



**The World Leader in  
Subsurface Imaging™**

# BallastScan



**Automated Ballast Condition Assessment System**



Historically, ballast condition assessment has been time consuming and required highly trained personnel. Ground penetrating radar has been utilized as a non-destructive evaluation tool to evaluate railroad ballast, sub-ballast, and sub-grade for the past 25 years.

## “Scattering Amplitude Envelope” Evaluation Technique

1 GHz air-launched antennas have traditionally been used to map layer interfaces in the ballast structure. However, layer interfaces are difficult to detect when fouling has occurred, preventing reliable automated processing. Textural differences in 1 GHz GPR ballast data tend to be subtle and can be masked by clutter in the data.

Employing GSSI's 2 GHz air-launched antenna provides a clear indication of the scattering from the void space found in clean ballast. This discovery has resulted in a new, fully automated “Scattering Amplitude Envelope” processing technique to characterize ballast condition.

The graphical output of this technique provides the radar data, clean ballast thickness information, and an innovative, color-coded, simple to understand condition assessment window. The ballast condition is synchronized with mile posts (kilometer posts) for a quick visualization of where maintenance efforts should be focused. An ASCII output file is also produced for integration with other programs and databases.

## BallastScan Benefits

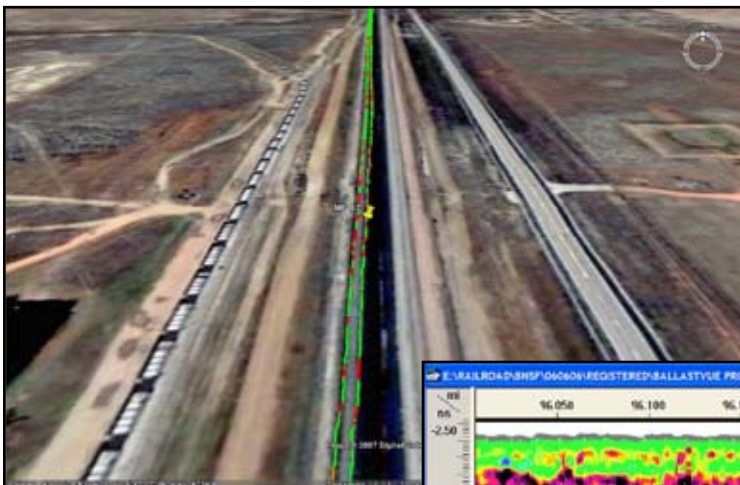
- Provides automated ballast condition assessment - single click processing
- Save money by identifying and focusing rehabilitation efforts where they are most needed
- Export results directly to a Google Earth™ file
- Collect data on both sides of rails simultaneously
- Data and graphical output synchronized with existing mile posts (kilometer posts)
- Process 240 miles (400 km) of data in less than 2 hours



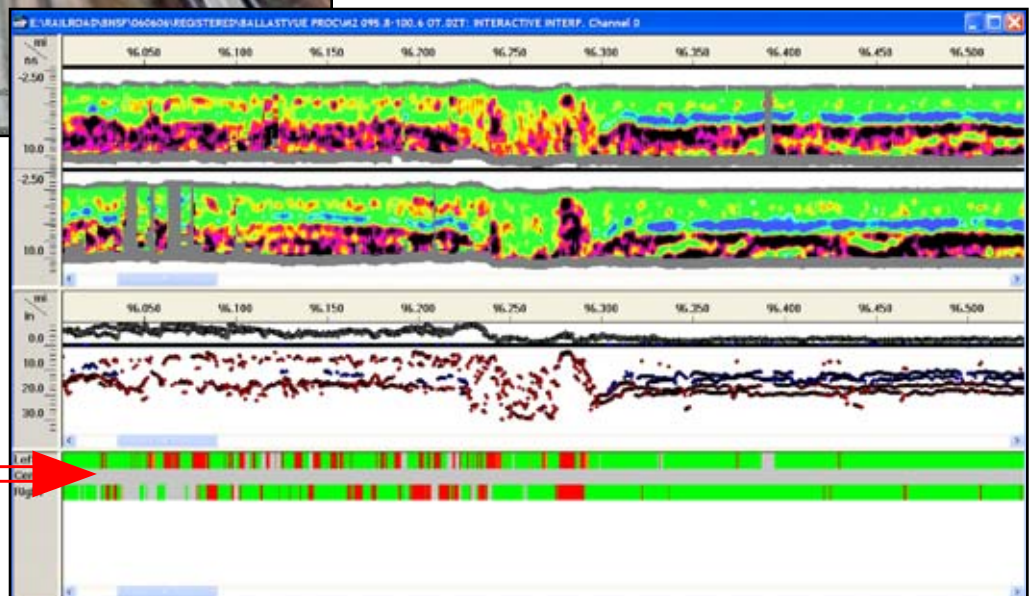
Developed in conjunction with the  
U.S. Federal Railroad Administration

## BallastVue™ Module

BallastVue is a module in RADAN Version 6.5 that automatically processes 2 GHz horn antenna data obtained on the shoulders of railroad tracks. The processed data can be viewed in RADAN, saved as an ASCII text file, or exported in KML format for viewing in Google Earth.



Google Earth image



BallastVue data image

### Maintenance Priority

Green - low priority  
Orange - medium priority  
Red - high priority

Top: Processed GPR data from shoulders

Middle: Ballast height above ties (sleepers), clean ballast thickness and relative moisture

Bottom: Maintenance Priority

## BallastScan System Includes:

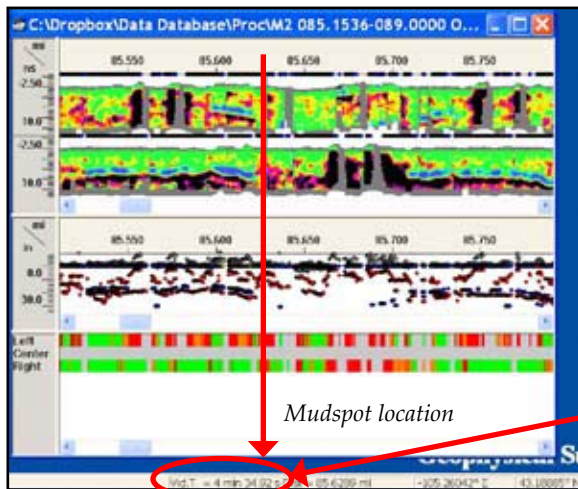
- SIR-20 Data Acquisition System with Panasonic ToughBook computer
- GPS Data Logger [1]
- Two (2) 2 GHz Horn Antennas [2]
- Two (2) 7-meter antenna cables
- Wheel mounted Distance Measuring Instrument
- RADAN software
- BallastVue Ballast Condition Assessment module
- On-site training



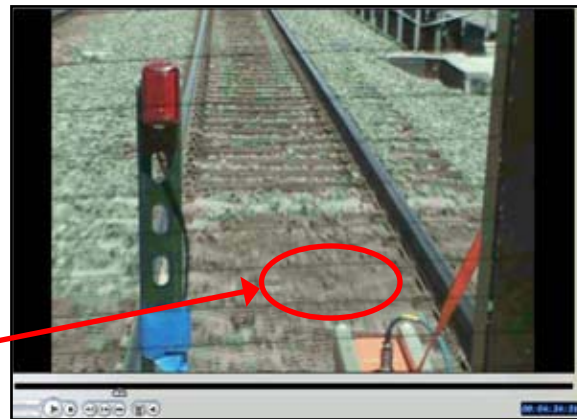
SIR-20 system

## Video Time Synchronization

Provides a method of synchronizing video time with GPR time.



Video time at specified location



Video playback from video player  
(Video software and hardware not included)

[1] An accurate GPS system is required to produce Google Earth type outputs. The GSSI GPS Data Logger is compatible with GPS systems capable of producing a NMEA GGA output string (i.e. Trimble Ag132 or Ag332). Differential or other GPS error correction is highly recommended.

[2] A dual antenna mount which locates the center of horn antennas approximately 6 inches (152 mm) outside of the end of the ties (sleepers) and approximately 14-15 inches (36-38 cm) off the ground is required, and is available as an option from GSSI. The antenna mount must allow antenna movement to avoid potential obstacles.



The World Leader in  
Subsurface Imaging™



Sea and Land Technologies Pte Ltd

65 Tuas Avenue 1, Singapore 639508  
Tel: +(65) 6518 0777 Fax: +(65) 6563 0366  
enquiry@sea-landtech.com.sg  
http://www.sea-landtech.com.sg