Container size and operation scenarios**
    - **Non-containerized products**
    - **Trans-shipment**
- **Operation and logistics feasibility for BART system and Integrated Air Freight Carriers**

Scope of Feasibility Study (cont.)

- **Safety and Security**
  - **Screening and/or Pre-screening**
  - **Maintain Closed transport system**
  - **Special personnel in BART for operation**
  - **Separating from passenger boarding area**
  - **Yard Security**

- **Institutional issues**
  - **Private vs. public**
  - **Union issues: truck driver reduction; new job creation**
  - **Product liability issues**


http://www.bart.gov
57 min ODY
51 min OHY
1:14 MB
28 OKS
35 min CL
ORY
Richmond
El Cerrito del Norte
El Cerrito Plaza
North Berkeley
Downtown Berkeley
Ashby
West Oakland
Embarcadero
Montgomery St
Powell St
Civic Center
16th St Mission
24th St Mission
Balboa Park (Transfer Station)
Glen Park
Daly City
ODY
Colma
South San Francisco
58 min OHY
35 Min OKS
San Bruno
Peak Only
Millbrae
San Francisco International Airport (SFO)
Pittsburg/ Bay Point
North Concord/ Martinez
Concord
OCY
Pleasant Hill
59 min ODY
51 min OHY
1:16 MB
28 min OKS
35 min CL
Walnut Creek
Lafayette
Orinda
Rockridge
MacArthur (Transfer Station)
19th St/Oakland
Oakland City Center/12th St (Transfer Station)
Lake Merritt
Fruitvale
OKS
Coliseum/ Oakland Airport
AirBART Shuttle
Oakland International Airport
San Leandro
Bay Fair (Transfer Station)
Dublin/ Pleasanton
Castro Valley
Hayward
South Hayward
58 min ODY
OHY
Union City
Fremont
BART System Map
= BART Yard

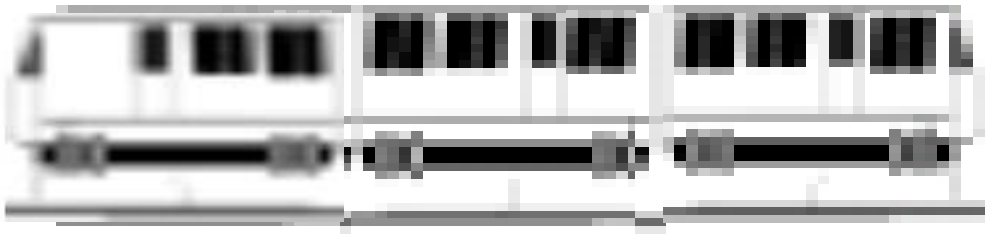
Concept of Operation

- **Accessing**
  - **Stations: Collection and distribution platform**
  - **Stations: Small containers and non-containerized products**
  - **Yard/shop: Large containers and dedicated freight consist**
  - **Connect with train**
    - **Caltrain on the same platform at Richmond Station**
    - **Union Pacific railway at Oakland BART Shop**
- **Transshipment**
  - **Small truck connection**
  - **Lift for passenger platform using small containers**
  - **Roller-mat for container moving**
  - **Electric cart for collection/distribution (DHL in New York)**

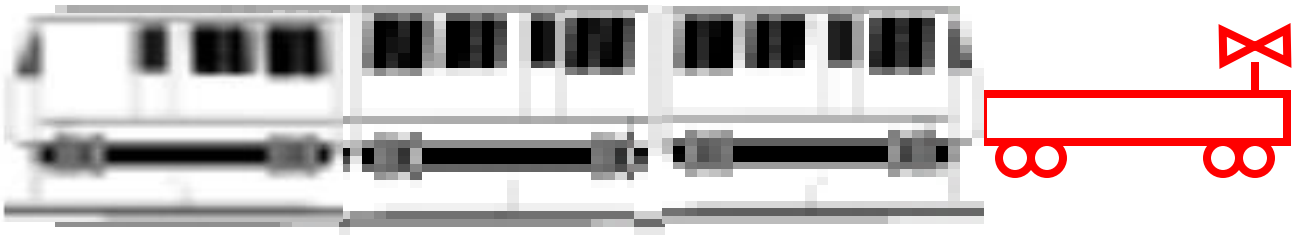
Concept of Operation

- **Consist Configurations**
  - **Scenario 1 (low volume)**
    - **Unmodified Cars added to current consists for Carts loaded/unloaded at passenger platforms**
  - **Scenario 2 (high volume):**
    - **Train consist with multiple (3 – 10 cars if available)**
    - **Dedicated consist made available in the yard**
    - **Containers loaded/unloaded at yards**

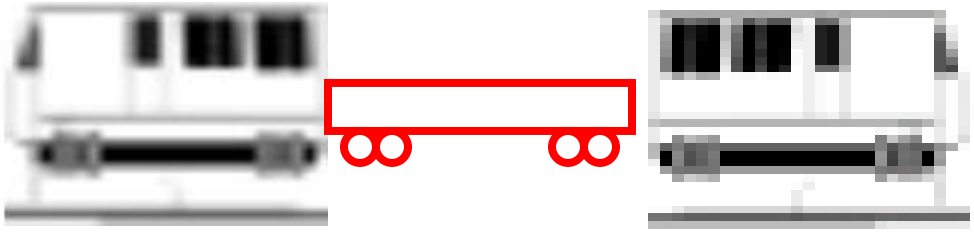
Consist Modifications



1) Modified BART Cars



2) Flatcar used as a Control Car



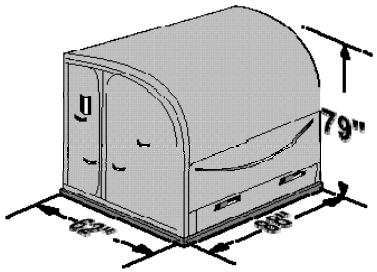
3) Flatcar without Control Elements

Vehicle Modifications

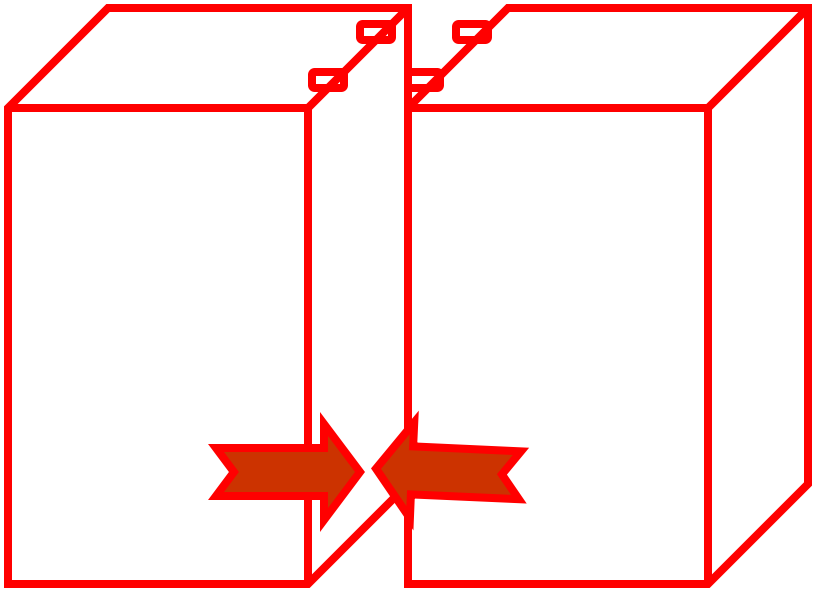
1) Modifying an Existing BART Vehicle

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

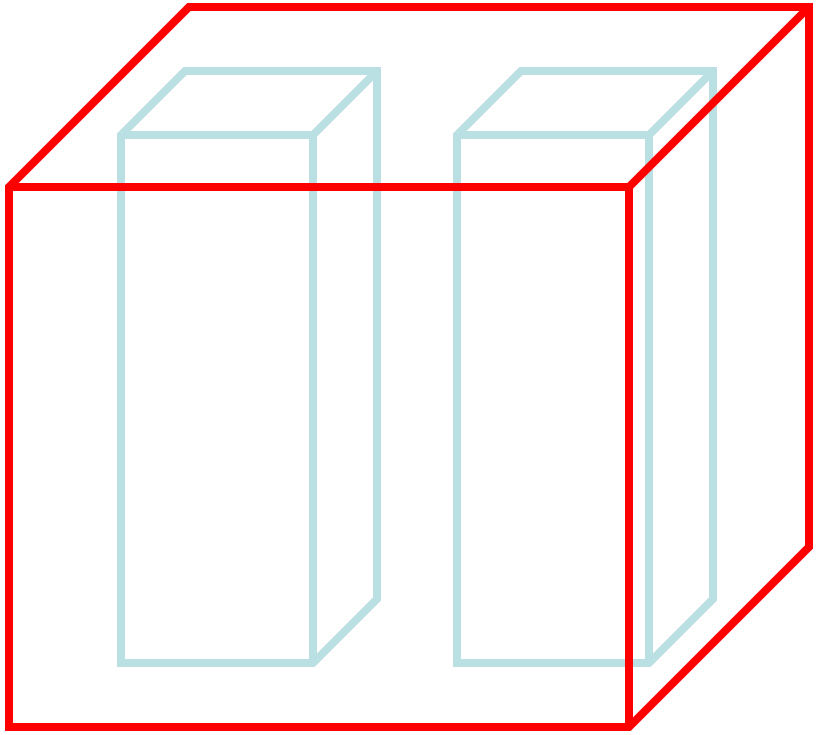
Container Modification



DEMI (AYY/AYX)
A-300/310 DC-10/MD-11/FEC 727
MAIN DECKS



1) Modifying an Existing Container



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

Coliseum BART Station Platform


BART
Concord Yard
200 ft


BART
Hayward
Yard

Oakland Shops/Annex

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;

Some Challenges

- **Critical access point of BART at OAK:**
  - **for all Integrated Carriers: FedEx, UPS, DHL**
  - **to extend a spur track for accessing BART line in two directions**
- **Products and container size of integrated carriers**
- **Improving travel time of BART:**
  - **Offline stations, at least for some critical stations**
  - **Direct Rapid Transit**
- **Improving capacity of BART:**
  - **Offline stations, at least for some critical stations**
  - **High frequency operations using new tech**