6th National Bus Rapid Transit Conference: No Longer an "Emerging" Mode

June 18-20, 2018
The Millennium Biltmore Hotel; Los Angeles, CA

Organized by
Transportation Research Board

Sponsored by
Committee on Bus Transit Systems (AP050)
Thank You!

TRB sincerely appreciates and thanks the following organizations for their generous support of the BRT Conference:

**PLATINUM**

[Metro](#)  [WSP](#)

**GOLD**

[AECOM](#)

**SILVER**

[Reason](#)  [Swiftly](#)
Welcome to the Transportation Research Board’s (TRB) 6th National Bus Rapid Transit (BRT) Conference. On behalf of the committee, we welcome to Los Angeles attendees from the public, private, non-profit and academic arenas from here in the United States and around the world.

BRT has been growing in popularity for the last 40 years. Initially dismissed as a technology for the developing world, many U.S. metro areas have built or are considering building BRT systems. The theme of this year’s conference, No Longer an “Emerging” Mode, is meant to reflect the popularity of BRT. From Spokane, WA to New York City, NY and from Ciudad Juarez, Mexico to Seoul, South Korea, BRT systems provide critical transportation service to local communities.

In planning this conference, for the first time, the Conference Planning Committee issued a call for abstracts. We received an overwhelming response of almost 100 abstracts. We accepted a little more than half of the abstracts for presentation at the conference. We also invited subject matter experts to present on as many of the major BRT focus areas as possible.

This conference would not have been possible without help from many individuals. Thanks to L.A. Metro for serving as local host agency and organizing the bus tours. The BRT technical tours are one of the best parts of any BRT gathering. Thanks to the Federal Transit Administration and American Public Transportation Association for providing staff and programming support for the event. Thanks to our patrons for funding the conference. The event would not have been nearly as extensive without you. Thanks to TRB staff for their hours of work, including input and liaison activities. Finally, thanks to our moderators, presenters and attendees. Without you there would be no conference!

Enjoy the 6th National BRT conference.

Baruch Feigenbaum
Reason Foundation
Chair, Conference Planning Committee
The Transportation Research Board is one of seven major programs of the National Academies of Sciences, Engineering, and Medicine. The mission of the Transportation Research Board is to increase the benefits that transportation contributes to society by providing leadership in transportation innovation and progress through research and information exchange, conducted within a setting that is objective, interdisciplinary, and multimodal. The Board's varied committees, task forces, and panels annually engage about 7,000 engineers, scientists, and other transportation researchers and practitioners from the public and private sectors and academia, all of whom contribute their expertise in the public interest. The program is supported by state transportation departments, federal agencies including the component administrations of the U.S. Department of Transportation, and other organizations and individuals interested in the development of transportation.

www.TRB.org
## Conference at a Glance

### Monday, June 18

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00 a.m. – 5:00 p.m.</td>
<td>Registration</td>
<td>Lobby Galleria</td>
</tr>
<tr>
<td>1:00 p.m. – 2:45 p.m.</td>
<td>Opening Plenary Session</td>
<td>Crystal Ballroom</td>
</tr>
<tr>
<td></td>
<td>• BRT in Southern California</td>
<td></td>
</tr>
<tr>
<td>2:45 p.m. – 3:15 p.m.</td>
<td>Networking Break</td>
<td>Crystal Ballroom</td>
</tr>
<tr>
<td>3:15 p.m. – 5:00 p.m.</td>
<td>Concurrent Breakout Sessions</td>
<td>Crystal Ballroom</td>
</tr>
<tr>
<td></td>
<td>• Breakout Session A: What is BRT (Is There a Consensus and Does it Matter)?</td>
<td>Crystal Ballroom</td>
</tr>
<tr>
<td></td>
<td>• Breakout Session B: BRT as Part of the Total Transit System</td>
<td>Emerald Ballroom</td>
</tr>
<tr>
<td>5:00 p.m. – 6:30 p.m.</td>
<td>Welcome Reception/Poster Session &amp; Exhibits</td>
<td>Gold Ballroom</td>
</tr>
</tbody>
</table>

### Tuesday, June 19

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:30 a.m. – 5:30 p.m.</td>
<td>Registration</td>
<td>Lobby Galleria</td>
</tr>
<tr>
<td>8:00 a.m. – 11:30 a.m.</td>
<td>L.A. Metro BRT Tour</td>
<td>Lobby Galleria</td>
</tr>
<tr>
<td></td>
<td>• Tour A: Wilshire BRT / Metro Orange Line Technical Tour</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Tour B: Metro Silver Line BRT / Express Lanes / El Monte Station Technical Tour</td>
<td></td>
</tr>
<tr>
<td>Noon – 1:15 p.m.</td>
<td>Lunch with Speaker</td>
<td>Gold Ballroom</td>
</tr>
<tr>
<td>1:30 p.m. – 3:15 p.m.</td>
<td>Concurrent Breakout Sessions</td>
<td>Crystal Ballroom</td>
</tr>
<tr>
<td></td>
<td>• Breakout Session C: Funding and Financing BRT Projects</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Breakout Session D: BRT, TOD and Complete Streets</td>
<td>Emerald Ballroom</td>
</tr>
<tr>
<td>3:15 p.m. – 3:45 p.m.</td>
<td>Networking Break</td>
<td>Gold Ballroom</td>
</tr>
<tr>
<td>3:45 p.m. – 5:30 p.m.</td>
<td>Concurrent Breakout Sessions</td>
<td>Crystal Ballroom</td>
</tr>
<tr>
<td></td>
<td>• Breakout Session E: Operational Challenges of BRT</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Breakout Session F: Development of BRT (Part I)</td>
<td>Emerald Ballroom</td>
</tr>
<tr>
<td>Time</td>
<td>Event</td>
<td>Location</td>
</tr>
<tr>
<td>------------------</td>
<td>----------------------------------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>7:00 a.m. – Noon</td>
<td>Registration</td>
<td>Lobby Galleria</td>
</tr>
<tr>
<td>7:00 a.m. – 8:00 a.m.</td>
<td>Continental Breakfast</td>
<td>Gold Ballroom</td>
</tr>
<tr>
<td>8:00 a.m. – 9:45 a.m.</td>
<td>Concurrent Breakout Sessions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Breakout Session G: BRT as Part of Total Transit Systems</td>
<td>Crystal Ballroom</td>
</tr>
<tr>
<td></td>
<td>• Breakout Session H: Political Challenges of BRT</td>
<td>Emerald Ballroom</td>
</tr>
<tr>
<td>9:45 a.m. – 10:00 a.m.</td>
<td>Networking Break</td>
<td>Gold Ballroom</td>
</tr>
<tr>
<td>10:00 a.m. – 11:45 a.m.</td>
<td>Concurrent Breakout Sessions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Breakout Session I: Optimal BRT (Design)</td>
<td>Crystal Ballroom</td>
</tr>
<tr>
<td></td>
<td>• Breakout Session J: Development of BRT (Part II)</td>
<td>Emerald Ballroom</td>
</tr>
<tr>
<td>11:45 a.m. – 1:15 p.m.</td>
<td>Lunch with Speaker</td>
<td>Gold Ballroom</td>
</tr>
<tr>
<td>1:15 p.m. – 3:00 p.m.</td>
<td>Concurrent Breakout Sessions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Breakout Session K: New Developments in BRT</td>
<td>Crystal Ballroom</td>
</tr>
<tr>
<td></td>
<td>• Breakout Session L: Vehicle Design and Propulsion Technologies</td>
<td>Emerald Ballroom</td>
</tr>
<tr>
<td>3:00 p.m. – 3:15 p.m.</td>
<td>Networking Break</td>
<td>Crystal Ballroom</td>
</tr>
<tr>
<td>3:15 p.m. – 5:00 p.m.</td>
<td>Closing Plenary Session: The Future of BRT: Automation</td>
<td>Crystal Ballroom</td>
</tr>
</tbody>
</table>
CONFERENCE AGENDA

Monday, June 18

9:00 a.m. - 5:00 p.m., Lobby Galleria
Registration

1:00 p.m. - 2:45 p.m., Crystal Ballroom
Opening Plenary Session

Welcome from the Conference Chair
Baruch Feigenbaum, Reason Foundation, Conference Chair

BRT in Southern California
Moderator: Baruch Feigenbaum, Reason Foundation

BRT as Part of the L.A. County Transit System
Phil Washington, CEO L.A. Metro

BRT in the City of Los Angeles
Seleta Reynolds, General Manager, Los Angeles Department of Transportation

BRT as a Tool for Economic Development and Placemaking
Vince Bertoni, Director of Planning, City of Los Angeles

BRT Service in a Suburban Setting
Joseph Raquel, Director of Planning, Foothill Transit

2:45 p.m. - 3:15 p.m., Crystal Ballroom
Networking Break

3:15 p.m. - 5:00 p.m.,
Concurrent Breakout Sessions

Breakout Session A, Crystal Ballroom
What is BRT (Is There a Consensus and Does it Matter)?
Moderator: Baruch Feigenbaum, Reason Foundation

The BRT Standard
Annie Weinstock, BRT Planning International

Federal Transit Administration BRT Guidelines
Ray Tellis, Federal Transit Administration

Freeway BRT Systems
Nadine Lee, L.A. Metro

The Importance of Transit Signal Priority
Alan Danaher, WSP

Breakout Session B, Emerald Ballroom
BRT as Part of the Total Transit System
Moderator: Brendan Finn, ETTS Ltd.

Jacksonville’s First Coast Flyer Bus Rapid Transit System - Linking the Region
Suraya Teeple, Jacksonville Transportation Authority

Reconstructing the Network around BRT - The IndyGo Plan
Justin Stuehrenberg, IndyGo
Using a data-driven approach to create a multimodal transit network that supports a BRT corridor  
Sandy Davis, Foursquare Integrated Transportation Planning

High Performance Transit, Spokane and the Total Transit System  
Karl Otterstrom, Spokane Transit Authority

Myth BUS- ted: BRT A Mode Of Choice In The Greater Toronto and Hamilton Area  
Kristin Demasi, Metrolinx/GO Transit, Toronto, Canada

5:00 p.m. - 6:30 p.m., Gold Ballroom  
Welcome Reception / Poster Session & Exhibits

BRT in the Regional Municipality of York, Ontario-Canada: Comparison of vivaNext BRT contract types (CM/GC) vs DB vs DBF-AFP  
Kathryn Webber, York Region Rapid Transit Corporation

Reconstructing the Network around BRT - The IndyGo Plan  
Justin Stuehrenberg, IndyGo

The Evolution of the Wilshire BRT as a Complete Street Solution within a Congested and Constrained Urban Corridor  
Brent Ogden, Kimley-Horn and Associates, Inc.  
Annelle Albarran, Los Angeles County Metropolitan Transportation Authority

From disarray to complete street: utilizing BRT to improve bus service, pedestrian safety, and traffic organization in the South Bronx  
Kyle Gebhart, New York City Transit Department of Transportation

Bus Rapid Transit as an Economic Development Tool - Orlando, FL  
Laura Minns, WSP-USA

Reviewing Active Headway Management for SWIFT BRT Operations  
Don Murphy, IBI Group

Graduating from Stop to Station  
Lauren Cencic, Los Angeles County Metropolitan Transportation Authority  
Meghna Khanna, Los Angeles County Metropolitan Transportation Authority

Developing Design Elements of Median Bus Stations along the Woodhaven Boulevard SBS Corridor  
Eric Swenson, Arup  
Janet Jenkins, New York City Department of Transportation (NYCDOT)

Integrating the A Line  
Kristin Thompson, Metro Transit, Minneapolis, MN

BRT in Brazil: state of the practice as from the BRT Standard  
Gabriel de Oliveira, ITDP Brazil

Making it Fit: Integrating BRT into Confined Arterial Corridors  
Stefano Viggiano, WSP, Inc.
Tuesday, June 19

7:30 a.m. - 5:30 p.m., Lobby Galleria
Registration

8:00 a.m. - 11:30 a.m., Lobby Galleria
L.A. Metro BRT Tour

Tour A: Wilshire BRT / Metro Orange Line Technical Tour
Tour B: Metro Silver Line BRT / Express Lanes / El Monte Station Technical Tour

Noon - 1:15 p.m., Gold Ballroom
Lunch with Speaker

BRT Developments Around the World
Brendan Finn, ETTS Ltd.

1:30 p.m. - 3:15 p.m.
Concurrent Breakout Sessions

Breakout Session C, Crystal Ballroom
Funding and Financing BRT Projects
Moderator: Cliff Henke, WSP

Federal Funding Opportunities
Jeff Boothe, CIG Working Group

California State Funding for BRT
Tony Mendoza

Local Ballot Initiatives
Cliff Henke, WSP

Using Value Capture to Fund and Finance BRT
Sasha Page, IMG Rebel Advisory, Inc.

Is Private Equity the Future of BRT?
Graham Carey, careyBRT

BRT in the Regional Municipality of York, Ontario-Canada: Comparison of vivaNext BRT contract types (CM/GC vs DB vs DBF-AFP)
Micheal Cheong, York Region Rapid Transit Corporation
Bruce Grundon, Metrolinx
**Breakout Session D, Emerald Ballroom**

**BRT, TOD and Complete Streets**

*Moderator:* Rich Weaver, APTA

- **How Do You Improve Arterial BRT Travel Times? Improve Pedestrian Infrastructure.**
  Seth Torma, WSP Inc.

- **The Evolution of the Wilshire BRT as a Complete Street Solution within a Congested and Constrained Urban Corridor**
  Brent Ogden, Kimley-Horn and Associates, Inc.
  Annelle Albarran, Los Angeles County Metropolitan Transportation Authority

- **From disarray to complete street: utilizing BRT to improve bus service, pedestrian safety, and traffic organization in the South Bronx**
  Kyle Gebhart, New York City Transit Department of Transportation

- **Bus Rapid Transit as an Economic Development Tool - Orlando, FL**
  Laura Minns, WSP-USA

**3:15 p.m. - 3:45 p.m., Gold Ballroom**

*Networking Break*

**3:45 p.m. - 5:30 p.m.**

*Concurrent Breakout Sessions*

**Breakout Session E, Crystal Ballroom**

**Operational Challenges of BRT**

*Moderator:* Annie Weinstock, BRT Planning International

- **Providence's New BRT: An Innovative Operating Plan**
  Seth Morgan, Rhode Island Public Transit Authority (RIPTA)

- **Innovation in Transportation Systems for East Bay BRT**
  Kevin Aguigui, Kimley-Horn and Associates, Inc.

- **Optimizing Express Bus Operation Scheme with Smart Card Travel Data**
  Yongju Yi, Ajou University, South Korea

- **Reviewing Active Headway Management for SWIFT BRT Operations**
  Don Murphy, IBI Group

**Breakout Session F, Emerald Ballroom**

**Development of BRT (Part I)**

*Moderator:* Martha Butler, L. A. Metro

- **San Diego’s Freeway In-Line BRT Stations**
  Dave Schumacher, WSP-USA

- **Station Design & Systems for BRT Stations – Santa Clara Alum Rock BRT**
  Ryan Gulick, IBI Group

- **Developing Design Elements of Median Bus Stations along the Woodhaven Boulevard SBS Corridor**
  Eric Swenson, Arup
  Janet Jenkins, New York City Department of Transportation (NYCDOT)

- **Graduating from Stop to Station**
  Lauren Cencic, Los Angeles County Metropolitan Transportation Authority
  Meghna Khanna, Los Angeles County Metropolitan Transportation Authority
Wednesday, June 20

7:00 a.m. - Noon., Lobby Galleria
Registration

7:00 a.m. - 8:00 a.m., Gold Ballroom
Continental Breakfast

8:00 a.m. - 9:45 a.m.
Concurrent Breakout Sessions

Breakout Session G, Crystal Ballroom
BRT as Part of Total Transit Systems
Moderator: Don Yuratovak, AECOM

Alexandria BRT Corridors: Deploying the Tools for Phased Implementation
Allan Fye, City of Alexandria, Transportation and Environmental Services

Best Practices: Prioritizing Regional BRT Corridors
Brian Welch, Regional Transportation District, Denver, Colorado

Painting the Vision of an Integrated On-Demand System - Enhancing BRT with Shared-Use Autonomous Shuttles
Matthew Lesh

Integrating the A Line
Kristin Thompson, Metro Transit, Minneapolis, MN

Breakout Session H, Emerald Ballroom
Political Challenges of BRT
Moderator: Tom Schwetz, Lane Transit District, Chair of the TRB Standing Committee on Bus Transit Systems

Public Policy Analysis and Bus Rapid Transit: Australasian Case Studies
James Reynolds, Monash University

Leveraging Public and Stakeholder Engagement for BRT in Maryland
Darcy Buckley, Montgomery County Department of Transportation, Montgomery County, MD
Sandy Davis, Foursquare Integrated Transportation Planning

Beyond the Brand: Creating a Clear and Compelling BRT Product
Katie Roth, Metro Transit, Minneapolis, MN

San Francisco’s Geary BRT - 10 Years Later and We’re Still Planning?
Kim Le, San Francisco Municipal Transportation Agency (SFMTA)

9:45 a.m. - 10:00 a.m., Gold Ballroom
Networking Break
10:00 a.m. - 11:45 a.m.
Concurrent Breakout Sessions

Breakout Session I, Crystal Ballroom
Optimal BRT (Design)
Moderator: Ray Tellis, Federal Transit Administration

- BRT in Brazil: state of the practice as from the BRT Standard
  Gabriel de Oliveira, ITDP Brazil

- Optimizing a BRT Vision in the Built City
  Christina Morrison, Metro Transit, Minneapolis, MN

- Use of Median U-Turn on BRT systems
  Jose Vidana Bencomo, University of Ciudad Juarez, Mexico

Breakout Session J, Emerald Ballroom
Development of BRT (Part II)
Moderator: Tom Schwetz, Lane Transit District, Chair of the TRB Standing Committee on Bus Transit Systems

- Manual on Uniform Traffic Control Devices
  Steve Andrle, Transportation Research Board

- Making it Fit: Integrating BRT into Confined Arterial Corridors
  Stefano Viggiano, WSP, Inc.

- Developing Adaptable, Context Sensitive BRT Stations
  Darcy Buckley, Montgomery County Department of Transportation, Montgomery County, MD

- Implementing a Station Planning Process in the Minneapolis-Saint Paul region
  Scott Janowiak, Metro Transit, Minneapolis, MN

11:45 a.m. - 1:15 p.m., Gold Ballroom
Lunch with Speaker

- L.A. Metro Strategic Plan and BRT Implementation
  Joshua Schank, L.A. Metro

1:15 p.m. - 3:00 p.m.
Concurrent Breakout Sessions

Breakout Session K, Crystal Ballroom
New Developments in BRT
Moderator: Bob Edelstein, AECOM

- Using origin-destination data to guide BRT corridor planning
  Jorge Barrios, Kittelson & Associates, Inc.
  David Miller, Foursquare Integrated Transportation Planning

- Implementation and evolution of Direct Bus: a new mode for Philadelphia
  Amy Bernknopf, Delaware Valley Regional Planning Commission (DVRPC)

- A performance-based framework for transit corridor planning
  Jorge Barrios, Kittelson & Associates, Inc.
  David Miller, Foursquare Integrated Transportation Planning
**Breakout Session L, Emerald Ballroom**
**Vehicle Design and Propulsion Technologies**
*Moderator:* Susan Meyer, Spokane Transit Authority

- **Electric Bus and Fuel Cell Development Technology**
  Dan Raudebaugh, Center for Transportation and the Environment

- **Vehicle Design and Opportunities and Design**
  Cliff Henke, WSP

- **Integrated Delivery**
  Carley Markowitz, AECOM

**3:00 p.m. - 3:15 p.m., Crystal Ballroom**
**Networking Break**

**3:15 p.m. - 5:00 p.m., Crystal Ballroom**
**Closing Plenary Session:**
**The Future of BRT: Automation**
*Moderator:* Dennis Hinebaugh, Center for Urban Transit Research, Chair TRB Public Transportation Group

- **Automated Technology Proving Grounds, Contra Costa County**
  Linsey Willis, Contra Costa Transportation Authority

- **AV Shuttle and Vehicle Advances**
  Angela Castro, RTC of Southern Nevada

- **BRT and Connected/Automated Vehicles – Houston, TX**
  Ramesh Gunda, Gunda Corporation

- **Demonstrating V2I Technologies in BRT Corridors**
  Edgar Torres, Kimley-Horn and Associates, Inc.
Next stop: more go.

With dozens of new transit projects in the works, including new Bus Rapid Transit lines in congested corridors, Metro is creating alternatives to traffic and transforming LA County.

Track our progress at metro.net/nextstop.
The Vine BRT, a 6-mile BRT, serves the Vancouver metropolitan region. System features include hybrid buses, GPS transit signal priority and off-board fare collection.

The Vine has 17 stops and stations in the most heavily used transit corridor served by C-TRAN.

WSP’s Role: Final Design; Alternatives Analysis

Clients partner with WSP to mobilize communities from coast to coast, drawing on our expertise in the planning, design and management of transportation infrastructure.

Find out what we can do for you.
Imagine it. Delivered.

AECOM is committed to providing innovative solutions to help our clients realize their ideas as their communities grow. We enhance the places where we work and live, as well as create and sustain a world in which we all flourish. We help our clients by applying creative vision, technical expertise, interdisciplinary insight and local experience to address complex challenges in new and better ways.

aecom.com
HARNESS THE POWER OF YOUR TRANSIT DATA

www.goswift.ly