

POSITIVE TRAIN CONTROL (PTC).

Union Pacific has been, and continues to be an industry leader in the development and implementation of PTC. For years we have been working on a solution that will improve safety and efficiency, and further enhance our fuel conservation efforts.

PTC ADVANTAGES

PTC is a predictive collision avoidance technology that can stop a train before an accident occurs. PTC is designed to keep a train under its maximum speed limit and within the limits of its authorization to be on a track. To accomplish this, sophisticated technology and braking algorithms will automatically bring both passenger and heavy freight trains to a safe stop. This will help prevent train-to-train collisions, over-speed derailments and casualties or injuries to the public and railway workers.

Because of its complex design and requirements, PTC is not an off-the-shelf system or software that can be implemented overnight. PTC has been in development by the railroad industry for decades, and recent advancements in GPS and other data transmitting technology have advanced progress.

VTMS

UP has begun testing PTC technology called Vital Train Management System (VTMS) across 456 miles of track in Iowa, Nebraska and Wyoming, and in Washington and Idaho as part of an international test with Canadian Pacific Railway. When necessary, VTMS will override the engineer or operator of the train.

Union Pacific PTC Testing Areas



Moving forward there are three main challenges to industrywide implementation.

1. Predictive Enforcement Complexity.

We need to complete the development of software that accurately predicts the stopping distance of every train operating on our railroad. The software must take into account where each train is, what kind of grade and curvature the track has, what kind of weather conditions are present, how long the train is, and how much it weighs. All these factors must be calculated to ensure a train does not derail when the system applies the brakes.

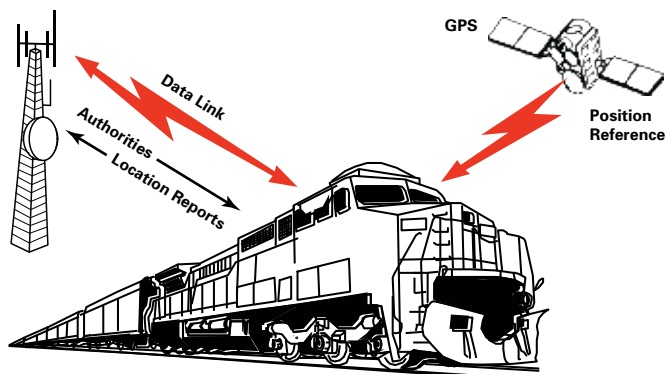
2. Sufficient Communications Spectrum.

We must ensure we have enough radio spectrum to communicate with every freight and passenger train operating on our railroad. Additional radio spectrum is especially critical for safe communications in metropolitan areas such as Los Angeles and Chicago.

3. Interoperable Systems.

We must ensure the software and hardware safely operate across all railroads—both freight and passenger—since we operate on each other's lines and share tracks.

POSITIVE TRAIN CONTROL (PTC). (CONT.)



SAFETY AND COMMITMENT

Safety of the public and our employees is Union Pacific's highest priority and a core value of our company. Our goal is to take safety to an unprecedented level. That's why we have a team of employees whose sole focus is to implement PTC in the safest, most aggressive manner possible. We will not take shortcuts that put safety at risk.

We are confident PTC technology will work and are investing heavily in new communications capability, technology and equipment. UP has spent tens of millions of dollars so far, and is prepared to invest hundreds of millions of dollars for implementation. UP and Norfolk Southern just spent roughly \$30 million to buy radio spectrum alone.

PTC AND LABOR UNIONS

We have discussed PTC with our unions, and they have expressed general support. They are concerned about technology eliminating jobs. Although the technology may provide for future labor savings, on which we would negotiate, our focus is to use PTC to improve safety, fuel savings and rail capacity.

NEXT STEPS

Once PTC technology proves safe and reliable, we will submit our plans to the Federal Railroad Administration for approval and begin installation. If all goes as planned, we hope to begin implementation in 2010, with completion by 2015 as federally mandated.

NON-PTC SYSTEMS

Non-PTC systems that do not provide predictive capabilities are used across many rail networks today. Automatic Train Control (ATC) and Automatic Train Stop (ATS), two of the most common, are reactive systems that wait for train engineers to acknowledge signals. Neither can prevent collisions under all circumstances.

True PTC systems like VTMS, the system UP is testing, provide predictive technology that will slow down or stop a train when needed, rather than just provide locomotive engineers a signal to slow down or stop.

AUTOMATIC TRAIN CONTROL (ATC)

ATC monitors wayside signals along the railroad right of way to automatically control train speed. If the color of a wayside signal changes to indicate a lower speed is necessary, the system alerts the locomotive engineer to slow down. The engineer must acknowledge the alert and reduce speed, or the ATC system will stop the train. If traveling under 20 mph however, enforcement is not active—and thus an accident could still occur.

AUTOMATIC TRAIN STOP (ATS)

ATS also monitors wayside signals. If the signal is not green, the system alerts the engineer to reduce speed. If the engineer fails to acknowledge the alert, brakes are applied. However unlike ATC, ATS does not require the engineer to both acknowledge the alert and slow the train. Once the engineer acknowledges an ATS alarm, the system does not take additional action.