Transit Technology Performance Criteria

I-70 Coalition
Technical Committee
February 14, 2008
Background & Purpose

• Outgrowth of Coalition’s Transit Workshop and Retreat, Oct. 2006
• Coalition remains Technology Agnostic
• Identify unique challenges for I-70 corridor
Performance vs Policy

- Some criteria appeared to have more policy implications
- Most criteria considered by Technical Committee were more performance specific
- Recommendation for Board discussion
Policy Criteria

- Affordability
- Operational Timeframe
- Interoperability (interface with existing systems)
- Minimize intermodal shifts
- Public-Private Partnerships
- Longevity – growth define 50 years
Additional Considerations

- Feasibility (RMRA study)
- FRA compliance
- Proprietary vs. non-proprietary
- Federal standards for “new” technology (or lack of)
- Freight – what kind, limitations
General Categories

- Passenger Criteria
- Environmental Criteria
- Efficiency Criteria
- Additional Criteria
Passenger Criteria

- Comfort and safety
- Frequency
- Travel Time
- Reliability
- Simultaneous local and express
- Carry “stuff”
Environmental Criteria

• Noise
• Elevated structure vs. at grade
• Energy Efficiency
• Weather, wind
• Grade
• Tunneling considerations
Efficiency Criteria

• Scalability
• Equipment Design Flexibility
• Operational Efficiencies, low maintenance cost
• Intermodal Integration
Additional Criteria

• Freight capacity
• CSS based
• Safety
• Weight
PASSENGER CRITERIA
Comfort and Safety

• Acceleration
• ADA compliance
• Creature comforts
  – restrooms
  – Entertainment opportunities (bar car)
  – Mobile wi-fi/broadband capability
• Ability to walk around
• Coffee and laptop friendly
• Adequate seating for all passengers
Frequency

• Headway times capable of accommodating peak demand periods

• 5 – 10 minutes
Travel Time

• Express – at least as fast as unimpeded vehicle on highway between Denver and Vail

• Local – equivalent of local transit now including station dwell time. As fast as unimpeded vehicle between destinations
Reliability

- Consistent, predictable travel times in all types of weather
- Protected from snow chutes, rock falls
- Redundancy
  - Power
  - Mechanical systems
- Down time minimal - TBD
Local and Express

• Accommodates both local and express service without undue delays for either

• May necessitate dual track and sidings for stations

• Inter-modal integration considerations
Carry “Stuff”

- Luggage, outdoor gear
- Bicycles
- Anything one could carry in passenger vehicle
- Minimize impacts on station dwell and boarding times
ENVIRONMENTAL CRITERIA
Noise

- External - less than highway noise levels
- Internal - ability to hold conversation without raising one’s voice
- Research - decibel levels about 50 db
Elevated vs At Grade

• Avoid environmental impacts
• Minimal Footprint
• Longer spans than just bridges
• Deployed in pre-fab sections
• Structural steel vs. concrete
• Ability to shed snow and avoid ice build up
Energy Considerations

• Incorporates green technologies for power sources
• Flexibility of fuel/power sources
• Energy consumption
  – Construction energy demands
  – Operational efficiencies (includes maintenance)
• Sustainability
Environmental Hazards

- Ability to provide reliable service under adverse and extreme alpine weather conditions
- Ability to withstand cross windshear and headwinds in excess of 100mph
- Avalanche and rock slide resistant
- Fire resistant
Grade

- Accommodate demand between Denver and Glenwood Springs without significant degradation of speed and efficiency
Tunneling

• Should accommodate transit through tunnels if required

• Minimal requirement for development of additional tunnels
EFFICIENCY CRITERIA
Scalability

- Expansion of alignments (spurs)
- Increase/decrease carrying capacity as demand varies
- Accommodate growth in demand over time (50 year horizon as defined by policy discussion)
- Peak vs. off-peak demand
Equipment Design

• Accommodate multiple needs for passengers, freight, passenger “stuff”, cars?
• Allows for private entities (UPS) to build specific needs vehicles.
• Consumer freight friendly
Operational Efficiencies

- Life cycle cost
- Low maintenance costs and demand
- Proprietary vs. non-proprietary (off the shelf parts availability)
- Ease of scalability
- Staffing requirements
- Automation – station & on-board
- Speed of loading and unloading stuff
Intermodal Integration

- Convenience (minimal mode changes)
- Speed (minimal transfers)
- Baggage transfer considerations
- Timing/coordination
- Shelter
- Station design/location
- Choice
OTHER CRITERIA
Freight Capacity

- Economics may drive considerations
- “Light” freight – consumer freight
- “Containerized cargo”
- During off hours
- UPS, FedEx
CSS based

- Environmental and Community considerations incorporated into construction and operations
Safety

• Security (threshold for convenience disruption)
• Grade separated crossing
• Emergency provisions (system failure)
• Weather
• Provisions for evacuation of system
• Governmental safety regulations and oversight?
• Wildlife “impacts”
Weight/Volume

• Minimum/maximum freight carrying capacity (consumer freight) anticipates average per passenger as well as freight only capacity.

• Cubic space requirements for “stuff”
Special thanks to the Technical Committee for many meetings, good discussions and thoughtful suggestions
QUESTIONS?