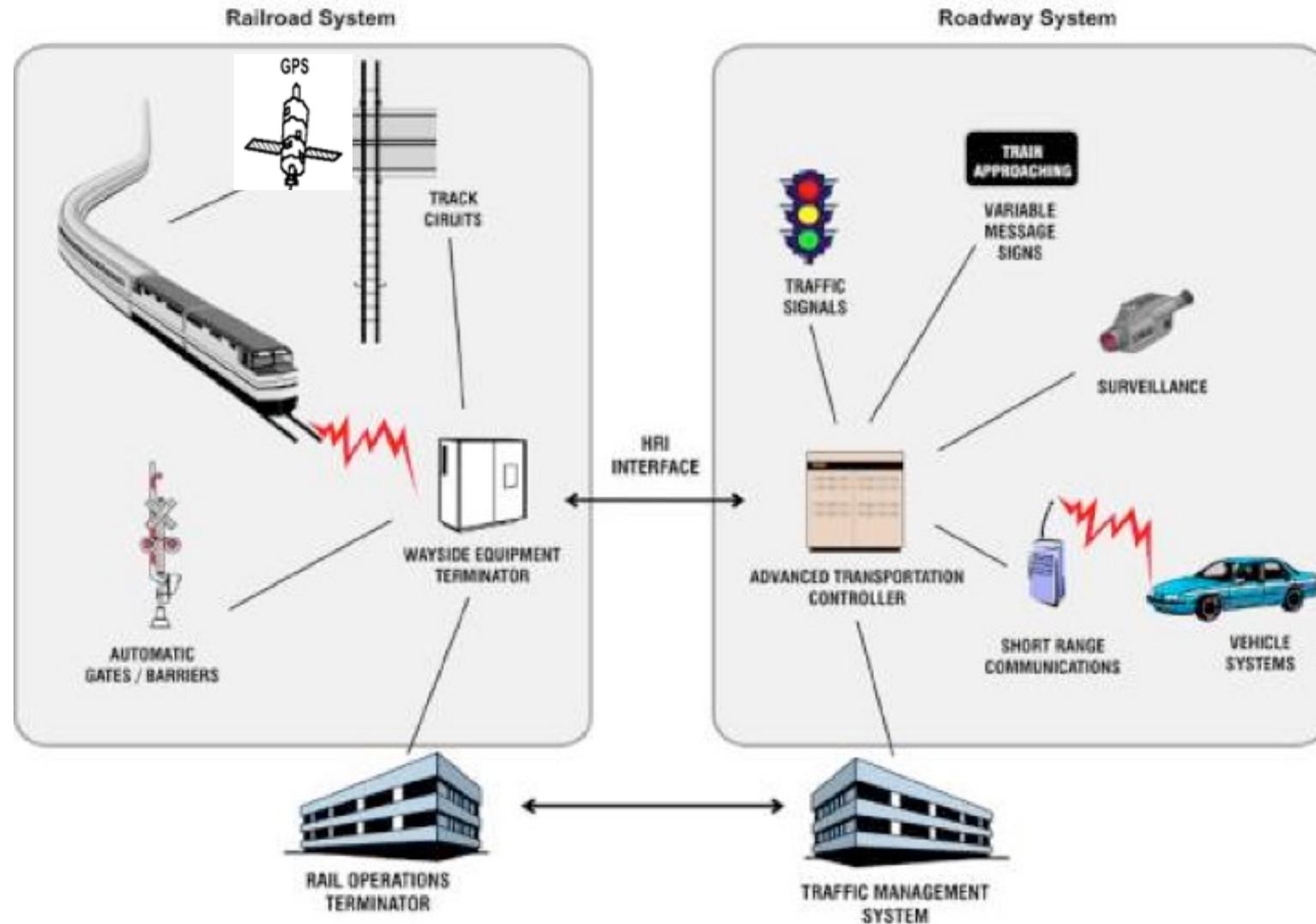


# Intelligent Grade Crossings

- Establish communication between railway control systems and highway control centers and signal systems
- Train presence and arrival times can be communicated over the data link to highway traffic control centers and to motor vehicle operators via in-vehicle and/or wayside displays
- Stalled vehicle detection can alert trains
- Second-train-on-approach warnings to road vehicles
- Reduction in gate down times and traffic congestion

# Architecture of ITS User Service # 1.10 – Highway-Rail Intersections



**Intelligent grade crossings** – Intelligent Transportation Systems (ITS) for roadways interact with intelligent railroad systems at highway-rail intersections (HRIs). Information about train location and arrival times, generated either by a PTC system or track circuits or off-track sensors, will be transmitted from train control centers to highway traffic control centers via the digital data link communications network, to motor vehicle operators, cyclists, and pedestrians via roadside traffic information signs, and to motor vehicle operators also via dedicated short-range communications (DSRC) radios to in-vehicle displays or audio warning systems. Similarly, sensors at HRIs will send information over the digital data link communications network to train control centers and then via the PTC system to trains should an HRI be blocked by an accidentally - or intentionally - stalled vehicle. Demonstrations of intelligent grade crossing devices have been conducted in many states. Architecture elements to describe the HRIs have been added to the ITS National Architecture as User Service #1.10, and work on the development of standards for intelligent grade crossings has been underway to ensure that there will be national interoperability.

# Crossing Surveillance Sensors



# Dashboard Warning



# Automatic Audio Notification



# Heads-up Display



# Dynamic Message Signs



## Second-Train-on-Approach Warnings

