

Railroad Intrusion Detection System

Rail Safety Package



Key Features

OVERVIEW

The Railroad Intrusion Detection System (RIDS) is a control system designed and developed by HSQ Technology to provide 24/7 monitoring of passenger rail right-of-way safety. It incorporates physical sensors and cameras with hi-tech software to afford railway operators a heretofore unavailable level of security and safety.

Previously, railways were completely dependent on train operators to detect and react to track impediments. Now with the development of the RIDS package, rail systems can add another level of assurance.

RIDS was originally developed for the Bay Area Rapid Transit / Valley Transportation Authority (BART/VTA) extension to the Berryessa Station. The area of coverage extends alongside a freight railway for 6.6 miles and includes 48 zones, 1000 tilt sensors, 50 cameras, and 5 monitoring locations. It is now available as a complete package.

At the heart of RIDS is the HSQ Gateway server. It processes tilt sensor and video events and sends event notifications to both operators monitoring workstations and to automatic train control systems in the case of an emergency. And through the use of georeferencing, it can pinpoint the exact position where an event is detected.

RIDS generates two levels of events: Low and High. Low level events are generated when a single sensor alarms or a small object enters the ROW. High level events are declared when multiple sensors alarm or a large object enters the ROW. Both types of events generate specific alarms and create log entries for history retention. The number of event levels can be adjusted according to system requirements.

RIDS interacts with existing Automatic Train Control systems to send 'zero' speed signals to trains when there is hazard on the tracks. This allows trains to be stopped without human intervention when an emergency occurs.

CAMERAS

Infrared intrusion-detecting cameras are placed on poles that provide an unimpeded view of the track right-of-way and to make them less vulnerable to sabotage and theft. Cameras are placed at intervals such that there are no dead zones and there are overlapping fields of view.

By using infrared cameras, imaging is available anytime of the day or night and is also unaffected by fog, rain, snow, or other weather circumstances.

The cameras are capable of determining an intrusion as small as one cubic foot or adjusted larger in order to limit false alarms all the while providing notification of an encroachment likely to cause harm.

- ◆ **Two different methods of detection:**
 - **Physical – Tilt sensors deployed along the fence that activate when the fence is deflected beyond a preset threshold**
 - **Visual – Using cameras with video analytics to detect objects of a configurable size impacting the fence or crossing into the passenger rail Right-of-Way (ROW)**
- ◆ **Thermal imaging cameras that provide visual and alarm data day or night, rain or shine**
- ◆ **Custom turnkey package incorporating tilt sensors, video cameras, video analytics, video management system, and command and control center**
- ◆ **Sophisticated video analytics limit the occurrence of 'false alarms'**
- ◆ **Interfaces with Automatic Train Protection systems to provide independent control in the event of right-of-way encroachments**
- ◆ **Integrated video management system that provides storage for the camera feeds**

SENSORS

Tilt sensors are placed on fence posts that delineate the right-of-way from the surrounding areas. They detect any event that causes the post to deflect beyond the preset minimum threshold angle but are unaffected by mere strikes against the fence.

Tilt sensors collect fence tilt level information and send it to the HSQ Gateway for processing. A serial server converts the Modbus serial protocol data from the tilt sensors using the Modbus TCP protocol before sending it to the HSQ Gateway.

The sensors 'X' and 'Y' positions are polled continuously by the HSQ Gateway server. For any sensor tilt angle feedback that exceeds the minimum limits set for that sensor, a low or high level event is generated and is shown as a zone-wide event on the operator workstation.

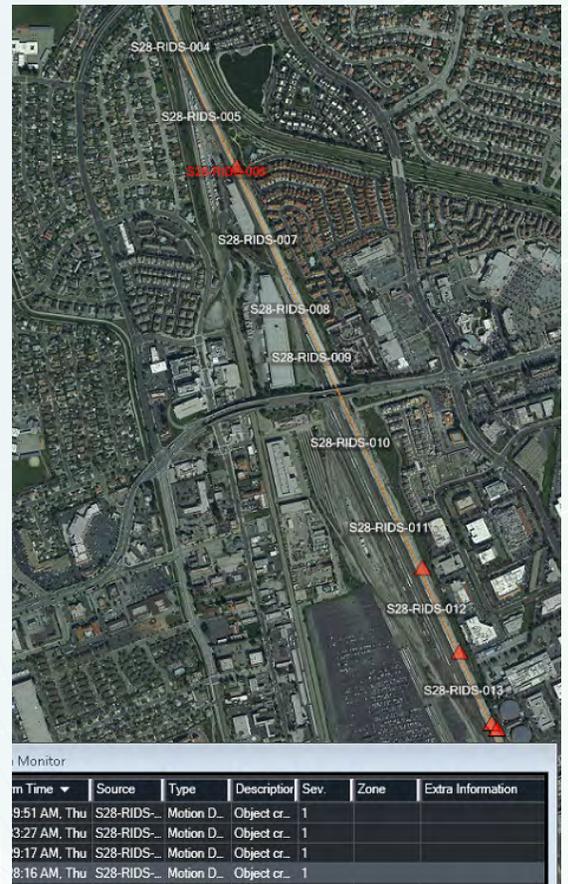


Thermal Imaging View

SERVERS AND SOFTWARE

RIDS logic uses two sources of information in order to make determinations for activating event levels for intrusions into the rail right-of-way track area. The fence-mounted tilt sensors comprise one source and the zone thermal imaging-based video analytics comprises the second source. The HSQ Gateway is where the logic to resolve this event level determination occurs.

The Video Analytics server houses the video portion of RIDS. Video streams from the thermal imaging cameras are analyzed for detection of objects based on predetermined criteria. If an event is detected, the server communicates the detection information to the Gateway server and then sends video and event logging data to the operator workstation.



Georeferencing and Alarm Window View