

TECHNICAL SPECIFICATION

RADAR ACQUISITION UNIT	DAD SRS PLUS, with interleaved multiplexing 1800 scans/sec
NUMBER OF COLLECTED PROFILES	Up to 4
ANTENNA FREQUENCY	Typical configuration: 400 MHz Different frequency upon request
POSITIONING	- Doppler Radar - GPS (optional)
COLLECTION SPEED	> 190 Km/h (4 profiles simultaneously)
MAXIMUM SCAN LENGTH	Unlimited collected profile length, no need to stop the train
POWER SUPPLY	10-15 Volts
VIDEO CAMERA	Synchronized radar and video data
ENVIRONMENTAL	IP65

SOFTWARE SPECIFICATION

RADAR PROCESSING SOFTWARE	<p>SRS DPA including: SRS DP (Data Processor) SRS DA (Data Analyzer and Reporting)</p> <ul style="list-style-type: none"> - Elimination of disturbances due to the sleepers - Automatic data processing according to a predefined macro - Management of GPS data and video frames - Automatic detection of layer interfaces - Automatic calibration of radar propagation velocity with core data - Insertion of assets along the track (e.g. switches, crossings, etc) - Assists the operator in evaluating track characteristics: <ul style="list-style-type: none"> • Ballast fouling • Ballast bed moisture • Moisture distribution within the ballast • Evenness of track bed basis
OUTPUT DATA	<p>Immediate visualization of ballast characteristics along the track:</p> <ul style="list-style-type: none"> - Stratigraphy - Ballast fouling levels - Ballast moisture levels - Undulation levels - Position of assets - Core samples - Video data

Railway experience

The SafeRailSystem is an integrated product based on more than 10 years experience in railway ballast surveying. More than 50,000 Km of railway track surveyed by this system worldwide.



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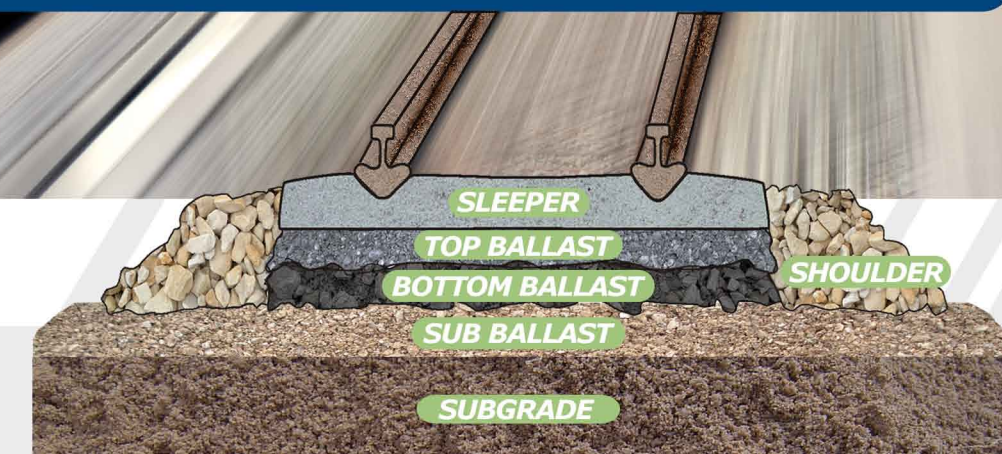
Transport
Engineering

SafeRailSystem (SRS)

The fastest train borne system for **railway ballast inspection**



-FASTEST ACQUISITION SPEED
-FASTEST PROCESSING WITH AUTOMATIC DATA INTERPRETATION



IDS: The leader in multi-frequency
and multi-channel Ground Penetrating Radar



Benefits

- Easy interpretation of ballast status through automatic tools
- Improved track maintenance decision making
- Reduces current costs for track investigation procedures, maintenance and renewal operations
- Continuous monitoring increases rail network management profitability
- Improved work specifications leads to less reworking.

Application

- High speed radar system for the inspection of ballast quality:
- Continuous mapping of ballast thickness
 - Locates areas with insufficient bearing capacity (e.g. ballast pockets)
 - Differentiates between clean and fouled ballast
 - Detects sections with drainage problems.

What is SRS

SafeRailSystem is an integrated solution allowing the user to autonomously inspect railway ballast for renewal and maintenance. SafeRailSystem includes:

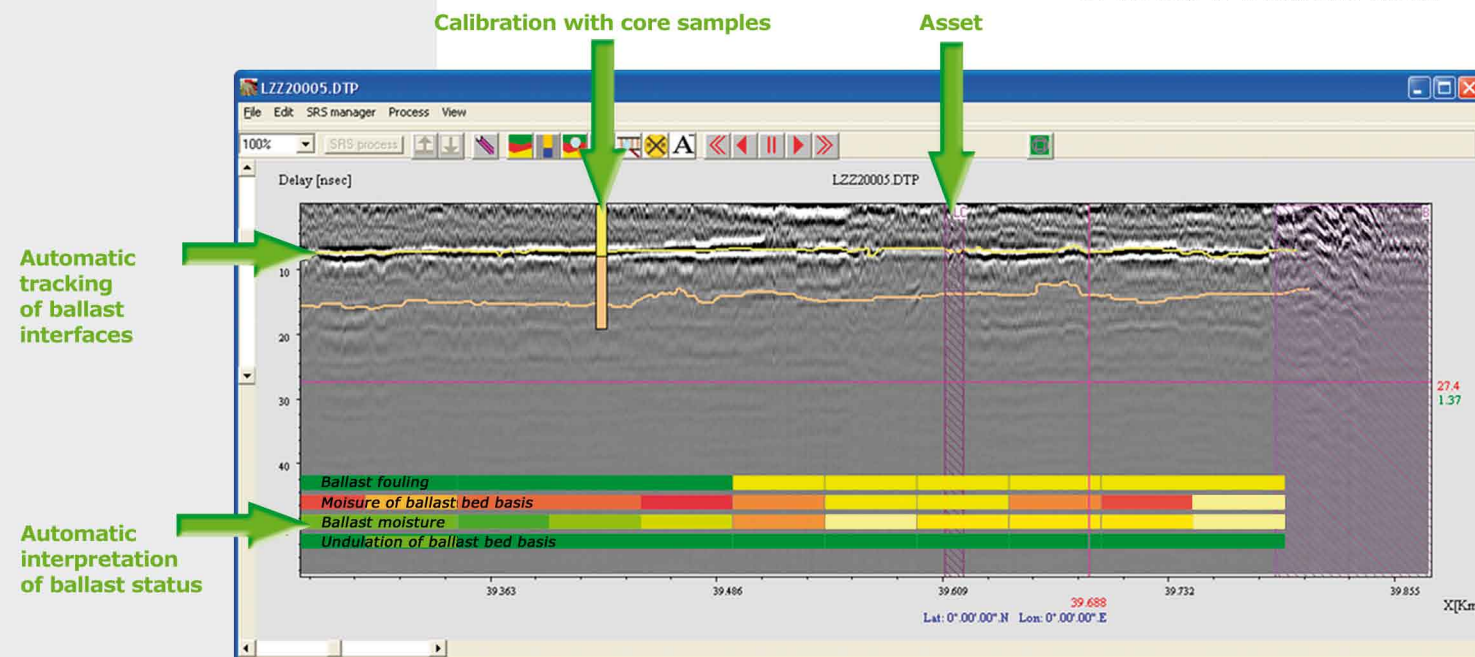
- A radar system composed of:
 - A 3 or 4 antenna array
 - High speed radar control unit
 - Data logger and visualization system
 - Doppler radar position-encoder
 - Video camera synchronized to radar data
- A dedicated post-processing software module for the easy and efficient interpretation of SRS data
- A customer training and support program to introduce the user to the autonomous and efficient operation of SRS.

System Features

- 3 or 4 simultaneous profiles covering the whole track
- Only scans between the sleepers to provide best data quality
- Accurate positioning through doppler encoder and SRS interface
- Integrated radar and video data.

Processing Features

- Automatic detection of layer interfaces
- Automatic calibration of radar data and core samples
- Automatic and operator assisted evaluation of ballast status:
 - Fouling
 - Moisture distribution
 - Evenness of track bed basis.



MAXIMUM SPEED* (Km/h)	
*Values refer to 384 samples per scan	
SCANNING STEP	SRS
12 Cm	190
60 Cm	>300

Layer	Moisture	Ballast fouling	Undulation of ballast bed basis	Assets
Top ballast	No ballast	No ballast	No ballast	Bridge
Ballast	Dry	Clean	Even	Level crossing
Sub ballast	Mostly dry	Mostly clean	Undulated	Switch
Subgrade	Dry to humid	Slightly fouled	Settlement	Tunnel
	Humid	Fouled		
	Humid to wet			
	Wet			

