DENTON COUNTY TRANSPORTATION AUTHORITY

Positive Train Control (PTC) Implementation on A-train Commuter Rail

Updated July 31, 2018

Presentation Overview

- DCTA A-train Commuter Rail Facts
- DCTA's A-train Safety Record
- What is Positive Train Control?
- ETA-C Technology 101 (PTC)
- PTC Implementation Challenges
- Current Status
- Path to Implementation

Key A-train Facts

- 21-mile corridor, single track with sidings
- 11 – Stadler GTW DMUs (AVT waiver – first in US)
- 6 stations, Mon. to Sat. Passenger Service
- 60+ passenger trains per day
- 10 Control Points/8 Intermediates
- Limited freight service – Temporal Separation, No Class I or HAZMAT (4 trains/week, south 7 miles of system only)
- No interoperability provision – not required.
- Terminus at north end of system
- Originally MKT Line; realigned for Lewisville Lake
- Long sight lines, minimal curves, max speed – 60mph, solid braking characteristics
- Fiber backbone, Layer 3 network

Key A-train Facts (Map of Corridor)

A-train Safety Record

- DCTA has a solid A-train safety record with
- A-train has less than one accident per passenger mile from FY14 through FY17 and 0 accidents per mile from January to June of 2018

A-train Incidents FY14 - June 2018			
Fiscal Year	Incidents	Revenue Passenger Miles	Incidents Per Revenue Passenger Mile
2014	3	624,330	0.0000048052
2015	4	651,120	0.0000061433
2016	1	644,710	0.0000015511
2017	3	533,079	0.0000056277
2018	0	248,295	0

DCTA fiscal years go from October 1 through September 30

What is Positive Train Control?

- Positive Train Control (PTC) is a complex communications technology that is designed to make commuter rail even safer by preventing collisions and other incidents by automatically detecting and controlling the movement of trains.
- PTC is a communications-intense technology that transmits data between trains and communications towers using wireless Internet, GPS, and encrypted radio transmissions.
- PTC utilizes a series of sensors and integrated monitoring systems that track key movement on trains and conditions on rail tracks in real time to identify potentially hazardous situations.
- If an unsafe speed situation arises, PTC automatically will trigger a train's braking system to slow it and prevent an accident, such as a train-to-train collision or exceeding speed restrictions in a curve.

E-ATC System “101” (Positive Train Control)

- DCTA is aggressively implementing the federally-mandated requirement to install Positive Train Control (PTC) equipment by the December 31, 2018 deadline.
- The agency is installing the Enhanced Automatic Train Control (E-ATC) which a type of PTC system that uses an underlying automatic train control (ATC) system in conjunction with other “enhanced” features or systems to achieve the core required functionalities of PTC.
- These systems are often integrated with underlying cab signal systems (CSS) and centralized traffic control (CTC) systems.
- GE ElectroCode 5 system in place – logical fit.
- Vehicles pick up signal from rail, no 220MHz radios, lowers complexity and cost.
- Wayside communications linked via Fiber network, leverages the infrastructure we have in place already.
- $20M budget – additional $2M risk assessed for unknowns in testing (Total - $950K/mile)

E-ATC Systems Implementation Across the U.S.

- Tri-Met (achieved initial type approval)
- Sonoma Marin Area Transit (SMART)
- Utah Transportation Authority- Front Runner
- CapMetro
- Florida East Coast
- DCTA
- Others pending

Current PTC Installation and Implementation Status

- Fully funded and committed to the EATC system and compliance at all levels in organization
- Installation 100 percent complete: wayside, vehicles, and back office
- DCTA is the first public transit agency in Texas to begin testing on PTC
- Static test is 100 percent complete
- Dynamic testing began July 2018
- On track to enter Revenue Service Demonstration (RSD) by December 31, 2018
- Continued leadership of EATC User Group efforts
- DCTA will request an extension (based on entry into RSD), fully compliant with the law

Current Status

First Quarter PTC Reports as of March 31, 2018[1]

Railroad Name	Total Hardware Installed	Onboard Hardware Installed[2]	Wayside Hardware Installed	All Spectrum Acquired?	Sufficient RSD Initiated?	Employees Trained
Class I Railroads						
BNSF Railway (BNSF)	100%	20,000/20,000	13,735/13,735	Yes	Yes	21,877/21,877
CSX Transportation (CSX)	96%	3,600/3,600	5,616/5,964	Yes	Yes	15,634/15,634
Canadian National Railway (CN)	96%	2,837/2,930	4,718/4,950	Yes	No	5,198/5,614
Kansas City Southern Railway (KCS)	95%	1,648/1,876	3,021/3,021	Yes	No	1,939/2,158
Union Pacific Railroad (UP)	95%	19,392/22,060	29,661/29,661	Yes	Yes	24,776/25,767
Norfolk Southern Railway (NS)	94%	5,188/5,800	10,733/11,193	Yes	No	18,438/18,832
Canadian Pacific Railway (CP)	91%	1,799/2,020	2,591/2,824	Yes	No	1,965/2,775
Intercity Passenger Railroads						
Amtrak (ATK)	94%	1,879/1,968	655/727	Yes	Yes	2,929/2,929
Commuter Railroads						
Southern California Regional Rail Authority (SCAX) "Metrolink"	100%	448/448	631/631	Yes	Yes	330/330
North County Transit District (SDNX)	100%	68/68	86/86	Yes	Yes	97/98
Southeastern Pennsylvania Transportation Authority (SEPA)	100%	1,525/1,525	152/152	Yes	Yes	1,192/1,192
Regional Transportation District Commuter (RTDC) "Denver"	100%	264/264	228/228	Yes	Yes	120/120
Sonoma-Marin Area Rail Transit (SMART)	100%	45/45	75/75	N/A	Yes	76/76
Northstar Commuter Rail (NSCR)	100%	48/48	N/A	N/A	Yes	18/18
Alaska Railroad (ARR)	100%	216/216	301/301	Yes	No	263/472
Denton County Transportation Authority (DCTA)	100%	44/44	121/121	N/A	No	0/50
Virginia Railway Express (VREX)	100%	164/164	N/A	N/A	To Be Determined	46/108
Utah Transit Authority FrontRunner Commuter Rail (UFRC)	100%	120/120	137/137	N/A	No	0/200
Long Island Rail Road (LIRR)	98%	584/584	332/361	Yes	No	1,859/3,194
Sounder Commuter Rail (SCR)	96%	155/164	49/49	Yes	To Be Determined	4/4
Northeast Illinois Regional Corporation (NIRC) "Metra"	90%	1,850/2,112	770/789	Yes	No	1,181/1,801
Port Authority Trans-Hudson (PATH)	86%	1,100/1,150	2,005/2,448	N/A	No	910/910
Metro-North Commuter Railroad Co. (MNCW)	86%	1,706/1,880	164/292	Yes	No	2,474/2,915
Peninsula Corridor Joint Powers Board (PCMZ) "Caltrain"	74%	134/268	246/246	Yes	No	0/199
Massachusetts Bay Transportation Authority (MBTA)	71%	834/1140	516/760	Yes	No	215/932

Current Status (PTC Installation – Wayside)

Current Status (PTC Installation – Vehicle)

PTC Implementation Challenges (Industry-wide)

- **Cost to Implement** – PTC will cost an estimated **$4.1 billion** to implement and up to $130 million a year in maintenance and operation costs.
- **Interoperability –** Many railroads run on tracks that they own or are hosted by freight railroads, or a combination of both. Critical to the successful implementation of PTC is making sure that all trains, tracks and the back-office of each railroad communicate with one another.
- **Limited contractors –** there is a limited number of contractors with the expertise to install PTC on both commuter rail and freight railroads which is causing delays in installation.
- **Installation Time** – PTC must be installed and tested while simultaneously continuing to provide safe, reliable service for passengers.

Path to Implementation

- Fully funded and committed to the EATC system and compliance at all levels in organization – long road to get here
- Installation 100 percent complete: wayside, vehicles, and back office
- Static Testing is complete
- Configuration Management Plan is complete and implemented
- Training is complete for wayside (signals). Training for trainers (onboard and operations) is complete. Remaining training will be accomplished before Revenue Service Demonstration (RSD).
- Dynamic Testing has been ongoing since July 22, 2018
- Formal application submitted to the FRA for RSD
- On track to enter RSD by December 31, 2018
- Key risk areas for entry into RSD:
  - **Approval to enter RSD by the FRA**
  - **Unknown significant dynamic testing issues**
- Continued leadership of EATC User Group efforts
- DCTA will request an extension (based on entry into RSD)