

Positive Train Control- A Regulatory Perspective





Outline

- FRA
- PTC
- Governing Regulation
- Operational Systems
- Questions





- Founded 1966
- Three Major Divisions
 - Office of Chief Counsel
 - Office of Railroad Development
 - Office of Safety
 - 8 Regional Offices
 - ~415 Inspectors
 - Signal and Train Control
 - Track
 - Motive Power & Equipment
 - Operating Practices
 - Hazardous Materials
 - Highway Rail Grade Crossing Safety



Prevent train to train collisions

Provide protection for MOW personnel working within the limits of their permission

Enforce Speed Restrictions





Don't specify the mechanism by which the standard is met...

Specify the criteria by which the proof

that standard is met will be evaluated





The Government specifies the performance objective-

"The system/product is at least as safe as what was there before"





Regulatory Requirements

.....The Railroad and Vendors Specify How They Intend to Meet the Objective





- FRA <u>Does Not</u> Mandate a Solution
- FRA <u>Does Not</u> Provide "Certification" of Product
- FRA <u>Does Not</u> Mandate a Risk Assessment Technique

"Any Method That Is Shown Suitable to the Associate Administrator for Safety in the Context of the Particular Product"

- FRA <u>Does</u> Approve Documents Submitted by Railroad
- FRA <u>Does</u> Evaluate Adequacy of Safety Analysis
- FRA <u>Does</u> Monitor Compliance



Regulatory History





- HR 2095
 - Class I railroad carrier
 - implementing by December 31, 2014,
 - Passed By House & Referred to Senate
- S 1889
 - All each railroad
 - implements by December 31, 2018
 - Senate Floor



- System Cost \$ 1,162,743,663
- Safety Benefits \$ 485,264,906
- Benefit Cost Ratio 0.42

Class 1 Railroads- 20 Year- 1999 \$



Effective date of the Rule – June 6, 2005

General

- All future systems (including conventional ones) with processorbased elements are subject to the rule
- Systems in revenue service before June 6, 2005 are exempt from the rule
- Systems in design and development prior to March 7, 2005 that will be placed in service before March 7, 2008 are also exempt upon written notification to FRA by June 6, 2005



Highway-rail Grade Crossing Warning Systems

Federal Railroad Administration

Section §234.275 Processor Based Systems

All Highway-rail grade crossing warning systems using new or novel technology or providing safety-critical data to any signal or train control system are subject to the rule

"New or novel technology" is defined as "technology not previously recognized for use prior to March 7, 2005"



Required by <u>ALL</u> Railroads

All <u>new and existing</u> processor-based signal and train control systems

- Six months to develop and adopt the plan (before Dec 6, 2005)
- Additional 30 months are given to fully implement the plan (before June 6, 2008)
- Railroads commencing operations after June 6, 2005 must adopt a plan prior to revenue service and implement the plan within 30 months after that.



Regulatory Requirements

RAILROAD DEFINES THE PROCESS TO MEET THE PERFORMANCE OBJECTIVE

RSPP

RAILROAD DEMONSTRATES THE PRODUCT MEETS THE PERFORMANCE OBJECTIVE

PSP





Principal Safety Document for Safety Critical Systems

- Railroad Specific Document
 - Content and Execution by Railroad
 - Vendor Preparation
- Establishes Minimum PSP Requirements
- 180 Day FRA Review Goal
- FRA Approves
 - Initial
 - Safety Critical Revisions



Product Safety Plan (PSP)

Principal Safety Document for Particular Safety Critical Product

-Railroad Specific Document

- Content and Execution by Railroad
- Vendor Preparation
- Joint PSP
- -System Lifecycle Approach



PTC Projects

- Projects in six different FRA regions
- There are 12 different projects
- Involving eight different railroads
- Located in 15 different states
- Consisting of 2333 route miles
- Totaling 2618 track miles



"Vital" Functions versus "Safety-Critical"





Active PTC Projects & Vendors

- Train Sentinel
 - Supplier is Quantum Engineering
 - Railroad is Ohio Central
- CBTM = Communication Based Train Management
 - Supplier is Wabtec
 - Railroad CSX
- OTC = Optimized Train Control
 - Supplier is Wabtec
 - Railroad NS
- ITCS = Incremental Train Control System
 - Supplier is GETS
 - Railroad is AMTRAK (Michigan Corridor)



- ETMS = Electronic Train Management
 - Supplier is Wabtec
 - Railroad is BNSF, METRA
- V-TMS = Vital Train Management System
 - Supplier is Wabtec
 - Railroad is UP
- CAS = Collision Avoidance System
 - Supplier is US&S
 - Railroad is Alaska
- NAJPTC =North American Joint Positive Train Control
 - Supplier is Lockheed Martin
 - Transportation Technology Center (TTCI)



- ETMS = Electronic Train Management
 - Supplier is Wabtec
 - Railroad is BNSF
- ETMS (Lite)= Electronic Train Management System Lite
 - Supplier is Wabtec
 - Railroad is Northern Indiana Commuter (METRA)
- ACSES = Advanced Civil Speed Enforcement System
 - Supplier is ALSTOM
 - Railroad is AMTRAK (NE Corridor)
- CBTM = Communication Based Train Management
 - Supplier TBD
 - Railroad Port Authority New York New jersey



- Builder: GE Transportation Systems
- User: AMTRAK, NS
- Status:
 - Pre NPRM
 - Revenue Service:
 - Nile to Kalamazoo MI (~ 50 miles)
 - 20 additional wayside miles available after testing
 - 90 mph passenger, 110 passenger after satisfactory V&V
 - Undergoing Verification and Validation of Software ECD 2008
 - Activation of Signal Crossing, Positioning of Switches
 - Status of Switches and Signals



ITCS





ETMS

- Builder: WABTEC, Cedar Rapids, Iowa
- User: BNSF
- Status:
 - "Augment Existing" "Overlay"
 - Mixture Territory Types
 - CTC, TCT
 - Beardstown Subdivision, IL (~140 miles)
 - No Activation of Signal Crossing
 - Status of Switches, Signals
 - PSP Approved for Operation 35 Subdivisions
 - Version 2 Under Test



ETMS





- Builder: Quantum, Jacksonville, FL Engesis, San Palo, Brazil
- User: Ohio Central Railroad
- Status:
 - Revenue Service on PCRR
 - ~ 40 miles
 - Preparing to Test on OCRR









North American Joint Positive Train Control Project

- Builder: Lockheed Martin
- User: Union Pacific, AMTRAK
- Status:
 - Activation of Signal Crossing, Status of Switches, Signals
 - 110 mph after satisfactory testing, PSP approval, and 3^{rd} party V&V
 - Mixture Territory Types (~ 120 miles)
 - Ridgely N to Mazonia IL
 - Integrated (Fixed Block)
 - Standalone (Moving Block
 - Moved to TTCI









Questions?

