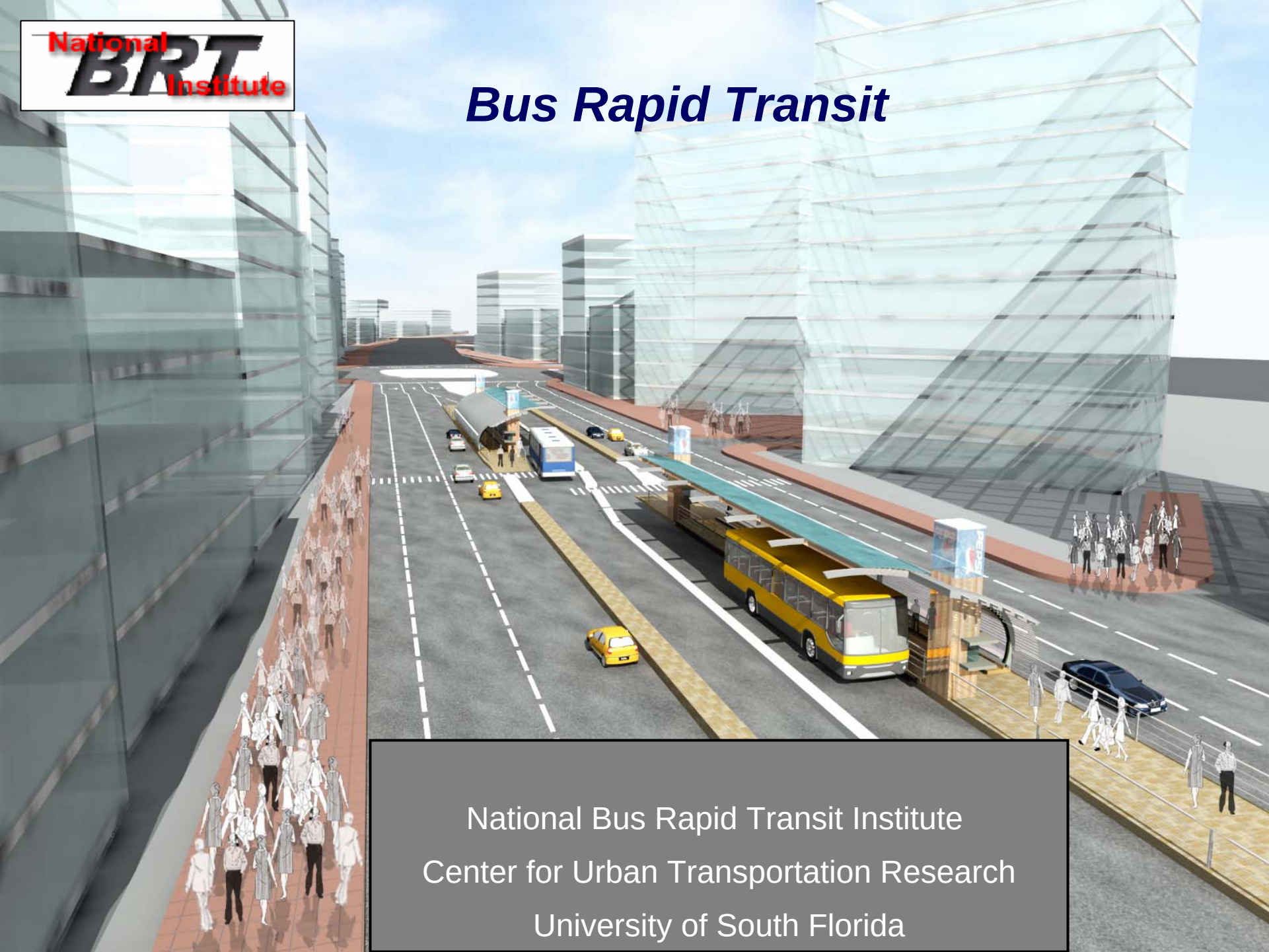
Bus Rapid Transit



National Bus Rapid Transit Institute

Center for Urban Transportation Research

University of South Florida

The National Bus Rapid Transit Institute (NBRTI)

- Housed at the Center for Urban Transportation Research (CUTR), University of South Florida (USF) in Tampa
- Established in 2001 to work in partnership with the Federal Transit Administration to support the development of BRT in the U.S.
- Core Program Areas:
  - Clearinghouse and Outreach
  - Technical Assistance and Support
  - Research and Demonstration

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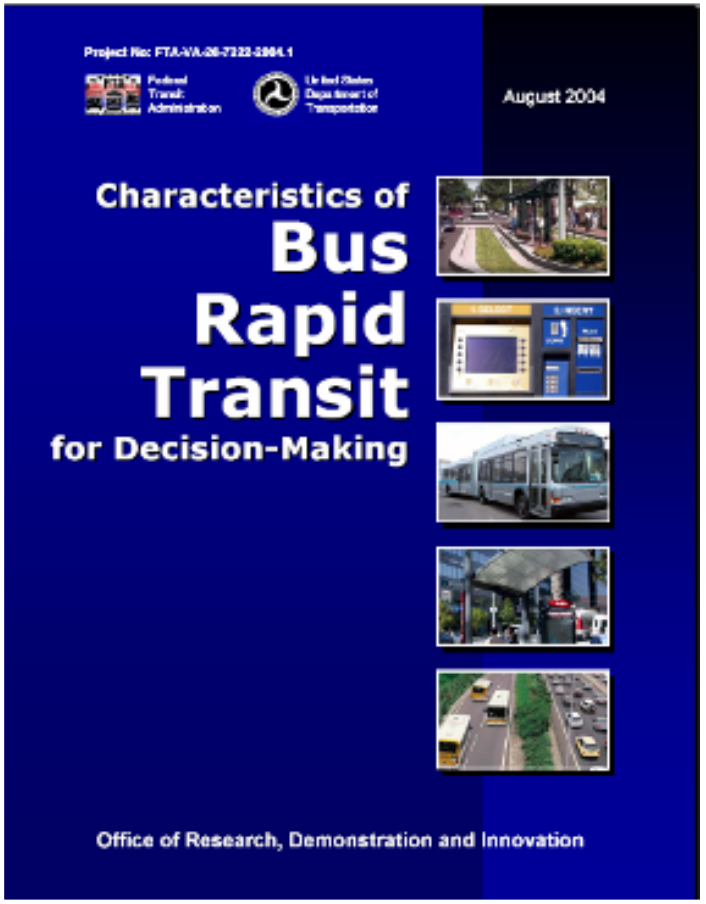
A framework for BRT in the United States – Characteristics of Bus Rapid Transit

- Defines the U.S approach to the BRT concept
- Categorizes different BRT applications
- Defines performance measures and impacts of BRT deployment
- Consistent with U.S federal funding mechanisms
- Provides a database of information for BRT systems in the U.S and abroad
- Originally published in 2004. Can be downloaded at: www.nbrti.org
- Update to be published this year



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What is a *BRT* system?

BRT *is an integrated bus-based "rapid" transit system typically utilizing highly-flexible service and advanced technologies to improve customer convenience and reduce delays.*

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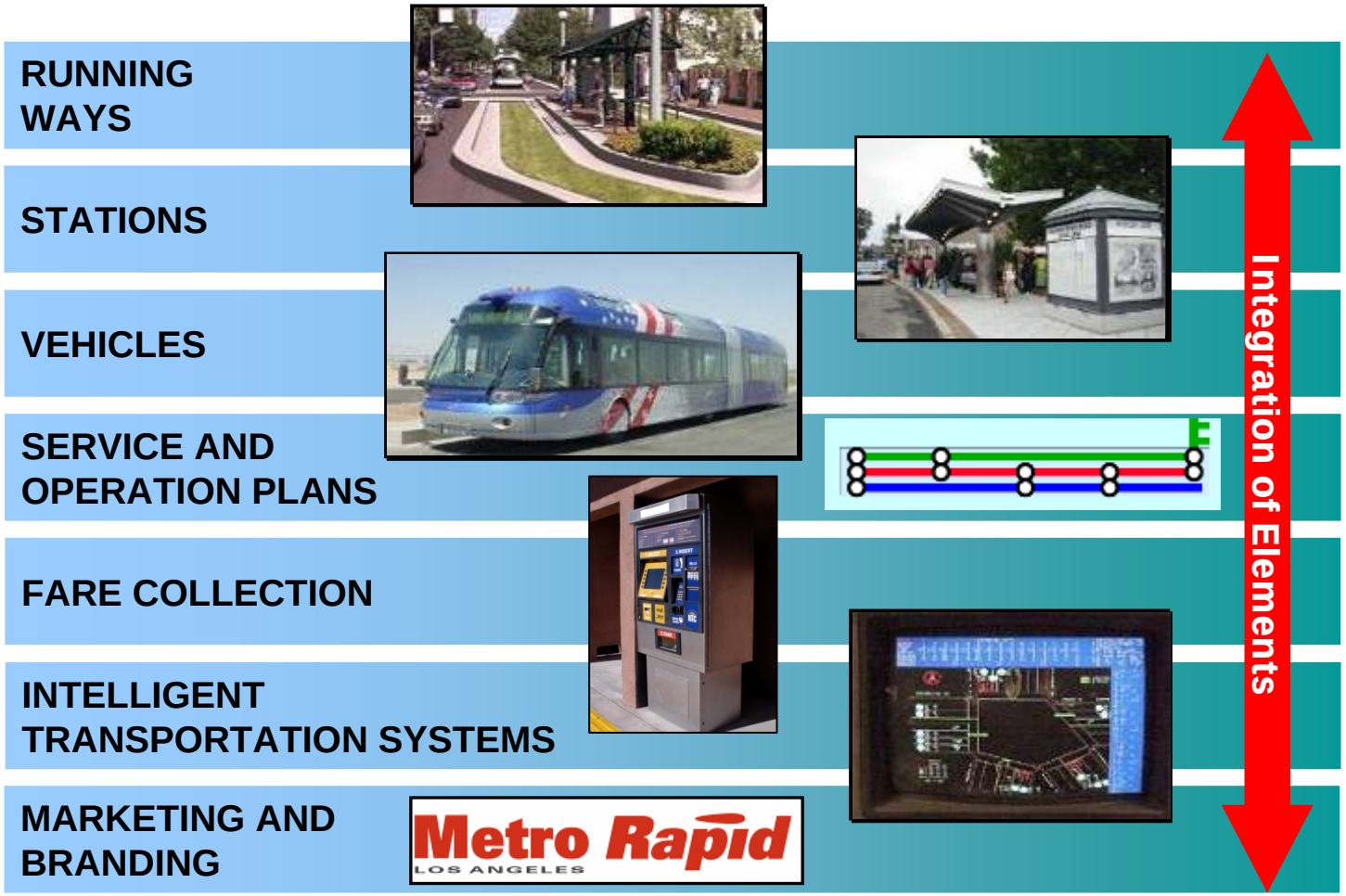
BRT in the U.S – A System of Systems



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Travel Ways

- **Exclusive or shared** transit ways
  - at-grade or grade-separated
- **Bus priority/HOV** lanes (Houston)
- **Dedicated** transit
- Transit streets or transit malls
- **Mixed traffic** (signal priority)
- **Queue jumps**
  - permit BRT vehicles to “jump” ahead of traffic queues

Arterial Bus Lanes

Boston: Silver Line

London
Quality Bus Corridor

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Bus/Transitway on Freeway ROW

Shoulder
Brisbane: SE Busway

Median
Houston: Transitways

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Running Ways

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Service Alternatives

- **Premium** service
- **Higher average speeds** than local service
- **Average speeds comparable to LRT**
- Parallel local and express service
- Major commuter corridors
- Skip stop
- **Reliable**
- **High frequency**
- All day
- Reduced dwell time
- **Highly flexible**
- No schedule

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Route Structures

- **More direct than local service**
- “Off-line” stations
- Anchored by major activity centers
- **Major corridors**
- Feeder routes
- Operate in low-density residential
- **Flexible**
- Effect on Land use
- No map

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Stations

- **Differentiated from regular bus stops**
- **Enhanced shelters** and/or transit center design
- Designated passenger “platform,” possibly raised
- Enclosed
- Can be multi-modal
- Other facilities (taxi stands, parking, etc.)
- **Customer information (real-time)**
- Joint-development/multi-use
- **Facilitates quick boarding and exit**
- Precision docking
- ADA accessible

"Rail-Like" Busway Stations

Level Boarding

Level Boarding is the key to creating a rail-like experience.
All of the above examples are bus-based systems that use it.

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Vehicles

- **Unique/distinct aesthetic design/look**
- Environmentally friendly
- Variable propulsion systems
- **High capacity** (articulated, bi-articulated)
- Wide aisles, increased passenger comfort
- **Low-floor**
- Large window design
- Increased amenities (laptop connections)
- **Multiple double-wide doors**
- Dual-sided entry/exit
- LRT like

Range of BRT Vehicle Options: Conventional Buses

Van Hool 300AG
Zuidtangent
Amsterdam;
York Rapid Transit
Toronto

New Flyer 60LF
Vancouver 98, 99B
Ottawa Transitways

Specialized BRT Vehicles

ATS Phileus
Eindhoven, Netherlands

Irisbus Civis
Las Vegas MAX

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Well- Lit, Open, Quiet Interior

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Vehicle Guidance

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Technology Demonstration

- Vehicle Assist and Automation
  - Assists or automates movement of buses to allow precise operations in extremely narrow lanes, at stations, and bus maintenance facilities
  - Includes precision docking, lateral guidance, and collision warning and avoidance
  - Project currently underway in Oakland, CA and Eugene, OR
- Intermittent Bus Lanes
  - Provides exclusive access to buses for finite time periods using signaling technology and access restrictions
  - Currently seeking an industry partner

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ITS – Advanced Technologies

- **Automated vehicle location**
  - real-time information
  - next vehicle
  - stop announcements
  - “ITEC” on-board info system
- **Signal priority/preemption**
  - reduce vehicle bunching
  - consistent wait times
  - on-time performance
- **Surveillance & security**
  - at stations
  - on vehicles

Los Angeles, CA

Signal priority and **low floor vehicles** aided in a:

- 28 to 33% decrease in travel time
- 30% increase in ridership, 14% net new
- No appreciable impact on cross–street traffic

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Passenger Information

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Faster Fare Collection

- **Fast, efficient so as to speed boarding**
- **Simple** to understand
- Minimal on-vehicle transactions
- Cashless
  - smart cards (multi-use)
  - pre-purchased tickets
  - passes
- **Proof of payment**
  - enter station

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Off–Board Fare Collection Options

Smart Card Fare Gates
TransMillenio, Bogota

Proof-of Payment: TVM
York, On. Rapid Transit

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Similar Operating Characteristics

Statistic	Rapid Transit Mode	
	BRT	LRT
ROW Options	Exclusive or Mixed Traffic	Exclusive or Mixed Traffic
Station Spacing	1/4 to 1 Mile	1/4 to 1 Mile
Vehicle Seated Capacity	40 to 85 Passengers	65 to 85 Passengers
Average Speed	15-30 mph	15-30 mph
P/H/D (exclusive ROW)	Up to 30,000	Up to 30,000
P/H/D (arterial)	Up to 10,000	Up to 10,000
Capital ROW Cost/Mile	$0.2M to $25M/Mile	$20M to $55M/Mile
Capital Cost/Vehicle	$0.45M to $1.5M	$1.5M to $3.5M
O&M/SH	$65 to $100	$150 to $200

Source: SpeedLink- A Rapid Transit Option for Greater Detroit. June 2001.

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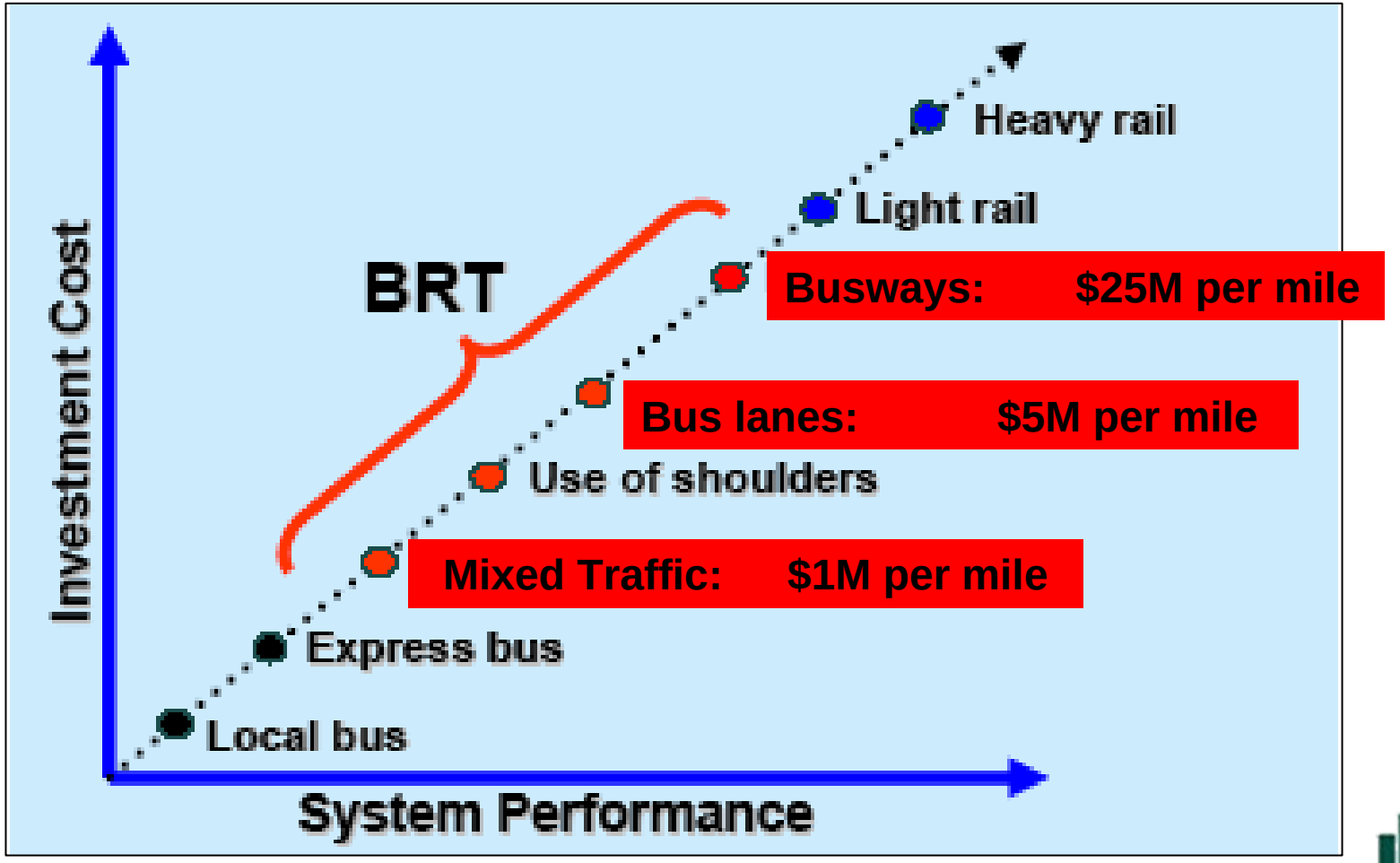
Range and Cost of BRT applications - Runningway Type is a core issue



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Bus Rapid Transit in the U.S.

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BRT in the United States: A Range of Complexity

- Beginning to Catch On
- Debate between BRT and LRT
- BRT Lite
- Rail-Like BRT
- Tradeoffs
  - Permanence vs. Flexibility vs. Affordability

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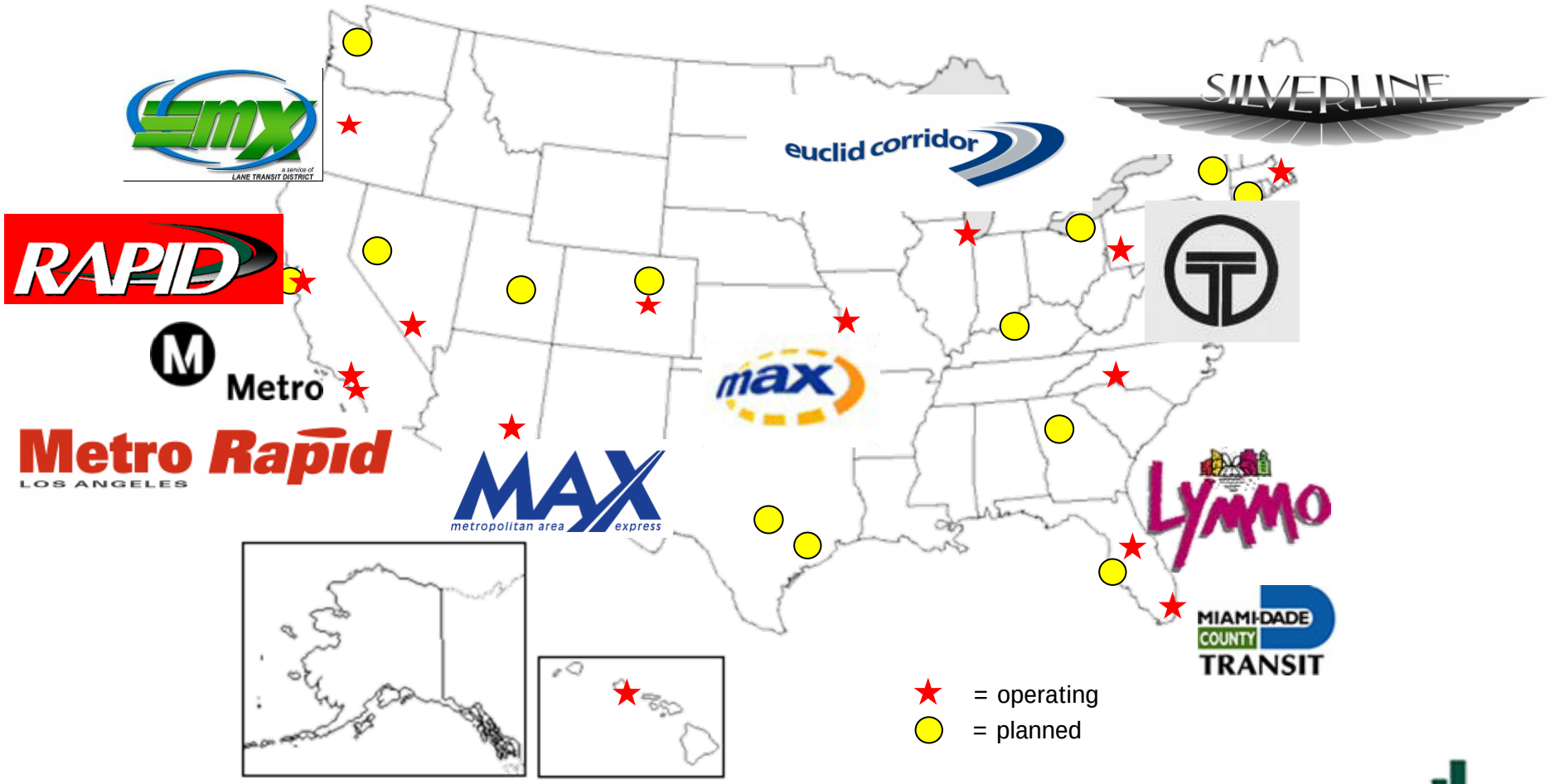
Overview of BRT Implementation in the U.S.



Exclusive Busways

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Conclusions

- Offer as “P**remium**” service
- **Brand** as unique, integrated service
- **Unique** characteristics
  - vehicles
  - stations
  - fare payment
  - “running way”
  - higher speed
  - highly flexible
  - ITS
- Environmentally friendly
- The future
  - precision docking
  - magnetic guidance (driverless)

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Conclusions

- BRT can provide effective solutions
- Characteristics suited to high and lower density environments
- Offer advantages in early & incremental implementation
- Ultimately its reliability, directness, convenience
- Low cost, high capacity alternative

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Thank you for your attention

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