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Transit Technology Performance Criteria

I-70 Coalition

Technical Committee

February 14, 2008



Background & Purpose

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- **Outgrowth of Coalition's Transit Workshop and Retreat, Oct. 2006**
- **Coalition remains Technology Agnostic**
- **Identify unique challenges for I-70 corridor**



Performance vs Policy

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- **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

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- **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?