



Positive Train Control

Project Scope

The Alaska Railroad (ARRC) is developing a multi-phased program to design, develop and implement a communication-based Positive Train Control (PTC) system that uses data radio communications between train dispatchers and train crews, or dispatchers and roadway workers. The PTC system will help to ensure safe freight, passenger, and roadway worker operation.

PTC offers an enhancement to current operation methods by preventing human factor errors that may cause catastrophic results. PTC will present human operators with improved information for decision-making.

The PTC project is comprised of a replacement Computer Aided Dispatch (CAD) system, an on-board computer system, 220 megahertz (MHz) VHF packet data radio technology, and Global Positioning System (GPS) locator technology. Wayside devices (including signals, switches, track integrity) are interrogated by approaching locomotives for status. If needed, the train will be stopped prior to moving over the specific device.

Benefits

Positive Train Control integrates CAD, on-board equipment, and wayside devices with a dedicated communication network. PTC offers powerful tools to improve the safety of:

Train Movement:

PTC will provide the regulatory-mandated safety enhancements that reliably and functionally prevent:

- train-to-train collisions;
- overspeed derailments, including derailments related to railroad civil engineering speed restrictions, slow orders, and excessive speeds over switches and through turnouts;

- incursions into established work zone limits without first receiving appropriate authority and verification from the dispatcher or roadway worker in charge; and
- movement of a train through a main line switch in the improper position.

Other On-Track Traffic:

- PTC will provide an authority/speed limit warning system for on-track vehicles.

Status

PTC is being implemented at ARRC in several phases. Federal Railroad Administration (FRA) Safety Certification is expected by December 31, 2015, and will include equipment installation on all ARRC locomotives. The railroad is implementing the freight industry standard for PTC, called Interoperable - Electronic Train Management System (I-ETMS) by Wabtec Railway Electronics.

Phase I

- The Wabtec Railway Electronics Train Management & Dispatch System (TMDS) will be installed by November 2012 and will implement Centralized Traffic Control and dark-territory Track Warrant Control as the methods of operation at the Alaska Railroad.

Phase II

- Installation of Meteorcomm LLC 220 MHz packet data radios in base stations, locomotives and wayside for the approximately 60-mile ARRC test corridor from the Anchorage Rail Yard to the Whittier Division. Additionally, all wayside devices within the test corridor will be equipped with monitoring features.
- Six locomotives will be equipped with a train management computer and radio equipment for testing, and critical feature validation and verification.

- Functional testing needed to submit the FRA-required PTC Safety Plan is scheduled to occur in spring 2014. FRA approval of the required PTC Safety Plan is expected in 2015, allowing ARRC to use the system in revenue service.

Phase III

- Installation of monitoring equipment for wayside devices on the rest of the railroad outside of the test corridor will happen concurrently with the functional testing.
- Remaining 47 locomotives will be outfitted with the onboard computer and radio equipment.
- Thanks to the American Recovery & Reinvestment Act (ARRA), switch and track integrity monitoring at eleven of 142 locations required by the 2008 Rail Safety Improvement Act, were done in 2009-2010. Work on remaining locations will continue through Dec. 31, 2015.

Phase IV

- will integrate on-track-vehicles (trucks and other vehicles outfitted to drive on the track) for

monitoring, alerting and warning of authority limits and proximity to other maintenance vehicles.

Costs and Funding

From 1999 through 2011, ARRC has spent about \$53 million on backbone communications upgrades and a CAD system to prepare for PTC implementation. Of this, the FRA funded earlier phases, and the Federal Transit Administration (FTA) funded later work with formula fund grants. \$1.3 million in ARRA Stimulus funds administered by the FTA was used to equip 11 wayside locations with monitoring equipment.

An additional \$70 million is estimated to complete the Positive Train Control System. For 2012, the Alaska Railroad has budgeted \$4 million in FTA grants (funded 91% by the FTA and 9% by ARRC) plus an additional \$1 million in Alaska Railroad funds to complete Phase I and begin Phase II.



Positive Train Control System Overview

