



Transforming Transportation



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The WestStart-CALSTART *BRT newsLane* Newsletter

The **BRT newsLane** is a bi-monthly electronic publication from WestStart-CALSTART, in partnership with, and funded by, the Federal Transit Administration.

The mission of the **BRT newsLane** is to inform stakeholders on the progress and activities of importance to the BRT community, in the U.S. and abroad; to expand the BRT network by connecting stakeholders through strategic partnerships, and to advance the use of clean vehicles and technologies in BRT systems. -- The Editor

Bus Rapid Transit *newsLane*

This Week's Feature

Hybrid Retrofits: Complete Coach's Thrifty Alternative

For transit agencies wanting to add improved service quality in their BRT vehicles but are a little short on time and constrained on funds, there might be an alternative to a new bus. Remanufactured buses might provide the answer. The integration of new, modern technology into an existing transit bus chassis can be a boon to the transit agency and their riders.

The advantage arises from the rugged, 12 year lifetime construction of U.S. transit buses. Older buses can be up-

fitted with some of the latest technology and subsystems to provide years of added service. The remanufacture can range from simply having selected subsystems removed and replaced with a newer, more capable subsystem to a complete stripping of the bus down to the bare frame and rebuilding to procurement specifications.

For example, the buses can be re-powered with the latest model drive-train combination after removal of the old drive-train. A diesel drive-train can

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Tech Corner

Scanning Tour: Transit Vehicle Assist and Automation

Optical and magnetic electronic guidance as well as mechanical guidance systems are being tested in Europe and Japan. Some communities seeking a high-image BRT service in the U.S. are seriously considering optical and mechanical technologies for precision docking and vehicle guidance applications. Moreover, recent data

from U.S. transit planners suggested that up to 36% prefer articulated buses with docking guidance in their plans for BRT service over the next ten years.

In September 2004, the U.S. DOT, led by Federal Transit Administration (FTA) and Federal Highway Administration

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Clean Vehicle Connection

PZEBs: Potential Path to Cleaner Transit?

In the mid 1990s, the California Air Resources Board (ARB) recognized that the Board's "Zero Emission Vehicle" (ZEV) program would not deliver clean vehicles in the quantities that regulators originally hoped for. So when Honda demonstrated a super clean gasoline engine in order to show that gasoline engines could perform at near ZEV levels without resorting to alternative motors or fuels, the agency created a new emission category, the Super Ultra Low Emission Vehicle (SULEV), to encourage their production. The new standard focused on vehicle tailpipe emissions, along with zero evaporative emissions and a warranty of 15 years or 150K miles on emission components; and it became part of the "Partial Zero Emission Vehicle" (PZEV) credit to offset ZEV requirements.

Historically, zero emission buses have been a part of our urban landscape. Though they're relatively rare today, for much of the past century hundreds of catenary "trolley" buses travelled urban streets across the country. Battery electric buses are becoming more common today as new technologies, such as advanced batteries and "opportunity charging" increase their practicality. Communities across the nation eagerly anticipate hydrogen fuel cell buses. While these technologies are improving, the question arises: what communities and regulators can do if these vehicles aren't viable in the timeframe, quantity, and price range needed.

Could an analogous bus standard - a Partial Zero Emissions Bus standard - encourage innovation by bus engine and drivetrain manufacturers, especially considering the challenge of meeting the 2010 heavy duty emission standards? There are developments underway that make it worth considering.

SunLine Transit Agency was the first public transit system in the United States to convert its fleet to 100 percent compressed natural gas, and has continued breaking new ground since. Sunline is planning to gradually replace its CNG buses with fuel cell powered buses, and is interested in dedicating facilities and staff to commercialization efforts. The agency has been involved in testing blends of hydrogen and natural gas in conventional transit bus engines, and serves as a popular beta test site for manufacturers of new technology including Cummins Engine Company, Detroit Diesel, Engelhard Corporation, John Deere and Federal Mogul (National Seal).

Gasoline-electric hybrid technology is showing promise. The City of Elk Grove in California is currently using ISE's ThunderVolt® gasoline hybrid system for its entire fleet of 17 commuter buses. These Gillig buses, remanufactured by Complete Coach Works and equipped with ISE's hybrid technology in 2004, use standard 87 octane unleaded gasoline. More than 100 gasoline-electric hybrid transit buses will be operating in California cities from Sacramento to San Diego by the end of this year.

A decade ago, regulators and manufacturers never dreamed a gasoline-fueled passenger car could be as clean as today's PZEVs. It's long been recognized that bus transit offers a terrific laboratory for demonstrating alternative fuels and advanced vehicle technology. Maybe adoption of such a standard for transit buses will provide an impetus to manufacturers and transit properties to promote new options in clean transit. *(Editor's Note: Thanks to Matt Peak and Tom Brotherton for their assistance in preparing this story.)*

Upcoming Events...

APTA Bus & Paratransit Conference.....May 15-18, 2005

This conference is the largest and most comprehensive learning experience for bus and paratransit professionals held in North America. Columbus, OH. Program Information: Contact Gloria A. Smith, or phone (202) 496-4818; for registration information: Contact Heather Rachels, or phone (202) 496-4845.

Rail-Volution 2005.....September 7-11, 2005

Rail-Volution is the definitive national conference for building livable communities. On-line registration for Rail-Volution 2005 will commence in late May. For information, visit www.railvolution.com.

Send notices on BRT events to: gmoscoe@calstart.org

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WestStart ACES Conference - May 24 - 26, 2005

Anchorage, Alaska

For more information, visit our web site, www.calstart.org.

Guidance

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(FHWA), initiated a project to examine the cost effectiveness of precision docking and vehicle guidance technologies for the U.S. transit system, grouped under Vehicle Assist and Automation (VAA) Systems for Transit Operations.

Selected members of the VAA steering group, which is made up of transit professionals, highway engineers and technology and policy researchers, visited VAA applications in Japan and most recently Europe. The VAA applications in Japan included the magnet-based Toyota Intelligent Multimode Transit System (IMTS) that provides fully-automated operations and the mechanically-based Nagoya Guided Busway. The European Scanning Tour



Optical Guidance at Rouen

included visiting systems in Rouen, France (optical); Eindhoven and FROG Navigation (magnets); and Essen, Germany (mechanical).

The Rouen system uses the Siemens/MATRA Optical Guidance system that is installed on a standard transit bus for use in precision docking. According to the transit operator, daily ridership is 30,000 passengers per day. Their data shows that precision docking reduces overall travel time by 4-5% at an additional cost of \$650,000 per kilometer.

The system being deployed in Eindhoven, Netherlands uses a magnet marker system that includes an articulated, sleek-looking bus called

the Phileas with all-wheel steering. The VAA technology is used for precision docking, vehicle guidance, and automated operations, where the vehi-



Phileas Bus Docking

cle operator has complete override capability. Benefit and cost data is currently not available.

A similar magnet-based system is used for the Rivium Park Shuttle in Rotterdam, Netherlands. The Rivium Park Shuttle includes a 20-person vehicle and operates in a fully autonomous mode with no driver. Described as a horizontal elevator, where riders board selecting their stop through a ticket vending machine. Phase II will expand the system and add second generation vehicles (approximately €350,000 (euro) each) and expanding the overall system to serve an estimated at 500,000 passengers per year.



Phileas Curbside Detail

The successful deployments of VAA systems have focused on technology

testing and demonstration. Unfortunately, data on benefits and cost to justify wide-spread deployment in the U.S. is scant and insufficient for transit agencies for planning purposes.

In November 2004, the VAA Stakeholder Working Group presented a research synthesis paper that concurred with these observations, suggested the relative technology priorities and possible cost-effective operating scenarios. In February 2005, the VAA group proposed a multi-year program plan that includes further foundation research into the available technologies, policy related issues, and a revenue service demonstration of precision docking and vehicle guidance technologies at a transit agency. The trial demonstration will yield real-world performance data and cost-effective-



Rivium Park Shuttle

ness of the technology in terms of benefits, operating and maintenance costs and customer and operator acceptance.

In May 2005, the FTA and FHWA report will be available detailing the VAA research synthesis, cost-effectiveness analysis and proposed multi-year program plan. The European Scanning Tour trip report is planned for release in spring 2005. Finally, a DVD is available of both the Japanese VAA systems and the European Scanning Tour. For more information regarding any of these reports, please contact Matthew Hardy of Mitretek Systems, at matthew.hardy@mitretek.org or Venkat Pindipolu, (FTA-TRI) venkat.pindipolu@fta.dot.gov.

In The News...

BRT: The Outlook for '05 and Beyond

Transit development is at a crossroads. It faces a tough fiscal climate, but at a few million dollars per mile on average, BRT will often be in a better position to meet this challenge than its more expensive counterparts in public transportation.

According to the Senate Banking Committee, more than 50 communities are now developing BRT systems. That number is expected to grow by 4-6 cities per year, as pointed out by WestStart-CALSTART in its market demand study for the FTA. The outlook for this new mode of public transportation - arguably the fastest growing mode since the early days of light rail development - is unquestionably bright.



NABI 60-ft Articulated Bus for LA Metro

That said, the competition for BRT funding will heat up in 2005 and beyond, as more and more cities compete for limited funding. Even though Congress is likely to enact a transportation reauthorization bill at funding levels considerably higher than the record set by the Transportation Equity Act for the 21st Century, it will not be nearly enough. According to FTA estimates, there is a funding gap of more than \$16 billion between what the BRT and rail projects in the FTA's project development pipeline will need in federal assistance, and what is likely to be available.

Since most of these projects are rail networks and extensions to existing systems, the pressure will mainly be felt by rail sponsors. It's possible some of these projects may be converted to BRT, just as Orange County, California recently did with its proposed Center Line light rail line. Sometimes, the choice will be to adopt BRT as a long-term solution. In other cases, it may be seen as an interim step until economic and/or transit density conditions become more suitable for a rail implementation.

However, in a fiscal climate that favors cost effective solutions, BRT projects will face similar pressures to

keep costs under control, meaning that some communities will likely favor less exotic BRT vehicles in the near future.

Complicating this even further, some bus manufacturers are experiencing financial difficulties, which are leading them to rethink and even discontinue their offerings in this market segment. For example, the public transport authorities in Rouen, France reportedly have cancelled their order with Irisbus for Civis; in Hungary, NABI announced that it will discontinue its CompoBus line of advanced-composite buses used in the BRT networks of Los Angeles and Phoenix after it finishes its delivery of 100 CompoBuses for L.A. later this year.

To address this situation, the Regional Transportation Commission of Southern Nevada (RTC) in Las Vegas announced that it is in negotiations with Irisbus to license the Civis design. Once the agreement is made, the RTC would then seek a U.S. manufacturer to adapt the vehicle to North American operating conditions using more readily available components. It would also contain at least 60 percent U.S. component value sourced and undergo final assembly here to comply with the FTA's Buy America regulations, the RTC added.



Irisbus Civis Articulated Bus for RTC

Going forward, it will be important to encourage public/private cooperation and revision of procurement guidelines for BRT, allowing for flexibility in risk-sharing for vehicle development, developing

design criteria for aggregated procurement, and creating opportunities for cash flowing during development. The guide to success is to avoid gold plating, and using sensible, cost-effective solutions that grow both ridership and confidence in the new mode. (EDITORS NOTE: Thanks to Cliff Henke for his assistance in preparing this article.)

Comm Line

FlexBRT - Innovation in Technology and Policy

Last year at the TRB/APTA Bus Rapid Transit (BRT) Conference, Randy Farwell of TranSystems Corp. presented the latest developments in their project, FlexBRT. The system combines aspects of BRT and paratransit, in that it uses ITS technology extensively to augment existing local service in suburban areas that may lack population density for an expanded BRT or LRT solution. The dynamically-routed, request-dispatched service, will allow customers to request a specific routing via phone, web or station kiosk, and within a maximum of 12 minutes, a FlexBRT shuttle will arrive. The system is projected to begin service in 2008-2009, in the Altamonte Springs/Maitland area in South Florida. But as noted by Frank Martz, Director of the Community Redevelopment Agency and Planning Services for the City of Altamonte Springs (which fostered this concept in 1999), BRT technology is not the whole story; the land use approach is just as innovative. Altamonte Springs has long been a suburb of Orlando, but it is becoming an urbanized city with a central core. And as economic and political times changed, the city chose a proactive path for development that included transit in every aspect. Assembling packets of desirable land for development, the City developed a transit component attached to each property, notifying developers up front what the demands for transit support would be.

Those terms became part of the property, and were incumbent on the original developer as well as any subsequent buyers. While some developers bridled at this notion, what Altamonte Springs offered in return was a variety of credits and expedited processing, indicating the importance of the city's private partners. Martz and others have coordinated with surrounding communities, so that the transit system that eventually goes in place will not stop at the city line, but will become a subregional system, crossing city and sometimes county lines. The innovative FlexBRT system, originally designed as a dedicated guideway service, has evolved to address community demands, and may eventually connect with Orlando's Lynx system. It will now

FlexBRT vs. Traditional Transit

Evaluation Criteria	Alternative in 2020	
	Traditional Circulator	FlexBRT
Peak Vehicle Requirement	31	30
Annual Ridership	563,500	1,086,543
Annual Vehicle Revenue Hours	151,934	74,907
Productivity (Riders/VRH)	3.71	14.51
Annual O&M Cost	\$8,295,600	\$4,393,600
Annual Cost per Trip	\$14.72	\$4.04
Annual Revenue	\$704,374	\$1,358,179
Annual O&M Subsidy	\$7,591,228	\$3,035,589
Annual O&M Subsidy/Rider	\$13.47	\$2.79

provide an efficient near-BRT service, combined with an on-demand service component controlled by a routing system based on complex algorithms. The system has gone through two field tests, and according to Martz, the Federal Transit Administration has expressed interest in exploring whether such an ITS-enhanced circulator system could be exported for use in other communities with similar needs. *(EDITORS NOTE: Thanks to Randy Farwell of TranSystems - rgfarwell@transystems.com - and Frank Martz of Altamonte Springs - FWMartz@altamonte.org - for their assistance in the preparation of this article.)*

Breaking News:

2005-03-03 : Community Transit to Debut First U.S. Invero Bus

Snohomish County, Wash. - Community Transit (CT) has joined forces with New Flyer, North America's largest bus manufacturer, to launch New Flyer's sleek new transit bus design. The aerodynamically-designed, low-floor Invero was developed several years ago and launched in the Canadian market. Improvements were made as the company sought to market the bus in the U.S. It is configured for comfortable perimeter seating and easy accessibility. The bus has large, frameless windows, allowing 26 percent more viewing area for passengers, and a wraparound windshield that eliminates glare and blind spots for the driver. The new buses also are environmentally friendly. They get significantly better fuel economy than the buses they are replacing, have advanced exhaust equipment and run on ultra-low sulfur diesel. Taken together these measures will reduce fuel costs as well as reduce fine particle and toxic emissions by 90 percent. The agency has ordered 33 Invero buses, which will be delivered between now and the end of May. The buses will enter the commuter service fleet in the spring and summer, replacing the oldest buses in the fleet, which are scheduled to be retired. "The Invero is the bus of the future, and we are proud to bring this bus to the Puget Sound," said Community Transit CEO Joyce Olson. "I have no doubt that our riders and drivers will enjoy the comfort, looks and features of the new Invero, and I'm sure other transit agencies will rush to get them."



Retrofits

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even be replaced with a fully integrated hybrid-electric drive cradle assembly similar to an installation in new transit vehicles. Also, passenger amenities could be included in the remanufacture such as LED destination signs, automatic stop annunciation systems, plush or even high back reclining seats and parcel racks with individual reading lamps.



Elk Grove's e-bus, by Complete Coach Works and ISE

A recent successful example is the City of Elk Grove purchase of remanufactured Gillig 40 foot transit buses by Complete Coach Works (CCW). Elk Grove selected the re-manufacture route rather than new hybrid-electric buses. The choice fit the City's timeline and the need to respond to air quality concerns plus an improved level of service. The result is an upscale bus equipped with a gasoline fueled hybrid-electric drive system and many passenger amenities at a price less than a new hybrid bus, delivered

in a relatively short six months.

The hybrid-electric drive, supplied by ISE Corp in San Diego, California, is a gasoline hybrid-electric system that uses an ultra-low emission (ULEV-rated) Ford engine, resulting in virtually zero particulate matter and already meeting the 2007 CARB and EPA standards for emissions of NOx. The

City also wanted a higher level of passenger comfort so they specified a comfortable, appealing interior equipped with airline style high back reclining seats and six TV screens with real time programming and news broadcasts. Eventually, there is a plan for Internet access for riders.

The bottom line is that re-manufactured buses may be another path to a vehicle with high-quality passenger amenities, increased fuel economy and lower emissions for BRT service. While not a "new" bus, the price may often be less and delivery time considerably shorter.

LTD Looks to the Future

by Ken Hamm - GM, Lane Transit
(Excerpted from *The Eugene Register-Guard*, 02/28/05)

Thirty-five years ago, I began my career in transit as a bus driver. As a driver, I learned about the needs of the people I served.

In the Regional Transportation Plan process, LTD was asked what it could do to reduce single-occupant vehicle miles traveled during the 20-year planning period. Bus rapid transit was proposed by LTD and adopted by Eugene, Springfield and Lane County as a key strategy in solving some of the transportation problems anticipated in the future.

BRT has become a priority strategy for many communities across America and a focus for federal investment in the transportation infrastructure of those communities.

The investment in BRT is an investment for today and for the future. The federal funds create local jobs today and in the future. But more importantly, BRT services will connect people to jobs, schools and community services in new ways in the future, when congestion threatens to choke our roadways and significantly affect our local economy.

Full article at: <http://www.registerguard.com/cgi-Story.py?name=ed.col.hamm.0228&date=20050228>

NewsLinks

2005-02-25 : Seattle Hybrid Buses Show Promise

The new buses are delivering up to a 50 percent boost in fuel economy compared with vehicles they're replacing...

2005-02-17 : Honolulu Shuttles its BRT Experiment

DESCRIPTION - Starting Feb. 1, the city began reassigning the buses to its more crowded Route A, which runs from Waipahu to the University of Hawaii

2005-02-16 : Orange County Suspends Center Line, Takes Stock

DESCRIPTION - The Orange County Transportation Authority (OCTA) will now consider expanding Metrolink rail service or building a rapid-transit bus system...

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