

**Legislative Mandates : Get the
most out the money you have
to spend:
Positive Train Control
Digital Narrowband**

APTA – IT-Transtech

Ft. Lauderdale FL

February 25th, 2010

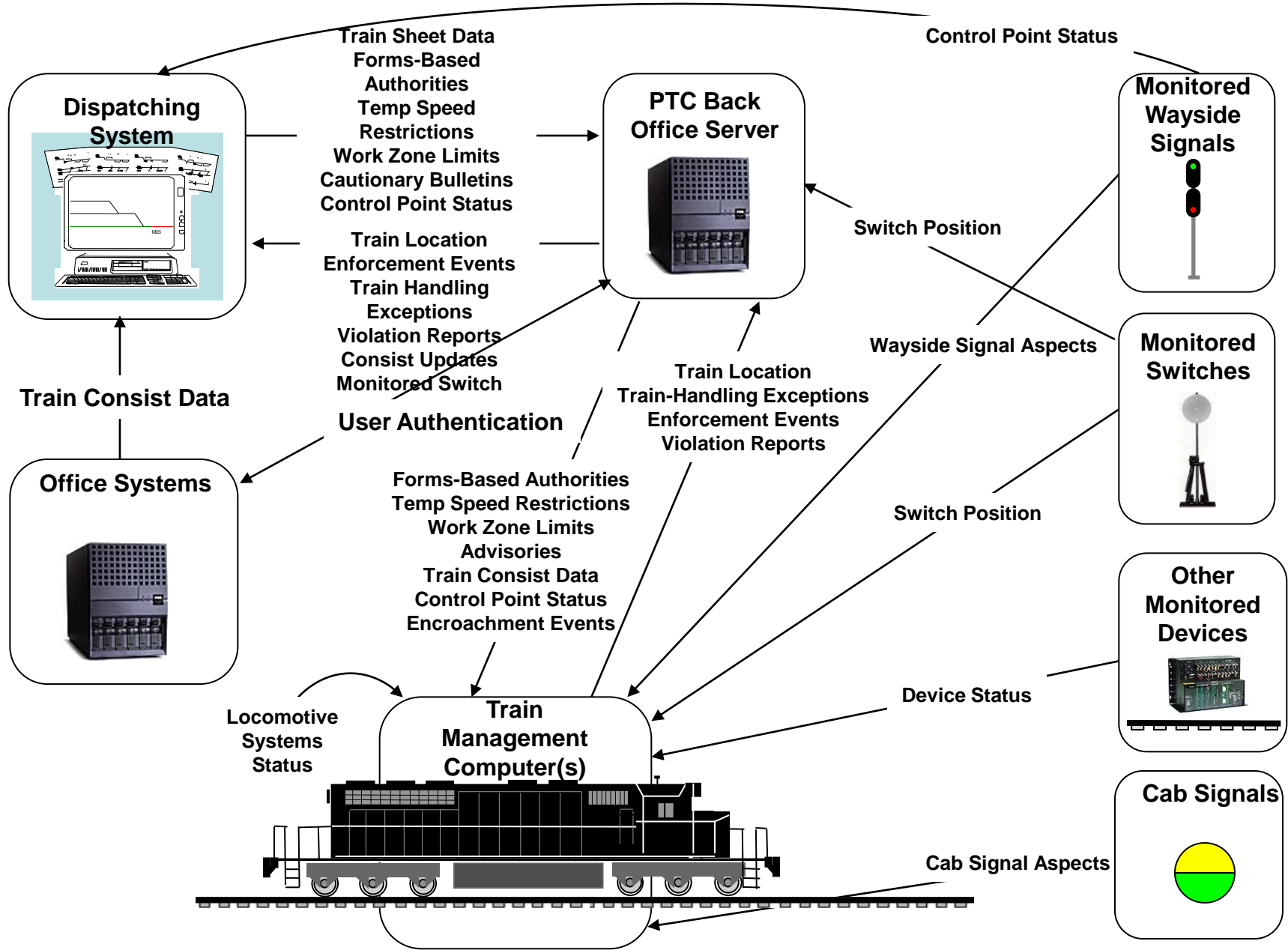
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PTC Legislative Mandate

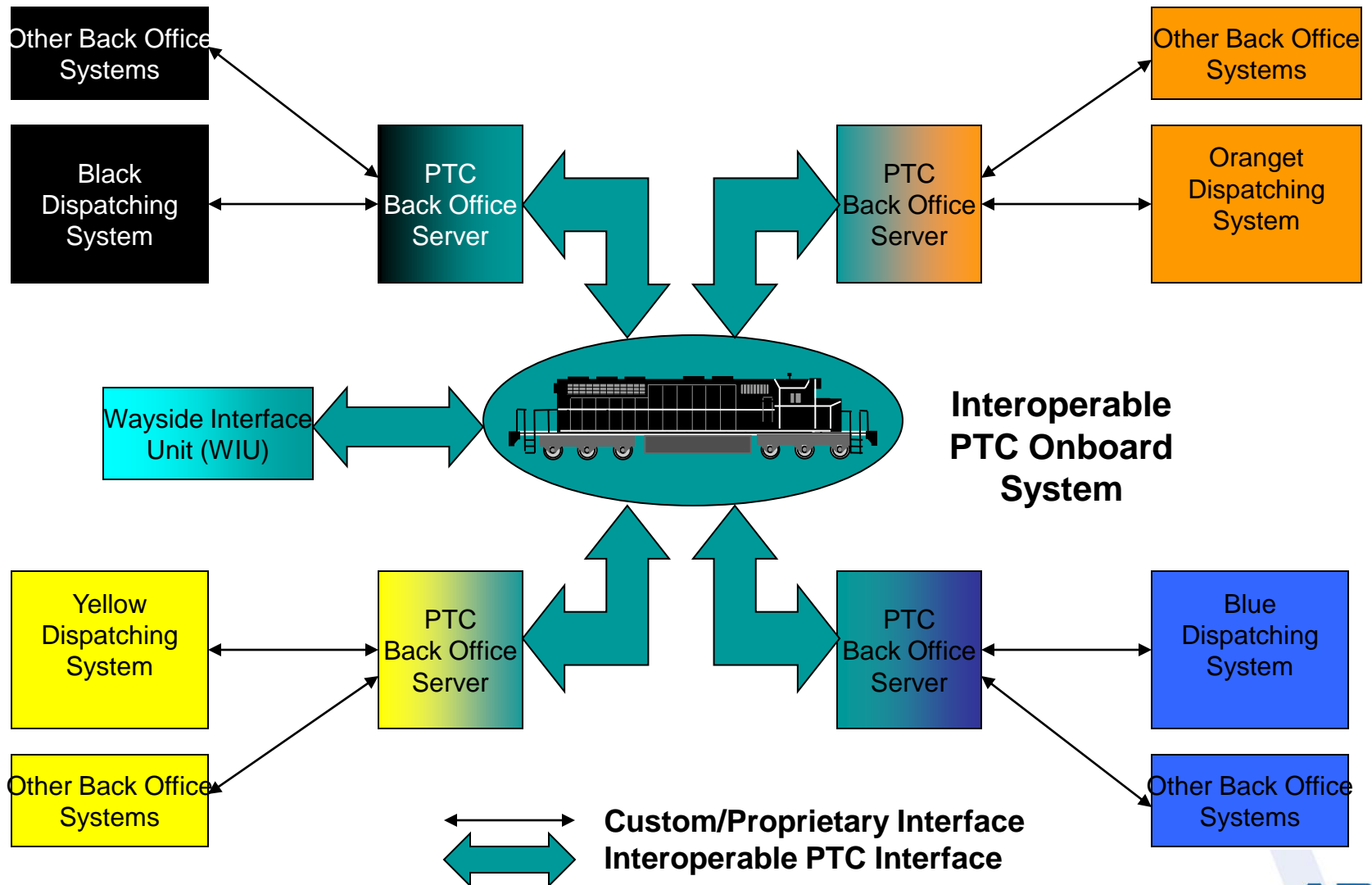
- Prevent train-to-train collisions
- Prevent over speed derailments
- Prevent incursions into roadway work zones
- Prevent movement of a train through a switch left in the “wrong position”
- For Class I railroads, their lines with 5 **mgt** (million gross tons) and **PIH** (Poison Inhalation Hazard)/**TIH** (Toxic Inhalation Hazard) traffic
- Intercity and commuter railroad lines
- **PTC system operational by December 31, 2015**

Who must Implement PTC and at what cost?

- Class I Freight Railroads
 - Total of 7
- Passenger Rail
 - 22 Commuter rail plus AMTRAK
- Short Line Freight Railroads
 - Approximately 60 Railroads
- Estimated cost of 5.5 Billion
 - 69,000 miles of track of which 24,000 are passenger lines and 18,000 miles qualify in both intercity and commuter rail categories
 - On board 30,000 rail vehicles



Interoperable PTC Architecture



Back Office Systems (Maintenance & Fleet Mgmt)

Central Office Systems

Train Control / SCADA



PTC



CIS

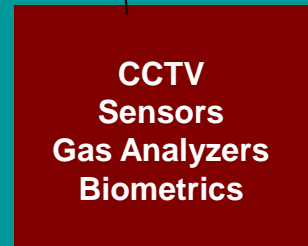
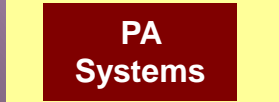
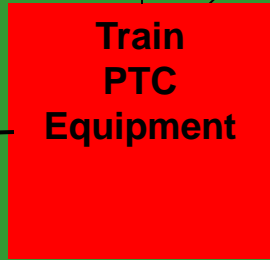
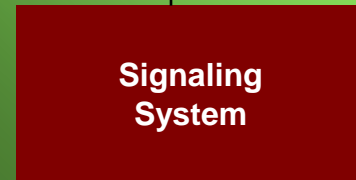
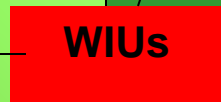
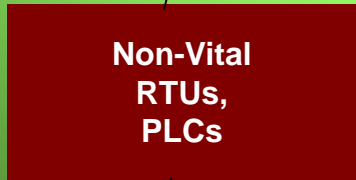


Security



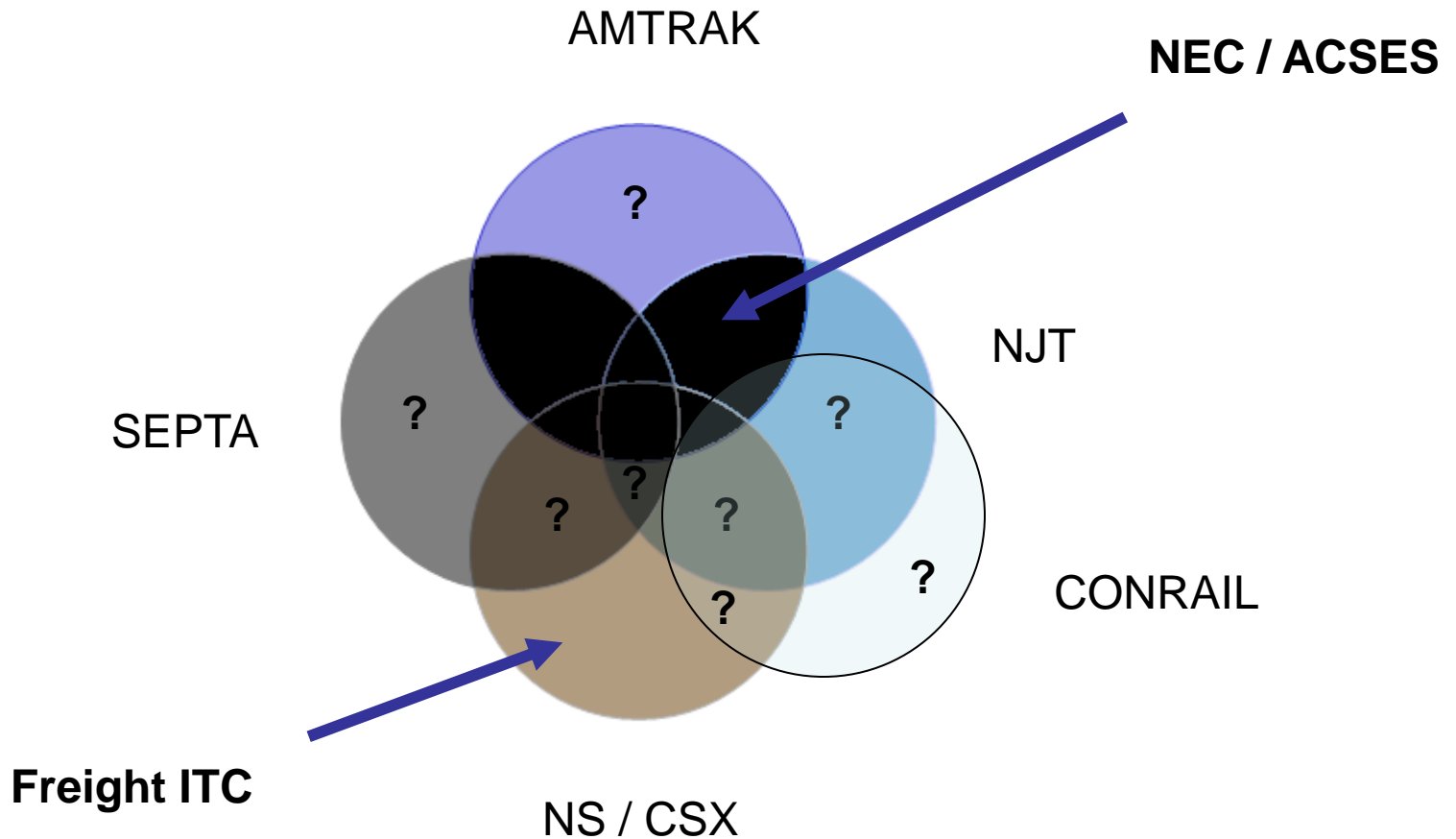
Firewall

Network (Fiber / Wireless)



Field Systems

East Coast Territory Overview



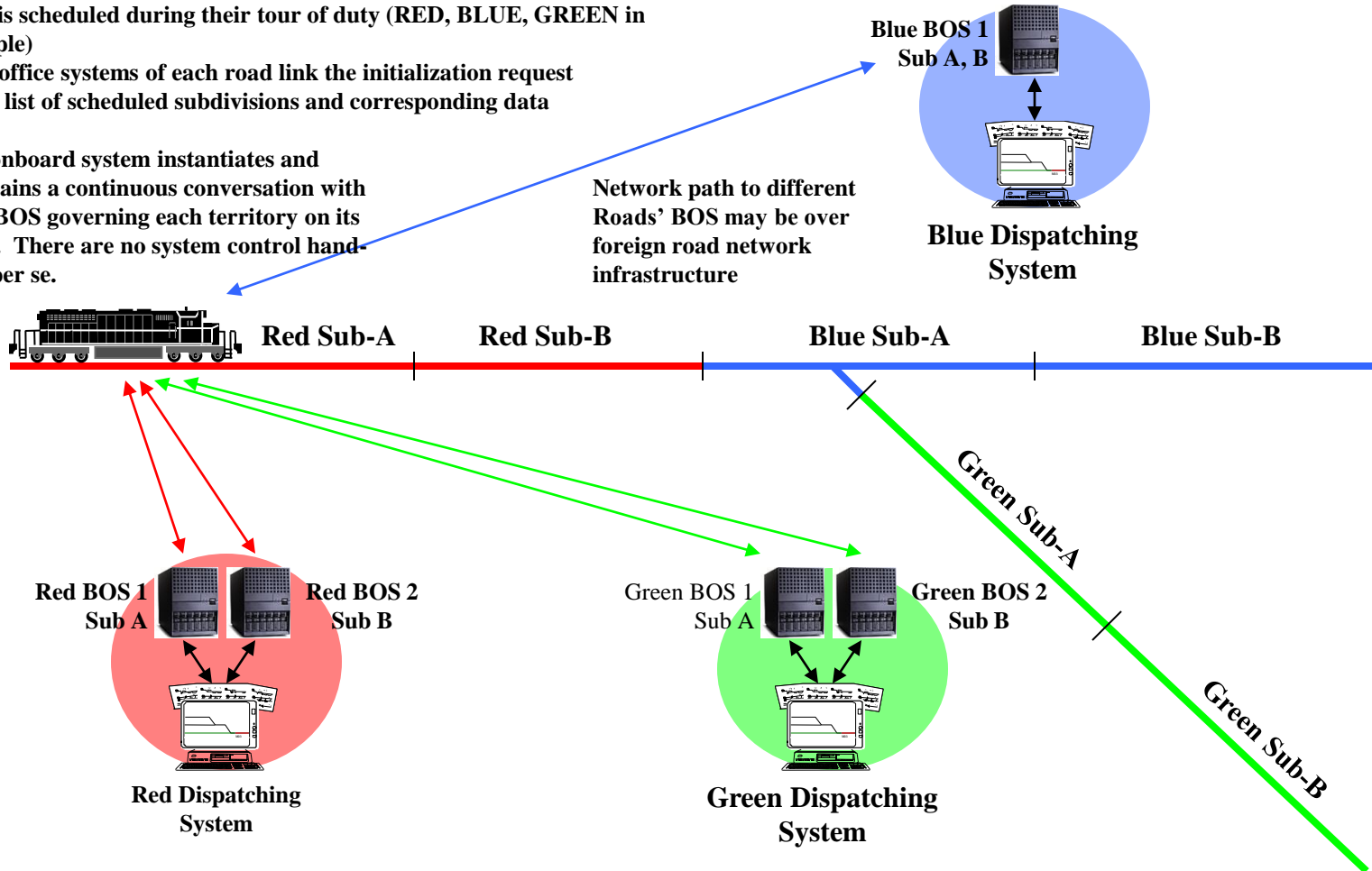
ITC Interoperability Approach

Example: Train scheduled for Red Subs A and B, Blue Sub A, and Green Subs A and B

At initialization, train crew indicates to onboard system each Road on which train is scheduled during their tour of duty (RED, BLUE, GREEN in example)

Back office systems of each road link the initialization request to the list of scheduled subdivisions and corresponding data

ITC onboard system instantiates and maintains a continuous conversation with each BOS governing each territory on its route. There are no system control hand-offs, per se.



PTC will drive data integration with other apps

- Event recorder download
- Asset Tracking and management
- Mobile Worker
- Video
- Network and Systems management
- Configuration Management
- Locomotive health
- Work Order
- Crossing Monitoring
- Wayside
- Detectors
- Security

FCC Narrowband Mandate

150-174 MHz and 421-512 MHz bands

On December 9, 2009 the FCC issued a Public Notice that re-affirmed the Narrowband deadlines:

Licensees and frequency coordinators should be aware of the following deadlines:

- (1) beginning **January 1, 2011**, the Commission will no longer accept applications for 25kHz licenses.
- (2) by **January 1, 2013**, Industrial/Business and Public Safety Radio Pool licensees must operate on 12.5 kHz or narrower channels.

FCC Narrowband Mandate

150-174 MHz and 421-512 MHz bands

- On March 24th, 2007, FCC issued a 3rd Report and Order reaffirming that **6.25KHz** digital radios are to be mandated, but with no date certain established.
 - Radio manufacturers have been developing 6.25 KHz radios and they are available.
 - The AAR has adopted a cross licensed technology (NXDN™) from Kenwood/ICOM as the industry digital 6.25 KHz standard.
 - “For interoperability, the AAR Wireless Communications Committee recommends that any railroad purchasing VHF tri-mode radios for use in the 160 MHz band, specify NXDN™ compliance for 6.25 KHz Very Narrowband (VNB) operation”

Digital Narrowband

- Current 12.5 Narrowband Mandate requires investment in new radios.
- 6.25 Mandate on the horizon.
- 6.25 Technology available in investments required to comply with 12.5
- Achieve additional business benefits from the investment.
- Digital 6.25 Narrowband provides opportunities for data applications for transportation.

Current Class I Freight RR plans

- Have been purchasing Tri-mode radios for Implementation in support of 12.5 operation that must be complete by 2013
- Have agreed to have all locomotives in interchange service equipped by July 1, 2010
- Have been testing NXDN 6.25 voice and data capabilities
- Digital 6.25 Narrowband provides opportunities for data applications for rail.

Potential Transportation applications for 6.25 Digital

- GPS
 - Rail loco, Passenger car, Mobile worker, etc
- Equipment Health
- Crossing Monitoring
 - Alarms, health
- Defect Detector applications
 - Hot Box Detector
 - Current – voice notifies engineer of axle of defect
 - Future – Data Comm to office and train of Car #

Summary

- PTC mandate will drive technology investment in Office, Wayside and Onboard that will enable new data integration opportunities.
 - Opportunity to review and optimize entire systems and network architecture.
 - Raises the bar on data quality.
 - Will drive innovation in the supplier community.
- Grant money is available to support security investments.
- Digital Narrowband data applications will provide business value for a mandated investment.
 - Think about the data applications you could implement.
- The future
 - More intelligence on mobile assets and at the edge of the network.
 - More useful data to integrate into the enterprise to gain business value.
 - More sensor data at lower costs.

Follow up questions and discussion

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