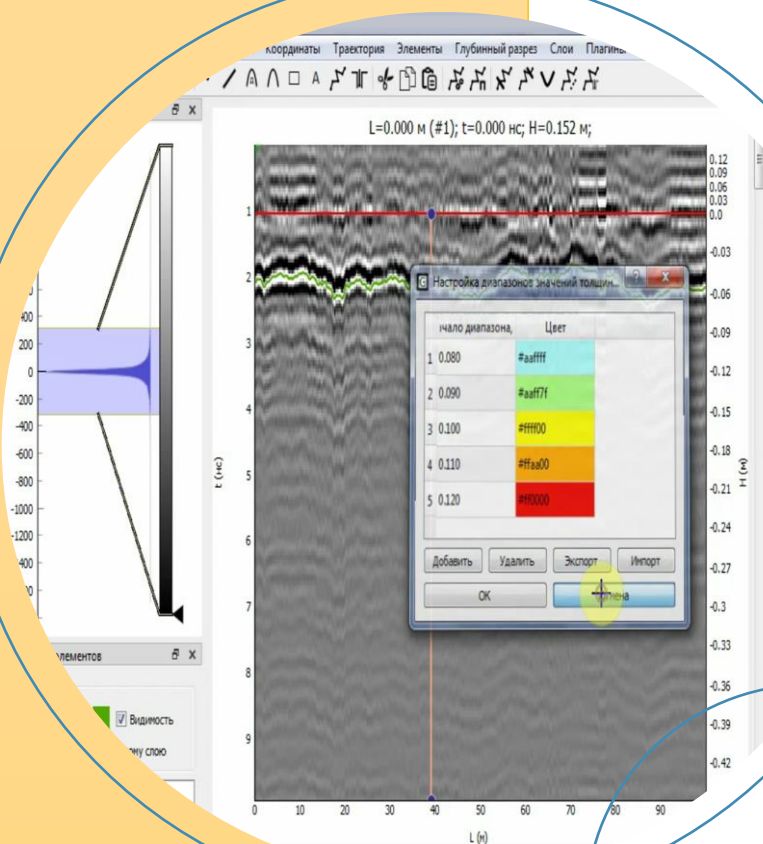


GeoReader

see what is hidden
from the eyes

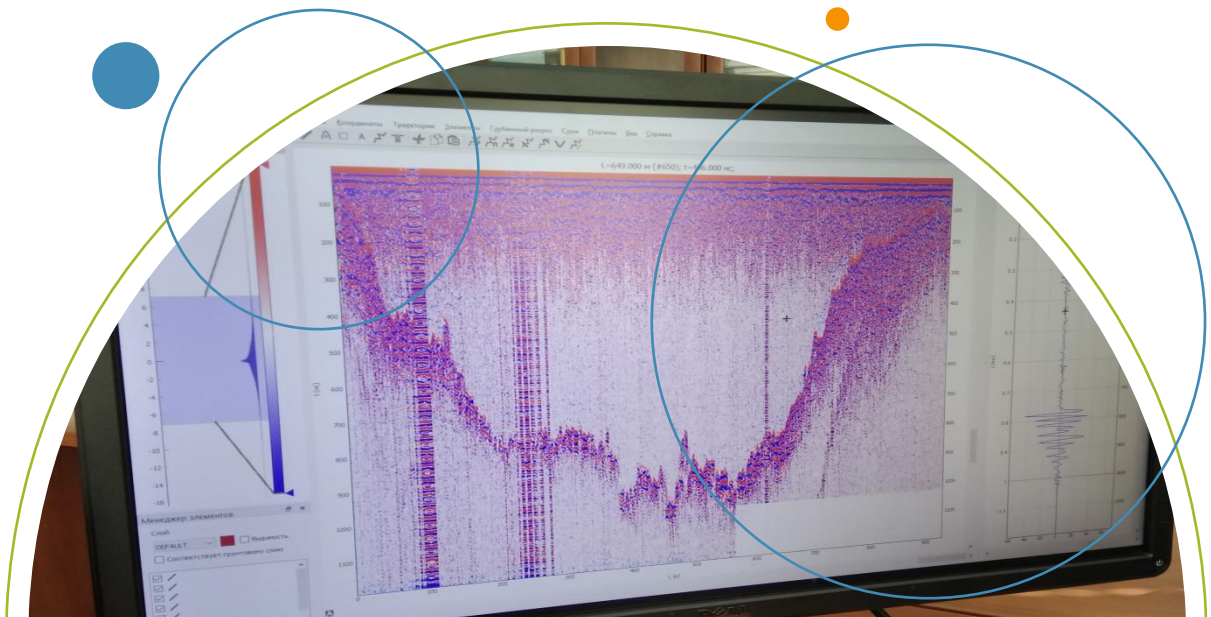


TIM, LLC
(Information
modeling technologies)

Description of the
SOFTWARE functionality

CONTENT

General information about GeoReader	3
Getting started	4
What do I need to know?	4
Mission	4
Advantages	5
Why GPR?	6
Algorithms based on Artificial Intelligence technologies	6
Our products and services	7
About us	8



GENERAL INFORMATION ABOUT «GEOREADER»

Structure

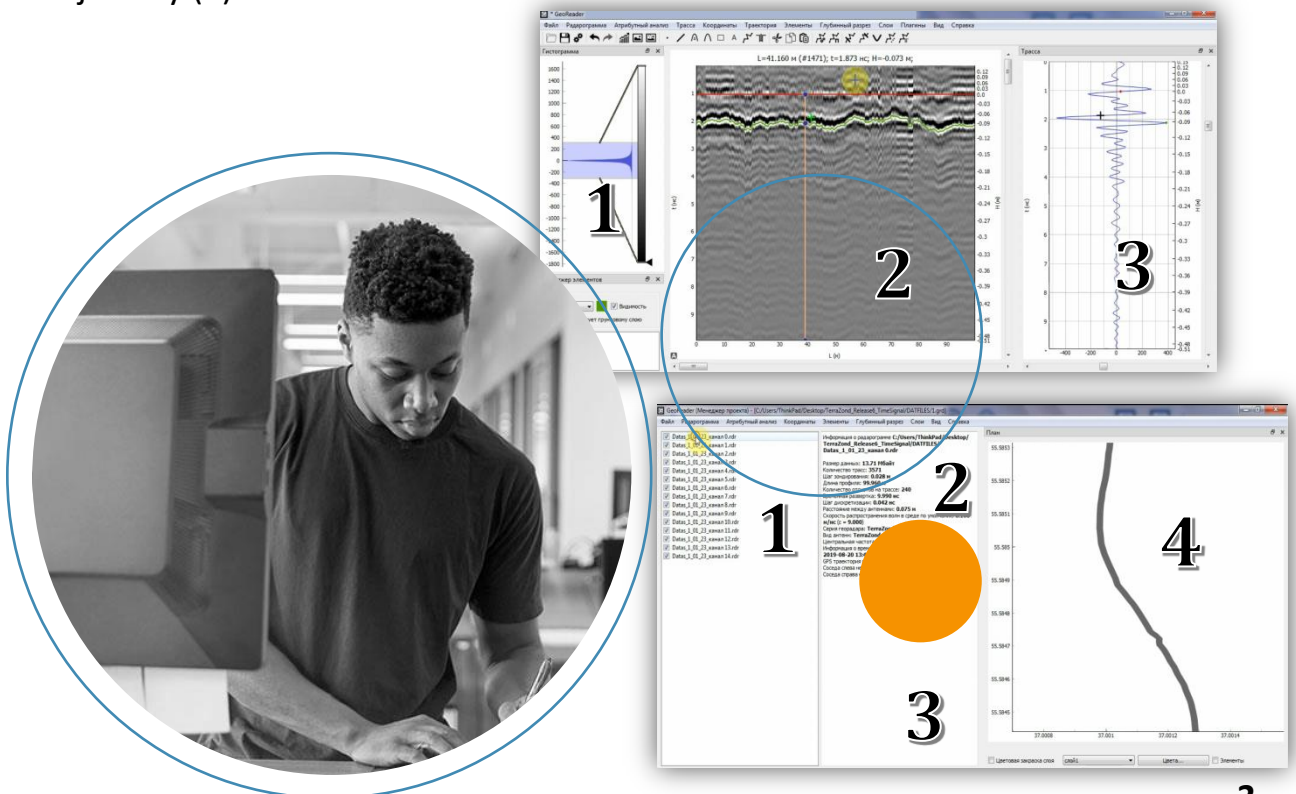
The GeoReader software package consists of three applications: processing a single subroutine, processing a package of GPR sections, and processing amplitude maps (C-scan mode). Separate modules and plug ins add functionality to perform specific tasks for each block:

- ✓ module for automated search of the boundaries on the GPR data
- ✓ module for automatic search for local anomalies based on attribute analysis
- ✓ as well as additional plugins –
 - * the plugin for calculating the depth section
 - * calculation of velocity parameters of the medium by the amplitude analysis method
 - * processing external graphs
 - * segmentation of borders and local objects

Interface

A single GPR section processing application consists of an element Manager (left, 1), a GPR section (in the middle, 2), and a trace (right, 3)

The GPR section package processing application (Project Manager) consists of a window with a list of files in the project (1), information about the selected file (2), a window with notes to the selected radarogram (3), and a plan window with a trajectory (4)



GETTING STARTED

What do I need to know?

Ground penetrating radar (GPR) is a geophysical method based on the emission of pulses of electromagnetic waves and registration of signals reflected from various objects of the probed medium. A device that implements the principles of geolocation is called a GPR.

Modern GPR is a complex electronic device whose components perform the following functions:

- ✓ generation of pulses emitted by the transmitting antenna;
- ✓ processing signals coming from the receiving antenna;
- ✓ synchronization of the whole system.

Thus, the GPR consists of three main parts: the antenna part, the registration unit and the control unit.

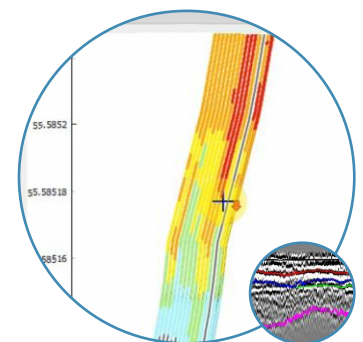
The antenna part includes the transmitting and receiving antennas. The registration unit is a laptop or other recording device, and the role of the control unit is performed by a system of cables and optical-electrical converters.

GPR is designed to study dielectric media by changes in permittivity and/or electrical conductivity. Most often, GPR is used for engineering and geotechnical survey of soils and non-destructive testing of (non-metallic) building structures.

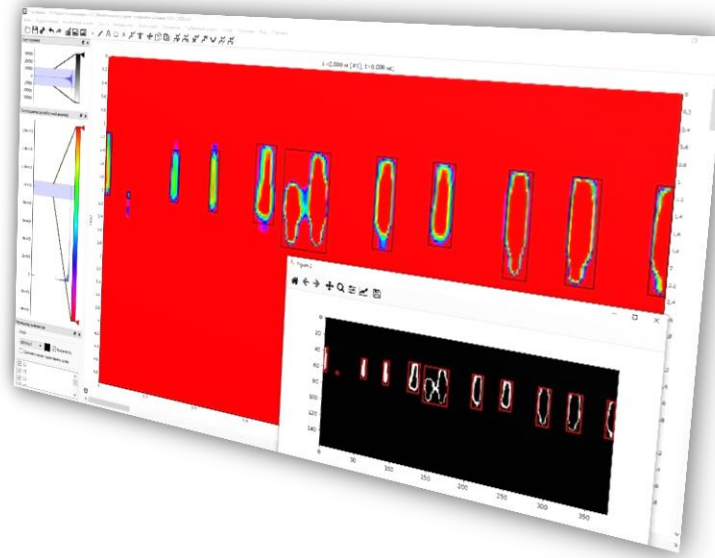
MISSION

« Assist transport construction organizations by applying non-destructive testing methods as effectively as possible »

The company's mission is to develop modern non-destructive testing tools for rapid and objective assessment of the condition of transport structures, providing the industry with additional opportunities to increase their durability and maintain them in a standard state



ADVANTAGES



«GeoReader» – specialized software

- 1) combination of geophysical and geodesic methods for solution of applied problems
- 2) creating a three-dimensional model of the underground environment and exporting it to CAD / GIS
- 3) binding to the project's coordinate system is performed with high accuracy
- 4) the requirements of industry standards are supported
- 5) the ideology of CAD and automation of work with data
- 6) availability of a wide range of capabilities for working with coordinates and heights of GPR routes (linking to satellite receiver data in global and local coordinate systems)
- 7) the function of calculating the speed parameters of the medium by the method of processing hodographs (OGT method) and methods of amplitude analysis in order to more accurately determine the thickness and properties of soil layers
- 8) building amplitude maps (C-scan mode) when performing area surveys to search for underground utilities, buried structures, etc.
- 9) justification and the reduction of places of the inappropriateness of drilling
- 10) support for 8 different formats of GPR equipment

WHY GPR?

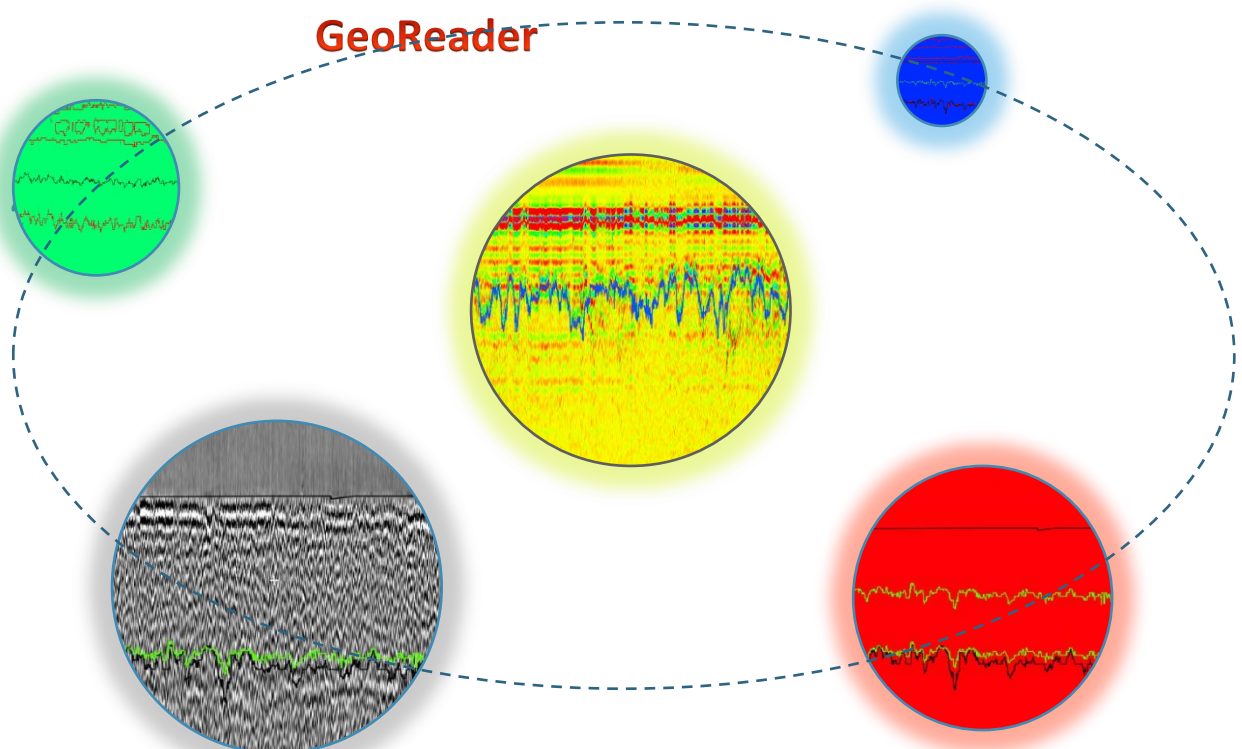
- ✓ Destructive control methods are local in nature and are resource intensive for extensive research
- ✓ Assessment of changes in the thickness of road structures layers is important for construction organizations when monitoring hidden works
- ✓ Structural anomalies are often the causes of deformations of the roadbed and prerequisites for subsidence of the upper structure of the path, which must be determined at an early stage through rapid diagnostics and non-destructive testing
- ✓ Thanks to GeoReader the GPR method is now available to transport engineers

«IT IS DIFFICULT TO WALK COMPLETELY STRAIGHT ON THE EARTH,
WHICH IS SPHERICAL»

– YANINA IPOHORSKAYA

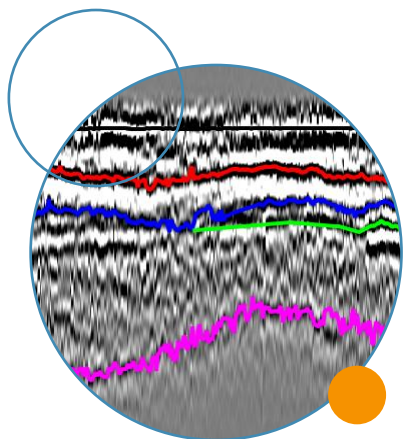
Algorithms based on Artificial Intelligence technologies

The solution of actual applied problems of the transport complex requires processing large volumes of GPR data, often requiring the participation of artificial intelligence. TIM company offers development of individual solutions for the customer's tasks using neural networks



OUR PRODUCTS AND SERVICES

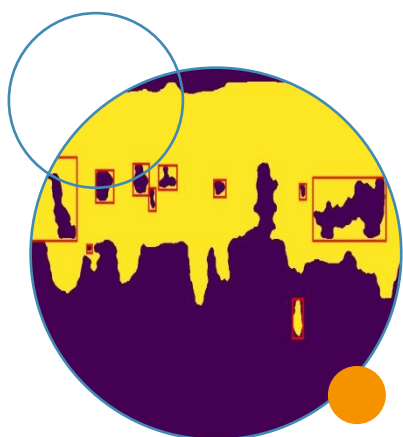
Automated search of the boundary layers of the road structure



Algorithms for automated search for the boundaries of road structures layers on the radar can create a digital model of structural layers with minimal operator involvement and the required detail to control their thickness in accordance with current standards

The estimated performance of automated algorithms for searching layer boundaries is 76.46 km of linear GPR profile for an 8-hour working day

Automatic search for structural anomalies in road structures

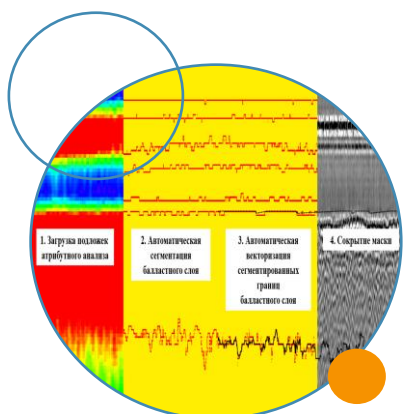


The functionality of GPR data processing using attribute analysis allows you to determine with high confidence the places of inhomogeneities in the construction of roads – subsidence, emptiness, inclusion of materials with different properties, areas of change in the type of construction and location of utilities.

Performance - 72.58 km of linear GPR profile per shift.

Algorithms for segmentation of local objects allow you to automatically detect anomalies on the GPR

Automatic search for the boundaries of the ballast layer



Railway track ballast layer segmentation algorithms are designed to automatically search for ballast bags and assess contamination of ballast layer materials

ABOUT US

TIM LLC is a company of non-destructive testing practitioners in transport construction.

We offer the audience of geophysicists, prospectors and engineers of the transport complex universal and at the same time specialized software for processing GPR-data of devices of both Russian and foreign production, for processing large volumes of data of GPR survey of extended linear objects.

First of all GeoReader is interesting:

- ✓ for highway departments
- ✓ for road construction organizations
- ✓ for design and survey companies
- ✓ for scientific research institutes

OUR CONTACTS

Postal and actual address:

16, Marshala Zhukova str., Uchaly, Republic of Bashkortostan, Russia, 453700

Telephone: +7 (347) 225-87-09,

Mobile phone: +7 (996) 400-68-17

E-mail: post@geotim.ru

Website: <https://geotim.ru>

