A Combined Quantitative and Qualitative Approach to Planning for Improved Intermodal Connectivity at California Airports

(PATH Project TO5406)

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Outline

• Objective and status of the research
• Air passenger intermodal connectivity
• Case study opportunities
• Air freight intermodal transportation
• Data collection
• Conceptual structure of the IAPT
• Next steps
• Discussion
Objective and status of the research

- **Objective**
  - Develop techniques for analyzing the effectiveness of alternative strategies for improving intermodal connectivity at airports using a combined quantitative and qualitative approach
    - Quantitative: Analytical models of airport traveler and transportation provider’s behavior, traffic networks
    - Qualitative: Descriptive case studies and analysis of agency decision making processes

- **Research products:**
  - Case studies of intermodal access projects at California airports
  - Develop prototype Intermodal Airport Ground Access Planning Tool (IAPT)
  - Using IAPT to evaluate selected case study projects at California airports
  - Policy recommendations and planning guidelines
Objective and status of the research

• Current status
  – Task 1: Review previous studies addressing ground transportation needs at California airports and select potential case study airports
    • Review of literature and previous studies in progress
    • Potential case study airports identified
  – Task 2: Review potential case study airports with Caltrans and other agencies, confirm data availability, and select case study airports
    • Memo on potential case study airports prepared
    • Presentation made to RTPA Aviation System Planning Working Group
  – Task 3: Assemble data and analyze air passenger mode choice behavior at case study airports and potential use of intermodal connections
    • Assembly of data for Bay Area airports in progress
  – Task 5: Define functionality and structure of modeling framework to analyze policy issues and potential intermodal projects
    • Planned functionality and structure of IAPT under development
Air passenger intermodal connectivity

- **Passenger intermodal connectivity**
  - **Motivation**
    - Reduce reliance on single-party occupancy vehicles
      - Particular focus on air party pick-up/drop-off trips
    - Improve coordination with regional transit services
  - **Examples of enhanced intermodal connectivity**
    - Direct service by regional rail system
      - BART extension to SFO
      - Metrolink/Amtrak station at BUR
    - Improved links to nearby rail stations
      - Planned people-mover between OAK and Coliseum BART/Amtrak station
    - Express bus service to off-airport terminals or regional intermodal terminals
      - Van Nuys FlyAway service to LAX
      - Marin Airporter service to SFO
Case study opportunities

- **Constraints on potential opportunities for intermodal connections**
  - Airport activity level large enough to generate sufficient ridership
    - Intermodal connections at smaller airports need to attract a larger proportion of total airport trips to generate a given level of ridership
    - What is considered a viable level of ridership is a policy question
      - Depends on the capital and operating costs of the link
      - Depends on the level of operating subsidy available
  - Rail system offers good enough service to be attractive
    - Train frequency
    - Regional coverage of network
  - Link to regional intermodal facility or transit hub
    - Large enough proportion of regional trip ends served by facility

- **Implications**
  - Intermodal connections only likely to be viable at the larger airports
  - Importance of the level of service of regional rail and transit system
Case study opportunities

• **Previously identified projects** *(Caltrans Ground Access to Airports Study)*
  
  – **Los Angeles International Airports**
    • FlyAway bus terminal expansion
    • New remote FlyAway terminals
    • Metro Green Line extension to the airport
    • Airport people-mover (potential link to Metro Green Line)
  
  – **Oakland International Airport**
    • BART connector to the airport (people-mover)
  
  – **Sacramento International Airport**
    • Remote terminal with light rail access
  
  – **San Francisco International Airport**
    • Improve regional access system from the south and east
    • Airport ferry dock
  
  – **San Jose International Airport**
    • Automated people-mover (potential link to VTA light rail and Caltrain)
Case study opportunities

- **Other potential intermodal connections**
  - Bakersfield (Meadows Field) Airport
    - Shuttle bus to Bakersfield Amtrak station
  - Burbank Airport
    - Shuttle bus to Metro Red Line (North Hollywood station)
  - Fresno Yosemite International Airport
    - Shuttle bus to Fresno Amtrak Station
  - John Wayne Orange County Airport
    - Shuttle bus to Tustin Metrolink/Amtrak station
  - Long Beach Airport
    - Shuttle bus to Metro Blue Line (PCH station)
  - Ontario International Airport
    - FlyAway service to new regional terminals
    - Shuttle bus to Rancho Cucamonga and East Ontario Metrolink stations
Case study opportunities

- **Other potential intermodal connections** (cont.)
  - San Diego International Airport
    - Shuttle bus to San Diego Trolley (Middletown station)
  - Santa Barbara Airport
    - Shuttle bus to Santa Barbara Amtrak station
Air freight intermodal transportation

• Principal market segments
  – Integrated carriers
  – All-cargo airlines
  – Passenger airline belly cargo

• Characteristics of integrated carriers
  – Customer mode choice criteria: Delivery time and affordable price
  – Time definite intermodal service: Main concern - traffic congestion
  – End-to-end delivery chain owned by limited carriers – integrated forwarding: Fully optimized network with sufficient demand
  – Three dominant carriers
    • UPS
    • FedEx
    • DHL
Air freight intermodal transportation

• Characteristics of door-to-door service chain:
  – Hub-and-spoke network configuration: Related to locations of sorting site and dispatch center
  – Centralized control of dispatching through real-time tracking of: location of each truck/van, performance, traffic, …
  – An aircraft fleet for moving freight between airports: night-time all-cargo flight
  – A long-haul truck fleet for moving freight between terminals
  – Terminals for sorting and processing freight
  – A ground fleet of pickup/delivery trucks
Air freight intermodal transportation

- Possible ways to improve intermodal air freight transportation:
  (Source: Tsao & Rizwan, The Role of ITS in Intermodal Air Cargo Operations)
  - Expanding the capacity of the facility and the efficiency
    - Freeway capacity expansion
    - Dedicated Truck Lane
    - Introducing other model in delivery chain: Rail, Hovercraft, Water shipping in Bay Area;
  - Optimally using the facility with new tech under the limit of capacity
    - Real-time traffic information including arterials for dispatching
    - Advanced Traveler Information System
    - Use of HOV lane
    - Dynamic dispatching and routing using ITS information
    - Traffic and travel time prediction for dispatching
    - Truck flow management near airport or sorting site
Data collection

- What data we need for modeling and what data for validation and case studies
  - Available modes
  - Scheduling
  - Fare and usage (reflecting demand – or response from customer)
  - Airport regulation and revenue charging
  - Service network
  - For a given OD, travel time comparison for each mode
  - Other relevant service and factors which could significantly affect transportation provider’s behavior
Data collection

- **What we have now**
  - MTC survey data for three Bay Area airports: SFO, OAK, JSC
  - MTC 1454 zone traffic Model in TP+
  - BART data for Sept. 2004 for SFO, Coliseum
  - Data collection for door-to-door vans and taxi in progress
Next steps

- Continue data collection
- Data cleaning
- Preliminary modeling
- Refining design of IAPT – Detailed flow chart and GUI
Technical discussion

• **Selection of case study airports**
  – Range of airport sizes and nature of air service
  – Nature of feasible ground access services at smaller airports
  – Potential intermodal connectivity options