



The integrated solution for autonomous railway ballast inspection with a high acquisition speed, fast processing and automatic data interpretation

SRS is an integrated radar array system specifically designed for the inspection of railway ballast quality and to aid with the restoration and maintenance process. SRS offers a non-destructive train mounted solution which can be operated at high speed (over 300km/h), doesn't require crews working on the track and doesn't entail line temporary closures. It provides a continuous inspection of ballast thickness, locates areas with insufficient bearing capacity, differentiates between clean and fouled ballast and detects sections with drainage problems.

## SRS SAFE RAIL SYSTEM BENEFITS

- **Improved track** maintenance decision making.
- **Increased rail network management profitability** due to continuous monitoring.
- **Cost reductions in track investigation procedures,** maintenance and renewal operations.
- **Easy interpretation** of ballast status through the use of automatic tools.
- **Minimized** survey time due to high-speed GPR solution.



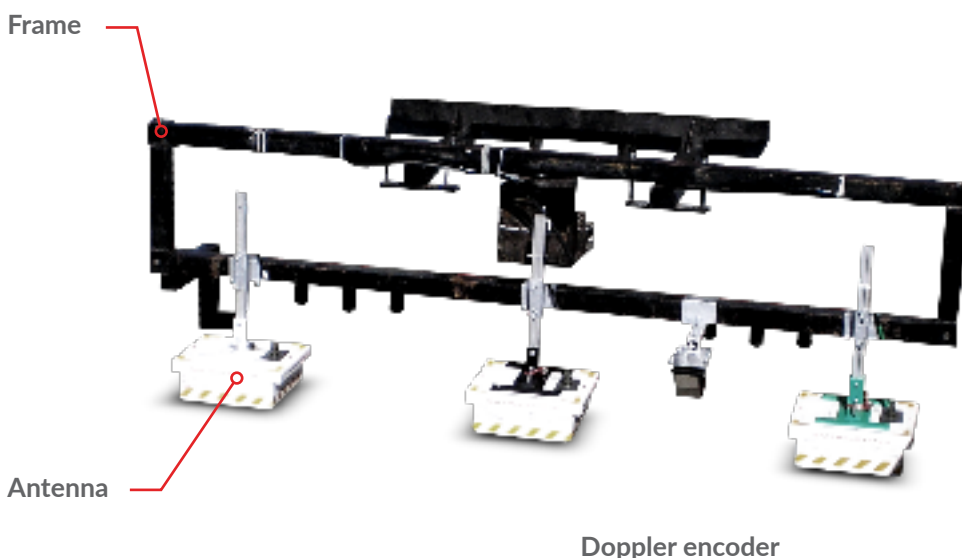
Road-rail vehicle equipped with SRS

## SRS SAFE RAIL SYSTEM FEATURES

- **High speed:** The SRS ground penetrating radar for ballast inspection can reach more than 300 Km/h with 12cm scanning steps.
- **Dedicated post processing platform:** Dedicated post processing software will guide the user through the interpretation of the data and detection of subsurface layers in a semi-automatic way.
- **Video Camera and GPS:** The SRS solution can be integrated with a video camera, GPS and a Doppler radar encoder in order to provide the exact location of a scan and save time in post processing.



SRS configured with antennas beneath the train



Data logger



SRS Radar control unit

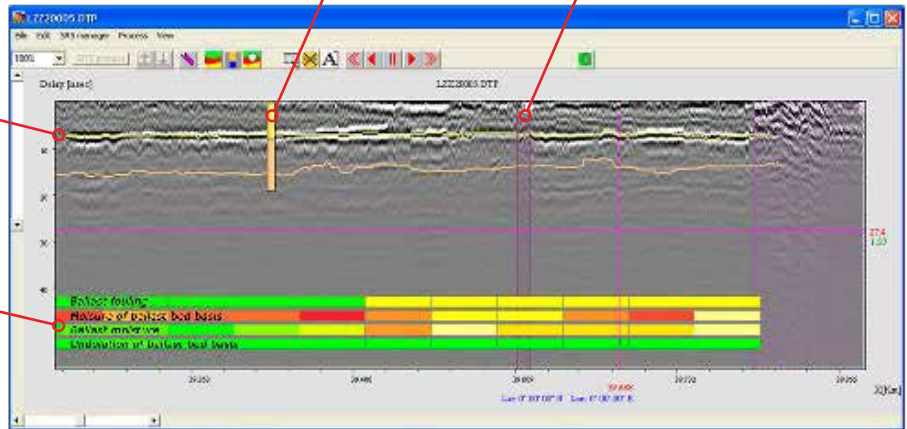
Doppler encoder

## DPA DATA ANALYZER

Automatic tracking of ballast interfaces

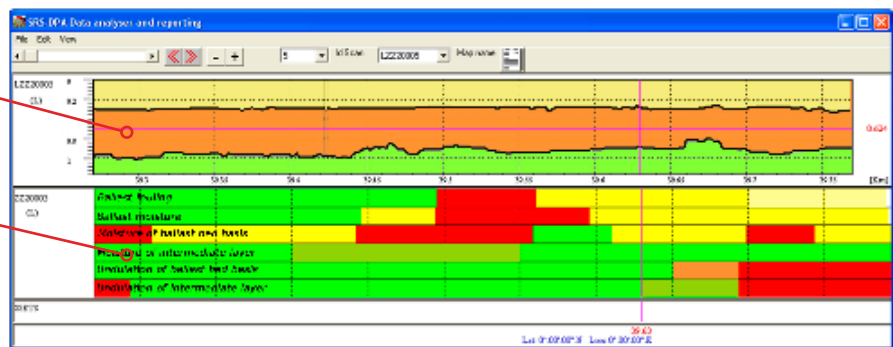
Automatic interpretation of ballast status

Calibration with core samples  
Asset



Ballast stratigraphy map

Map of ballast status



### SYSTEM SPECIFICATIONS

RECOMMENDED LAPTOP	Panasonic CF-19 Tough-Book
MAX. ACQUISITION SPEED (@ STD. TRACE INTERVAL)	280 kph @ 12 cm trace interval (up to 4 channels)
POWER CONSUMPTION	35 W
POSITIONING	Doppler radar and/or GPS
NUMBER OF CONTROL UNITS	2 synchronized DAD SRS PLUS
SCAN RATE PER CHANNEL: (@512 SAMPLES/SCAN)	700 scans/sec

### ANTENNA SPECIFICATIONS

ENVIRONMENTAL	IP65
ANTENNA FOOTPRINT	38 x 43 cm
NUMBER OF HARDWARE CHANNELS	3 or 4
ANTENNA CENTER FREQUENCY	400 MHz
CERTIFICATION	EC, FCC, IC

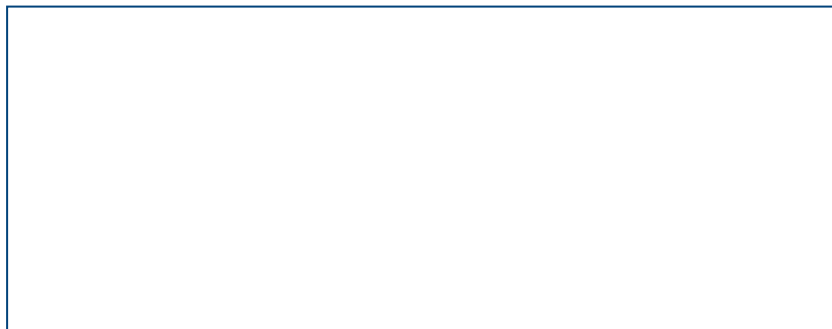
### SOFTWARE SPECIFICATIONS

SRS DP

SRS-DPA Data Analyzer and Reporting

- SRS DP:
- Continuous mapping of ballast thickness
  - Location of areas with insufficient bearing capacity (e.g. ballast pockets)
  - Differentiation between clean and fouled ballast
  - Detection of sections with drainage problems
  - Automatic algorithm for ballast condition assessment recognition

- SRS-DPA Data Analyzer and Reporting:
- Layer stratification and interpretation view for each profile
  - Layer cross-section view
  - Report of layer statistical results for each profile can be output in a text file



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