

North American Positive Train Control Program Update to RSAC

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Agenda

- Program objectives, scope and requirements
- Program Status:
 - Standards and Eastern Projects
 - IDOT Project

Program Objectives

- Project Objectives:
 - Develop, test and demonstrate PTC Capabilities
 - Including Flexible Blocks and Advance Activation for Highway Grade Crossings
 - Meet the RSAC PTC Safety Objectives
 - Preventing Train to Train Collisions
 - Enforce Speed Restrictions
 - Protection for Roadway Workers

Program Scope

- Develop and Evaluate a PTC System on the Union Pacific Springfield Subdivision
 - Springfield to Mazonia (123 Miles of CTC)
 - Production ready system at the beginning of 2003
- Develop industry interoperability standards
- Funding 1/3 Industry and 2/3 FRA/IDOT

Program Requirements

- Standards Developed will be Open and Non-proprietary
- Program Procurements will be Competitive
- Specifications will be Driven by Functional and Performance Requirements
 - Not by Specific Technological Approaches
- Will follow and meet requirements of “Processor Based Signal and Train Control Systems” final rule
 - Currently following draft 8 of NPRM

Standards And Eastern Project Development Status

Standards Work Completed

- Developed Data Dictionary - from a variety of inputs, ATCS, LSI, Eastern Project
- Progressed Eastern Project which has drafted standards for interoperable systems onboard the locomotive and will develop some off board messages
- Selected ATCS Specification 200 for upper layer RF protocols
- Wireless Communications Task Force focus group studying the scope of possible changes to ATCS protocol. WCTF will provide technical expertise on wireless communications to NAJPTC.

More Standards Work Completed

- AAR activities:
 - Formed a Railway Electronics Task Force to handle Configuration Management and development of AAR Electronic Standards (Section K of MSRP)
 - Initial MSRP issue includes: EOT, AEI and Configuration Management
 - On the docket are: M591 Operating Display, M590 LSI Architecture (as modified)

AAR Standards Activities (Continued)

- Cab Electronics
 - Will build on AAR cab electronics standards (LSI) and modify them to take advantage of more up to date technology, includes a “communications management unit”, which will:
 - Develop functionality for “Communications Manager” which will allow for more independence for RF link
 - Likely include high throughput link (e.g. 802.11)
 - Cab electronics work ,along with Eastern Project outputs will provide specifications for industry train control standards

Other Standards

- Industry Train Control Concept of Operations (part of NAJPTC)
- Addressing (AAR Program)
 - Establishing databases for:
 - ATCS railroad numbers
 - IP addresses for APCO-P25 (really the onboard CMU)
 - End of train devices
 - APCO-P25 radios

Plans

- Industry Concept of Operations
 - ARINC completed a survey of PTC functions
- Cab electronics message development
 - Have worked with RETF and have scheduled a meeting for message development at ARINC
- LMC will develop System Design and Interface Design documents - start next quarter and complete third quarter - input/feedback

More Plans

- Modify and update ATCS Specification 110, Environmental Requirements
- Continue to update NAJPTC documents through a configuration management process.
- Determine performance requirements as output of IDOT Project and Industry Concept of Operations as input into Train Control Standards
- Complete modification of M590

IDOT Project Development Status

Project Status

- TTCI manages the Program and IDOT Project
- ARINC led team is the System Engineers
- System developer/integrator RFP released last February
- Award made to team led by Lockheed Martin, now under contract
 - Includes Wabtec, Union Switch and Signal and Parson Brinkerhoff
- Support Contracts with Amtrak and UPRR in the works

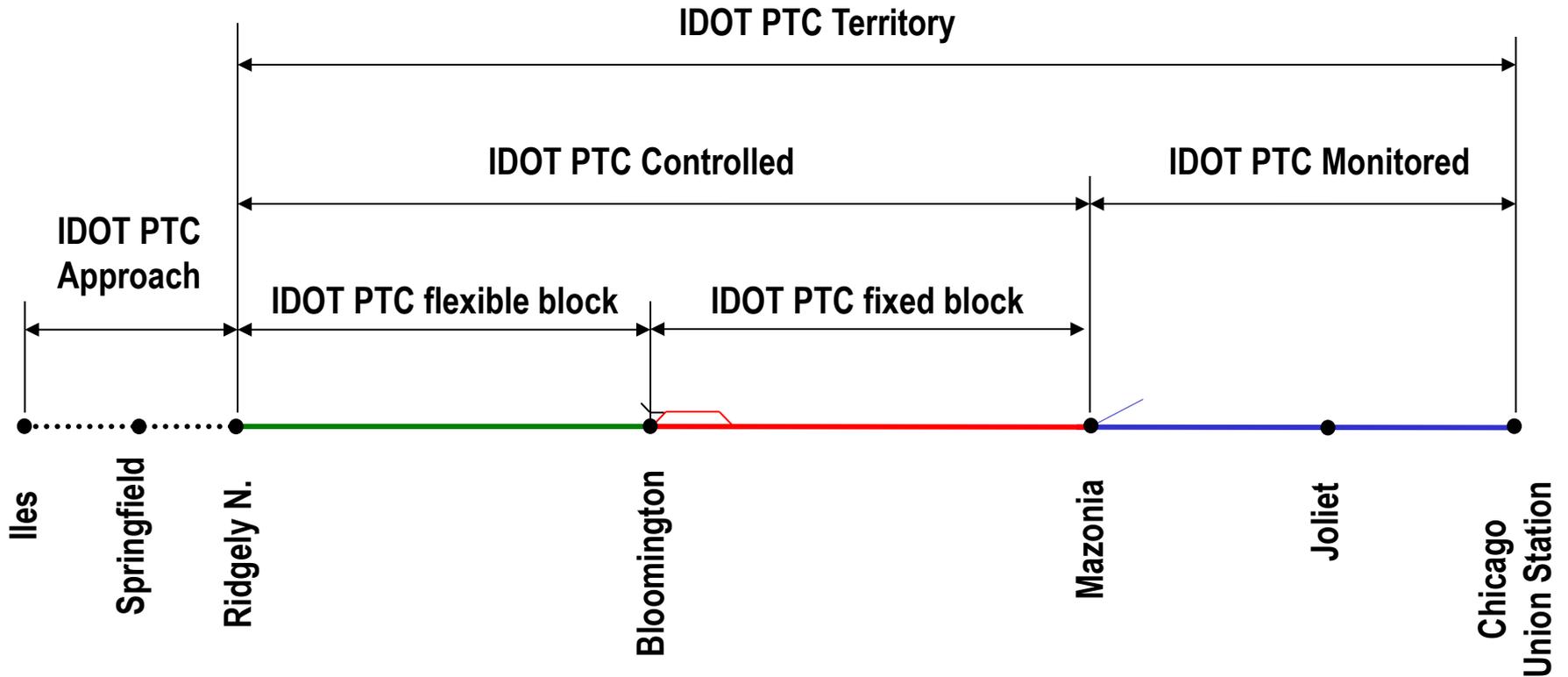
Implementation Approach

- Seven incremental builds
 - Will have testing after each build
 - Each build will be functionally independent
- Will provide for non-communicating trains

Build Schedule

Build	Schedule	Comments
Tracking	1Q01	Need communications infrastructure, locomotive equipment, track database and positioning technology
Speed	3Q01	Need speed limits (Form A and civil speeds, etc.) reactive enforcement
Management		
Authority	4Q01	Fixed block need CAD (Form B, and authority information) signal upgrades
Management		
Authority	2Q02	Flexible block, locomotive control
Management		of power switches
High Speed	3Q02	Requires new advanced crossing systems and track upgrades
Operation		
Roadway	3Q02	Roadway worker equipment
Worker		
Predictive	4Q02	Complex implementation – also
Enforcement		pacing

Overview of IDOT PTC Territory



Note:
Spurs: non-controlled
Yard Tracks: non-controlled
Industry Tracks: non-controlled
CTC Sidings: controlled

IDOT Project Issues

- Signal system upgrades and dispatching interface
- Locomotive electronics standards - integration of Eastern Platform into design
- RF Communications compatibility
- Location and braking systems variability
- System safety verification and validation

Summary: IDOT Challenges

- Interoperability consensus & cost-effective design – captured in industry PTC standards
- HSR grade crossing operation and safety
- Risk management / performance - based regulatory philosophy – Particularly, handling of non-communicating trains
- Aggressive schedule; full funding;
- Timing of multiple upgrades/implementations

Important Milestones

Date	Milestone
December 15, 2000	SDR, all changes to systems requirements complete
March 1, 2001	Preliminary Design Review
February 15, 2002	Build 3 testing complete
May 15, 2002	Build 5 testing complete
June 15, 2002	Product Safety Plan submitted to FRA
September 30, 2002	Build 7 testing complete
October 15, 2002	Complete installation of all hardware
December 31, 2002	Completion of testing and system acceptance