How Will We Shape Railroads In The Future?

Steven Ditmeyer

- Principal, Transportation Technology and Economics

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1967	1990	2011	2017
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NextGen Train Control

What does it mean for the future of rail passenger service in America?

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Amtrak's New President: Richard Anderson

- Former **chairman** and **CEO of Delta Airlines**

- Recipient of the Air Traffic Control Association's Glen A. Gilbert Award, one of the **most prominent awards in aviation**, and ATCA's highest honor

- **Recognized for his leadership** as chair of the NextGen Air Traffic Control System Advisory Committee

What is FAA's NextGen Air Traffic Control program and why are they doing it?

FAA is:

➢ Shifting air traffic control from analog voice (broadcast) to digital data communications (discretely addressed);

➢ Shifting from radar to GPS, augmented with WAAS, for aircraft position and speed information;

   ▪ The comm system for transmitting GPS position and speed info to control centers and other aircraft is called ADS-B, or Automatic Dependent Surveillance – Broadcast;

➢ Shifting from old to new control center computers and displays; and

➢ Requiring airlines and aircraft owners to equip their aircraft with on-board computers and sensors.

Next Gen uses *continuous real-time information* regarding aircraft location and speed to:

➢ Increase safety while flying more passengers, more cargo, more types of aircraft;

➢ Reduce congestion and delays in the air and on the ground;

➢ Improve the efficiency of airline operations;

➢ Reduce aircraft fuel consumption, reduce aircraft noise, and reduce emissions; and

➢ Increase the capacity of the National Airspace System.

➢ FAA does **not** say that NextGen Air Traffic Control is **just** a system overlaid on radar to improve air traffic safety, or **just** a system to improve airline and airport efficiency.

➢ FAA says that NextGen Air Traffic Control consists of **integrated** systems that will improve **both** aviation safety and efficiency.

What is NextGen Train Control?

NextGen Train Control is very similar to NextGen Air Traffic Control

They both use:

➢ *Continuous real-time information* transmitted over a digital data link communications network;

➢ GPS positioning with WAAS augmentation to get 1 to 2 meter positioning accuracy;

➢ New sensors;

➢ New on-board and control center computers; and

➢ Textual as well as graphic cab displays to focus on situational awareness.

Short definition of NextGen Train Control: It's what comes next after PTC

➤ The railroad and FRA people who have worked on PTC have defined it as a safety-only non-vital overlay of the wayside signal systems.

➤ Therefore, I am defining NextGen Train Control as focusing on:

(1) improving on the safety of PTC, and

(2) increasing the efficiency, economic viability, and financial success of railroads well beyond the little that is achieved with PTC.

In 1992, an Amtrak president saw the benefits of NextGen Train Control (then called ARES)

Graham Claytor had been a naval officer in World War II; a partner in a Washington, DC law firm; president, CEO, and chairman of the Southern Railway; and Secretary of the Navy, Acting Secretary of Transportation, and Deputy Secretary of Defense before becoming president of Amtrak.

As Deputy SecDef, he authorized the completion of the GPS satellite constellation and the implementation of digital battlefield communications.

ARES
For Safety and Service

Amtrak

Gerald Grinstein, Chairman and CEO, Burlington Northern Railroad:
We designed ARES in the 1980s and have tested it for more than two years on Burlington Northern's line serving the Mesabi Iron Range. The system is now ready for implementation. We are proud that we can extend its benefits to Amtrak, an important partner in railroading.

W. Graham Claytor, Jr., President and Chairman, National Railroad Passenger Corporation:
The Amtrak-ARES demonstration project, designed to show the benefits of an advanced train-control system, can carry Amtrak service to new levels of safety, reliability, and efficiency.

The benefits that Graham Claytor and Amtrak expected from ARES PTC when integrated with other info systems:

Customer Service
- Ensures schedule compliance
- Provides accurate and timely ETAs
- Helps dispatchers operate trains on schedule
- Provides accurate locations and status of trains

Train Scheduling
- Improves on-time performance
- Provides accurate locations and status of trains
- Helps improve maintenance-of-way (MOW) planning
- Helps improve crew scheduling
- Incorporates railroad system schedule and strategy into traffic plan
- Calculates optimum train pacing speeds

And more:

Rail Operations Safety
    Displays route ahead for train crews
    Provides conflict checking for all issued authorities
    Provides MOW crews access to train ETAs
    Provides more reliable communications
    Ensures that authorities are clearly understood
    Provides alarms and advisories for noncompliance
    Upgrades unsignalled territories
    Prevents overspeeds
    Maintains positive train separation
    Ensures route integrity
    Monitors equipment integrity

And even more:

Productivity
- Reduces voice radio congestion
- Provides easy access to track, train and MOW information
- Allows locomotive maintenance to be scheduled efficiently
- Improves train handling
- Provides on-track time to MOW crews without talking to the dispatcher
- Manages dispatcher recordkeeping and reporting
- Helps improve crew management

Asset Management
- Reduces time locomotives are out of service
- Reduces locomotive maintenance expenses
- Reduces fuel consumption
- Assists power distribution
- Increases track capacity
- Schedules locomotive maintenance
- Optimizes existing communications network
- Provides locomotive health and status
- Monitors fuel consumption

What does the Railroad Safety Improvement Act of 2008 require of PTC systems?

PTC systems must prevent:

➤ Train-to-train collisions,

➤ Over-speed derailments,

➤ Incursions into established work zone limits, and

➤ The movement of a train through a switch left in the wrong position.

These were performance requirements, not design requirements. Railroads could decide how they would implement them and inform FRA. FRA would approve or disapprove.

But then, bad things happened with PTC.

What happened to PTC

➢ Railroad CEOs assigned PTC implementation to their signaling departments.

➢ The signaling departments decided to replace their wayside signals with new ones, and overlay PTC on them.

➢ Railroads appealed to and were granted relief by FRA from certain requirements.

➢ Because the law did not require any efficiency improvements to accompany the safety improvements, the railroads decided not to implement any efficiency improvements.

➢ As a result, PTC costs doubled and business benefits of the type Claytor and Amtrak had sought in 1992 disappeared.

What should Amtrak and other passenger railroads do to their PTC systems to improve safety and efficiency?

To improve safety, the passenger railroads should:

➢ Make sure that the locations of ends of trains, as well as the fronts, are known to the dispatchers and locomotive engineers to prevent rear-end collisions in addition to head-on collisions,

➢ Add GPS receivers and data radios on m-o-w vehicles and machines to make sure that dispatchers and trains know where they are (to prevent Chester, PA collisions),

➢ Install switch position sensors on ALL switches (to prevent Graniteville, SC accidents), and

➢ Add on-board cab map displays showing track profile and alignment for situational awareness (to prevent Philadelphia, PA overspeed accidents),
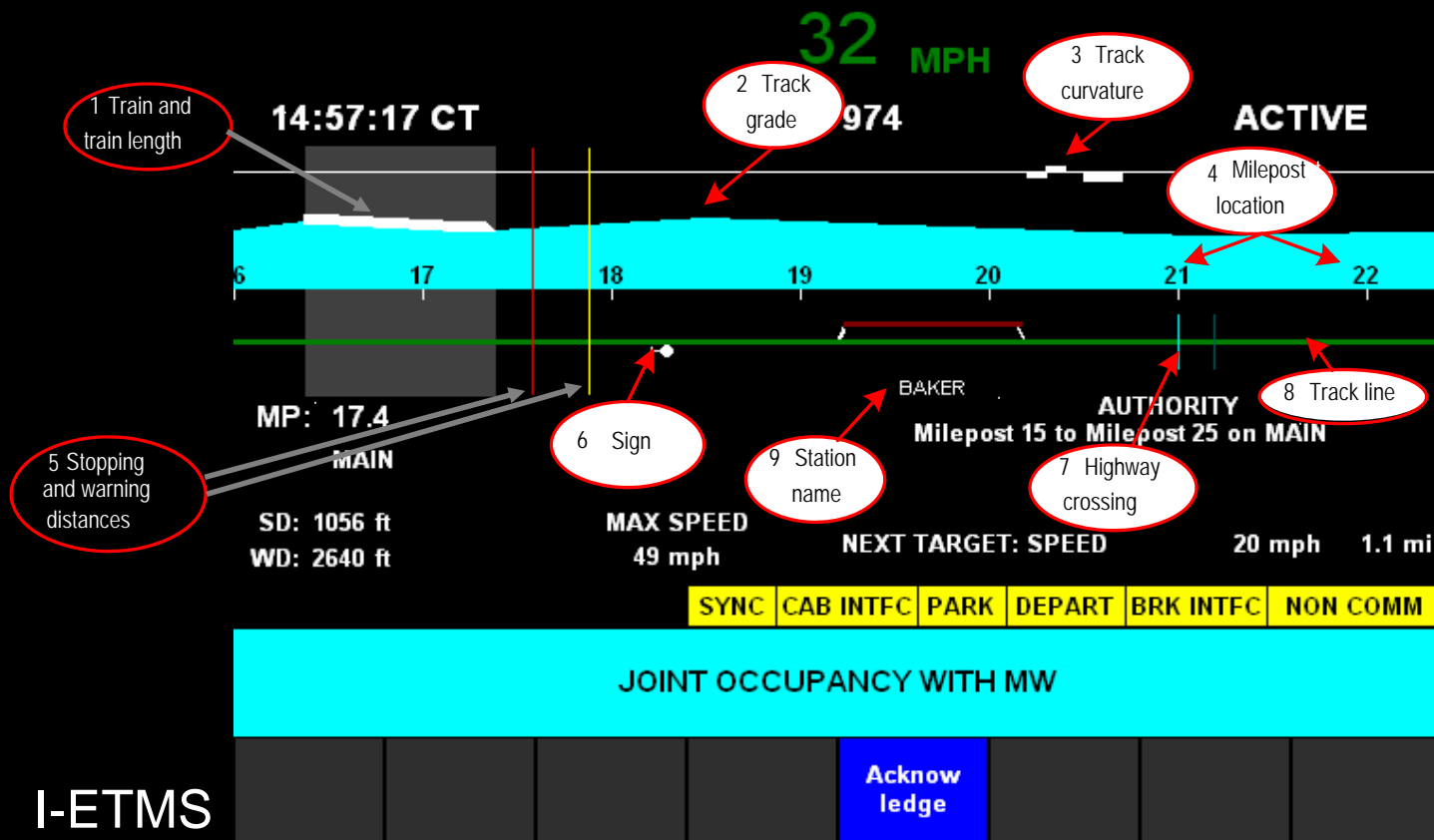
PTC cab displays on Amtrak trains on Amtrak trackage
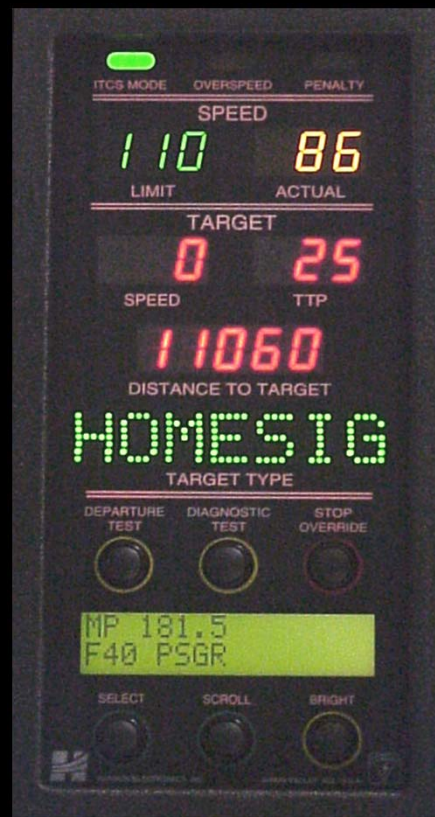
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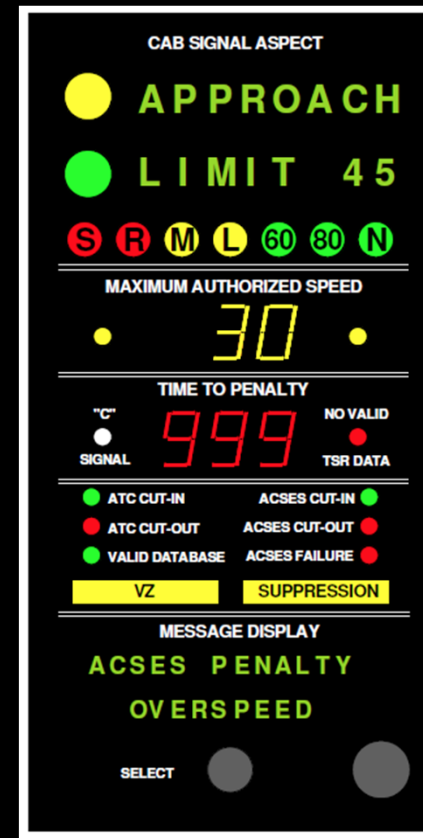
ACSES
Northeast Corridor

PTC cab displays on Amtrak trains on freight railroad trackage

I-ETMS

Note much better situational awareness

To improve safety, the passenger railroads should:

➢ Write new, simplified rule books for NextGen Train Control – to replace NORAC and GCOR – that reflect the new paradigm of train operations decoupled from fixed blocks and wayside signals,

➢ Incorporate intelligent grade crossings into the PTC systems,

➢ Investigate systems for improving detection of broken rails with something other than track circuits, and

➢ Install PTC into and through terminal areas (to prevent Hoboken, NJ end-post collisions)

To improve efficiency, the passenger railroads should:

➢**Integrate** PTC with locomotive health reporting, work order reporting, train consist information, precision dispatching systems, and locomotive, car, and crew scheduling systems.

➢**Decouple** PTC from wayside signal systems and fixed blocks, and implement moving block operations.

The keys to successful implementation of NextGen Train Control

➤ TOTAL support of the Chairman and CEO

➤ An i mplementation team consisting of representatives from EVERY department that will be affected by NextGen Train Control:

Operations Planning	Marketing & Pricing
Transportation	Information Systems
Dispatching	Safety & Rules
Mechanical	HR & Training
Track Maintenance	Labor Relations
Signaling	Finance
Telecommunications	Corp Communications

Final Thought…

"A properly implemented NextGen Train Control system will get the right information to the right people at the right time to run the railroad safely and efficiently."

Questions?
Email me, call me, or see me at tonight's reception!

Steven R. Ditmeyer
Principal
Transportation Technology and Economics

Phone: 703-768-5540
Cell phone: 703-980-0073
Email: srdit@aol.com