

# SAT-LX

## Improving railroad crossing safety

**R**ailroad crossing safety is one of the highest priorities for railway infrastructure operators. Finding cost-effective solutions to ensure safety in remote, low traffic areas is especially a challenge. CGI's SAT-LX, a satellite-based advisory warning system, addresses this challenge by improving safety in these areas at a reasonable cost.

Railroad crossing safety is continuously improving through the implementation of automatic barrier systems or the removal of crossings altogether from high speed, high traffic areas. Although these improvements are costly, the benefits are clear. For remote, low traffic areas, however, it can be difficult to justify expenditure on these types of solutions, even though a majority of railroad crossing accidents occur in remote areas in many countries. Deployment of safety measures is often further hampered by the lack of an adequate communications and power supply infrastructure, further increasing the level of investment needed.

### SOLUTION OVERVIEW

SAT-LX is a low-cost advisory warning system that can be easily deployed at remote railroad crossing sites to provide road users with timely information about approaching trains. It can be combined with existing railroad crossing solutions or serve as a complete solution for improving safety in rural locations.

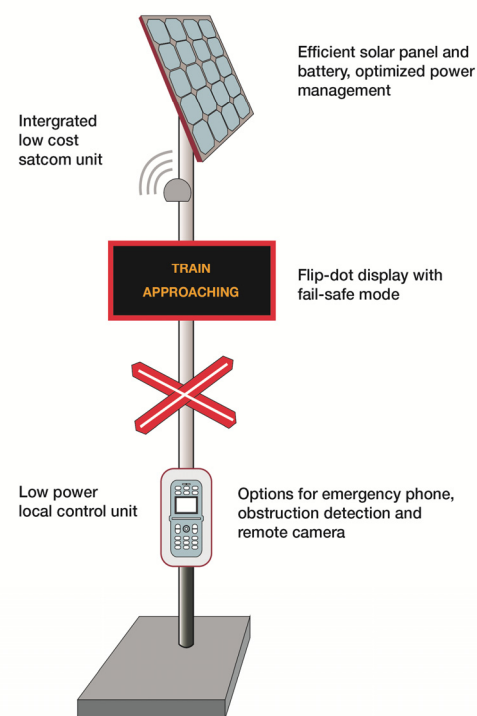
The system maintains an up-to-date database of train positions and calculates the time of arrival for trains at railroad crossings supported by the system. Calculations are based on position and line speed (plus, actual speed, when available). Position, line speed and actual speed information is obtained through the following:

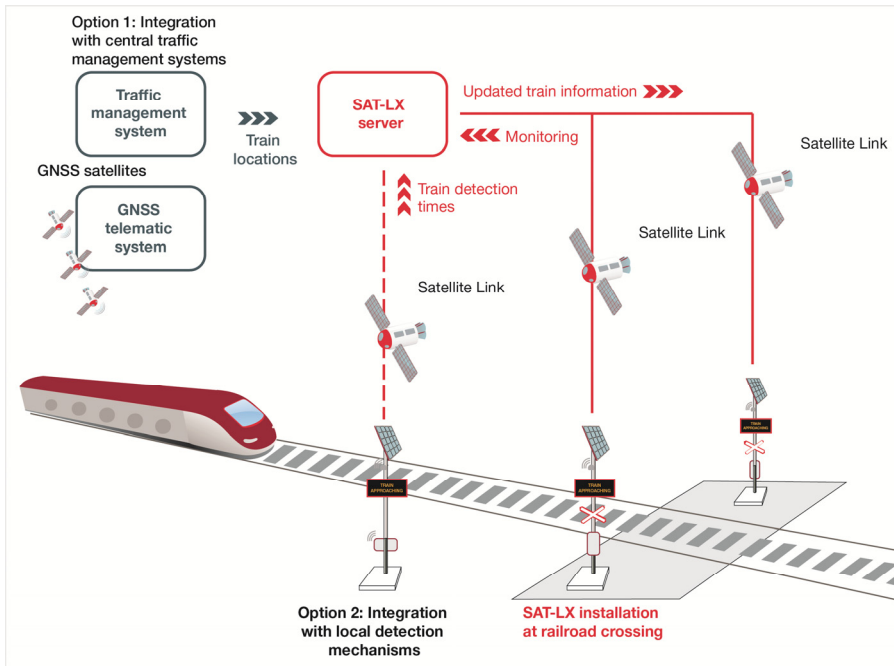
- Rail traffic management systems and real-time updates on train movements (e.g. from GPS telematics); or
- Information collected via satellite links from dedicated train detection systems along the line of the railroad crossing. These could be traditional track-based systems (e.g., track circuits, axle counters, etc.) or other systems mounted away from the track (e.g., radar or RFID)

Advisory warnings are relayed via satellite to the railroad crossing site whenever a train is within a specified distance of the crossing. When an advisory warning is not displayed, the default mode is always to instruct road users to stop, look and listen. Depending on the accuracy and reliability of available information, the expected arrival time of a train can also be displayed.

### SOLUTION BENEFITS

- Designed to improve safety at remote railroad crossings with no active protection
- Up-to-date, reliable information to railroad crossing users
- No need for trackside power or communications infrastructure
- Easy to install and maintain
- Remote equipment health checks reduce need for scheduled inspection or servicing
- Proven technology
- Failsafe mode in event of power or equipment failure
- Options to support emergency telephone and object detection





## TRACKSIDE EQUIPMENT

SAT-LX takes advantage of satellite communications already available at a railroad crossing coupled with a built-in power supply to remove the need for any existing power infrastructure at the site.

Satellite communications provide connectivity independent of the terrestrial infrastructure, improving coverage, reliability and capacity.

The following components are deployed at the site:

- Small, low-power satellite terminal unit providing two-way connectivity to the central SAT-LX server within an operations center
- Flip-dot display providing up-to-date information to road users, with a safe mode in the event of system or power failure
- Autonomous power supply provided by solar panel and battery (or fuel cells in areas with significantly restricted daylight)
- Low-power control unit, managing the power supply, flip dot display and message exchanges over the satellite link

Additional features can be integrated with the onsite equipment to take further advantage of remote connectivity. These include emergency telephone facilities, sensor systems to automatically detect and report any obstructions on the line, and webcams to provide still images of the site to support more detailed assessments of situations. The Sat-LX satellite connectivity can be also deployed more widely to support condition-based monitoring of other trackside equipment in remote areas.

## About CGI

Founded in 1976, CGI is a global IT and business process services provider delivering high-quality business consulting, systems integration and managed services. With 68,000 professionals in 40 countries, CGI has an industry-leading track record of delivering 95% of projects on-time and on-budget, aligning our teams with clients' business strategies to achieve top-to-bottom line results.

**Note:** The SAT-LX solution is based on the results of the LeCross Feasibility Study addressing improvement of railroad crossing safety. This study was funded by the European Space Agency under the ARTES 20 program. Work was carried out with the valued support of VTT.

