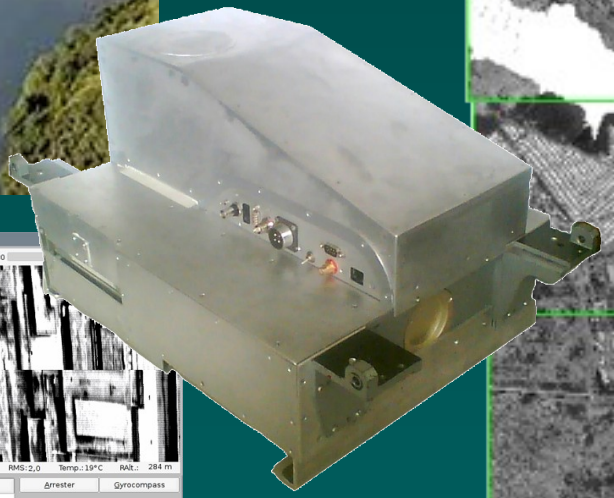
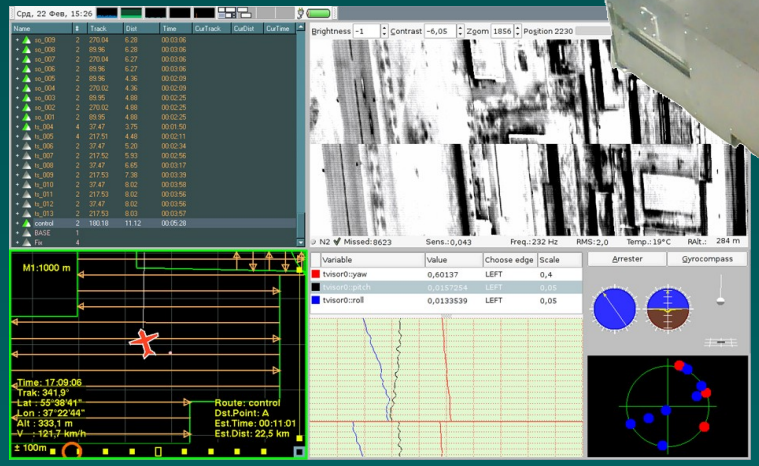
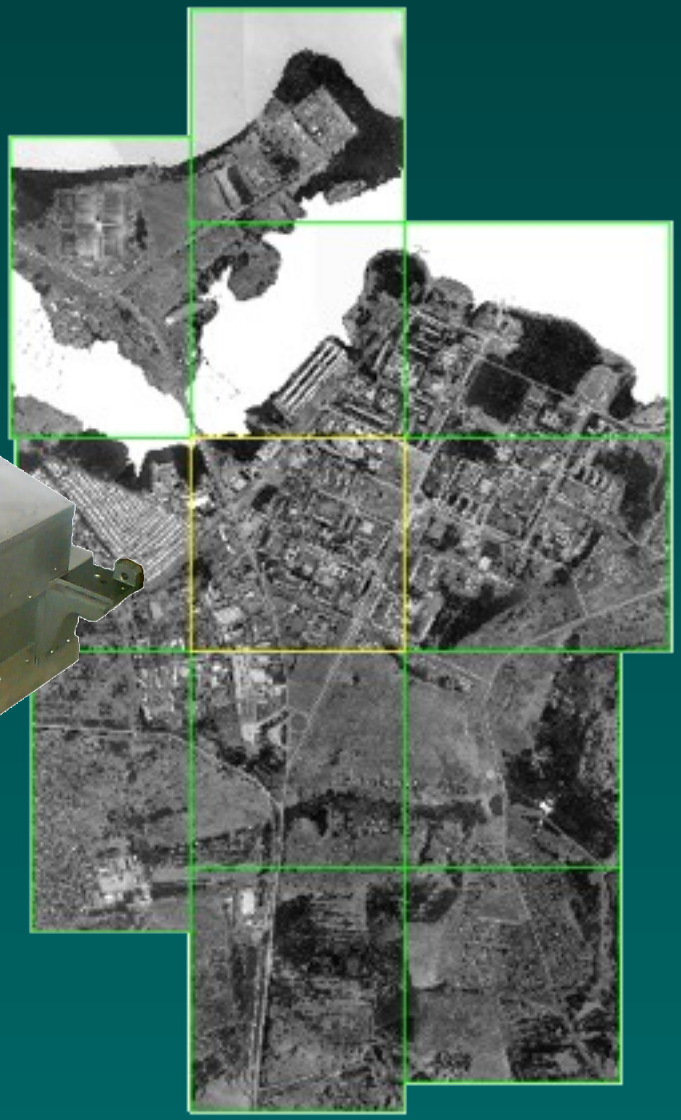
Airborne Thermal Survey

Geotechnologies provides airborne thermal survey including producing of digital map layers for customer GIS system. We also provide full software support of a survey process.







Airborne Thermal Survey Equipment

For airborne thermal survey we developed high resolution scanning system Scan-T

System Specifications

- Angle of view: 120°
- Scanning frequency: 230 lines per second
- One line consists of 3500 points
- Ray width: 2,4'
- Sensor: Cadmium Mercury Telluride
- Cooling system: microcryogenic Integral-Stirling system
- Wavelength range: 8-14 μm (far IR)
- Sensitivity: 0,05 ° C for background temperature 20 °C
- Lossless real-time data compression
- Data are are transferred through TCP/IP and recorded on the hard drive of an on-board laptop
- For correction of geometrical distortions caused by aircraft deviations pitch, yaw, roll, altitude and GPS data are registered.
- Dimensions: 50x30x30 cm
- Weight: 30 kg

Aircrafts

The system can be installed on any light helicopter or fixed-wing aircraft. It can be installed inside or outside fuselage. Geotechnologies has the experience of work with following aircrafts:

Mi-8

Ka-26

Mi-2

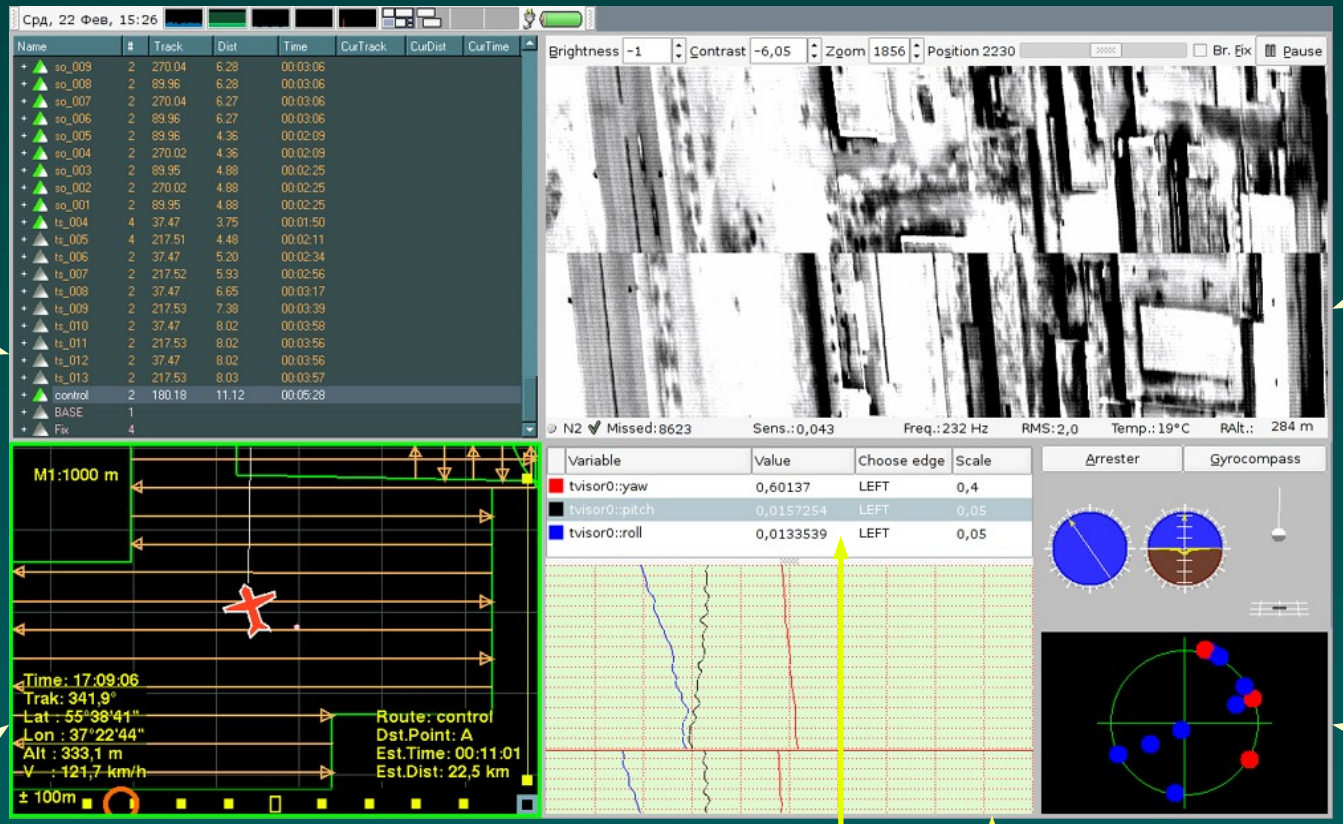
An-2

Cessna 172D

P68 Observer 2

Navigation and Data Acquisition

Multifunctional software is used for navigation and data acquisition. It allows to plan a flight, to control the quality of incoming data and to interact with the pilot through the pilot's display. Here is a screenshot of the on-board sotware .



Flight plan file

Infrared image in real-time

Navigation map: here navigation information is shown and flight plan is diplayed schematically

Measured parameters list and charts

Satellites indicator

Survey data processing

First step: automatic synchronization of scanner and navigation data, correction of image distortions caused by aircraft deviations.

Here is an example of the correction.

Image before correction

Image after correction

Survey Data Processing

Second step: automatical image mosaic and georeferencing. For all procedures traditional photogrammetry methods are used.

The example of the seven flight lines mosaic.

Survey Data Processing

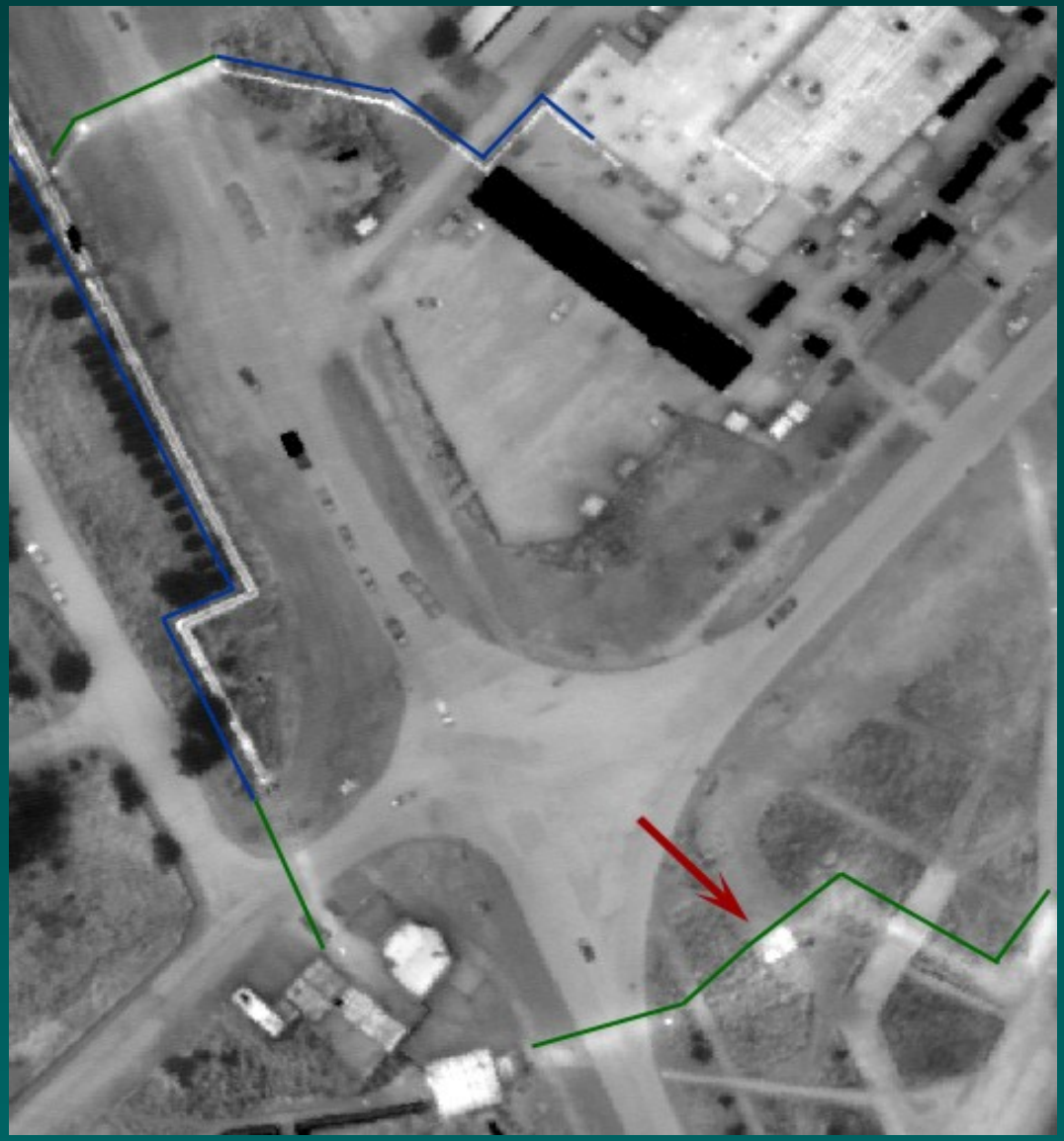
Final step: image transformation in accordance with requirements of GIS system.

One sheet

Sheets layout

Thermal Imaging Applications

Monitoring of heat supply networks.



Here is an example of thermal image (Russia, Smolensk Region, Desnogorsk town); Underground sectors of the heating system are marked by green lines, overground sectors — by blue line; the red arrow shows the sector of heat losses.

Thermal Imaging Applications

Monitoring of heat supply networks.

Underground heating system (Russia, Smolensk Region, Desnogorsk town); arrows show sectors of heat losses

Thermal Imaging Applications

Monitoring of heat supply networks.

Underground heating system (Latvia, Ekabpils on the left; Russia, Desnogorsk on the right); the arrows show sectors in state of failure.

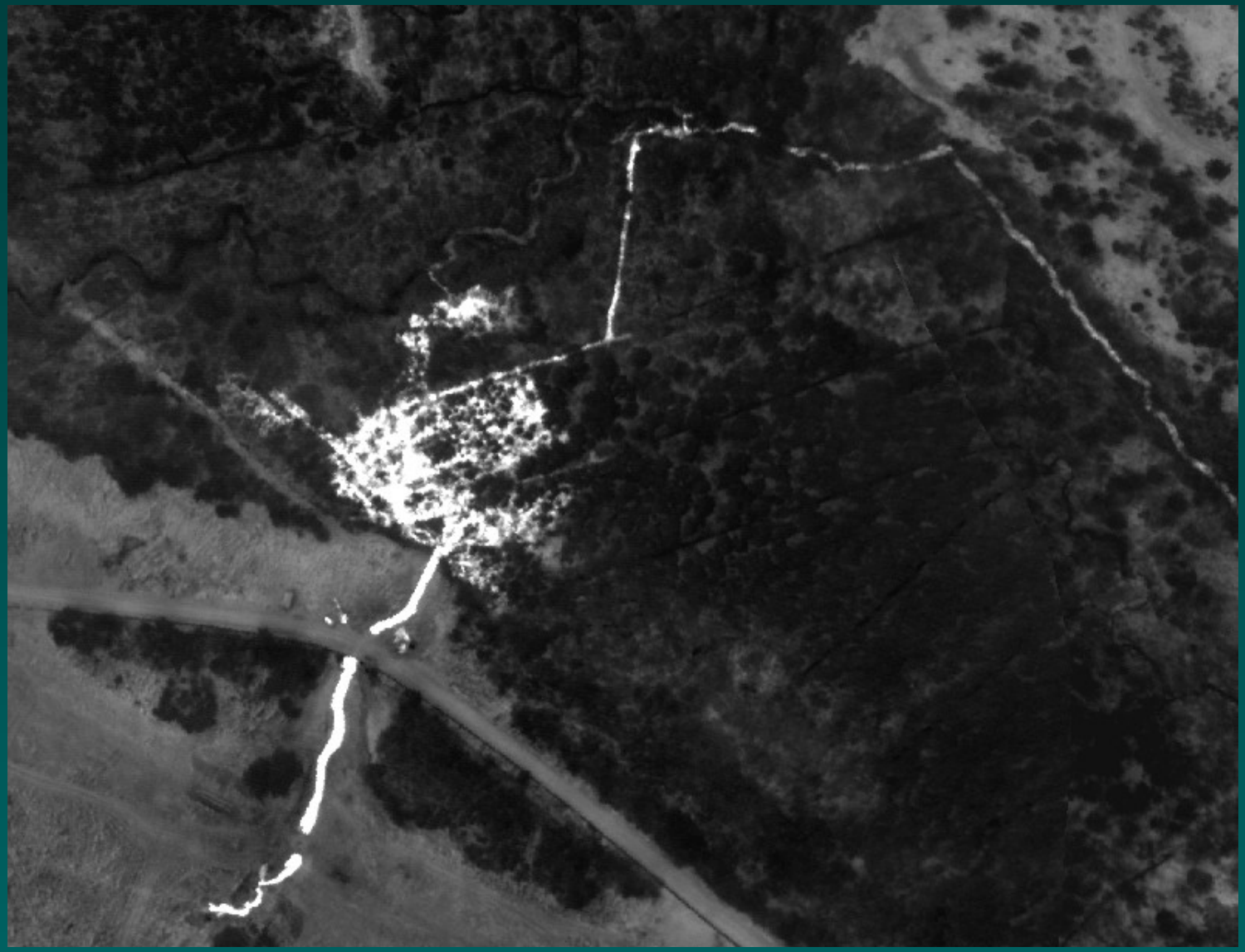
Thermal Imaging Applications

Waterbody monitorng.

Water pollution by industrial effluent (water reservoir in Desnogorsk, Russia)

Thermal Imaging Applications

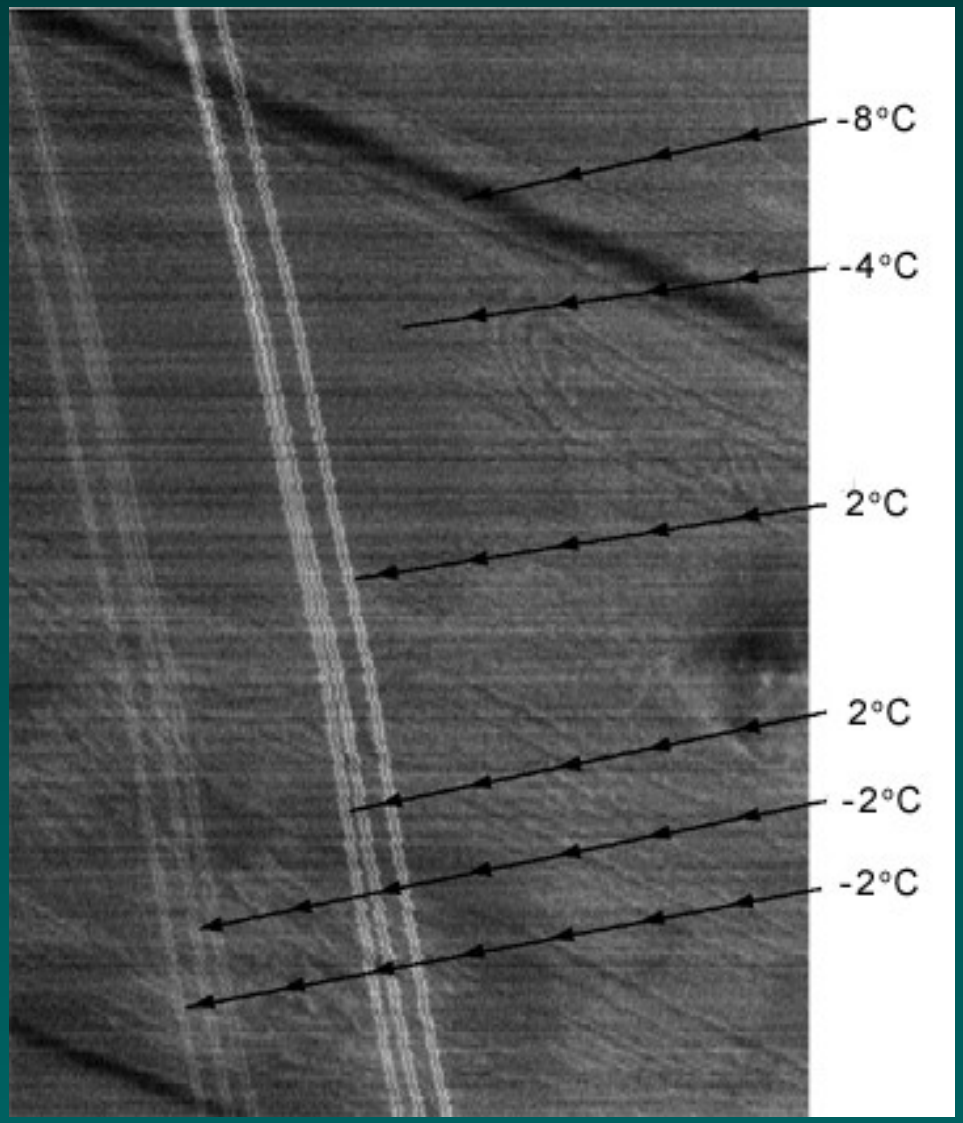
Enviromental monitoring.

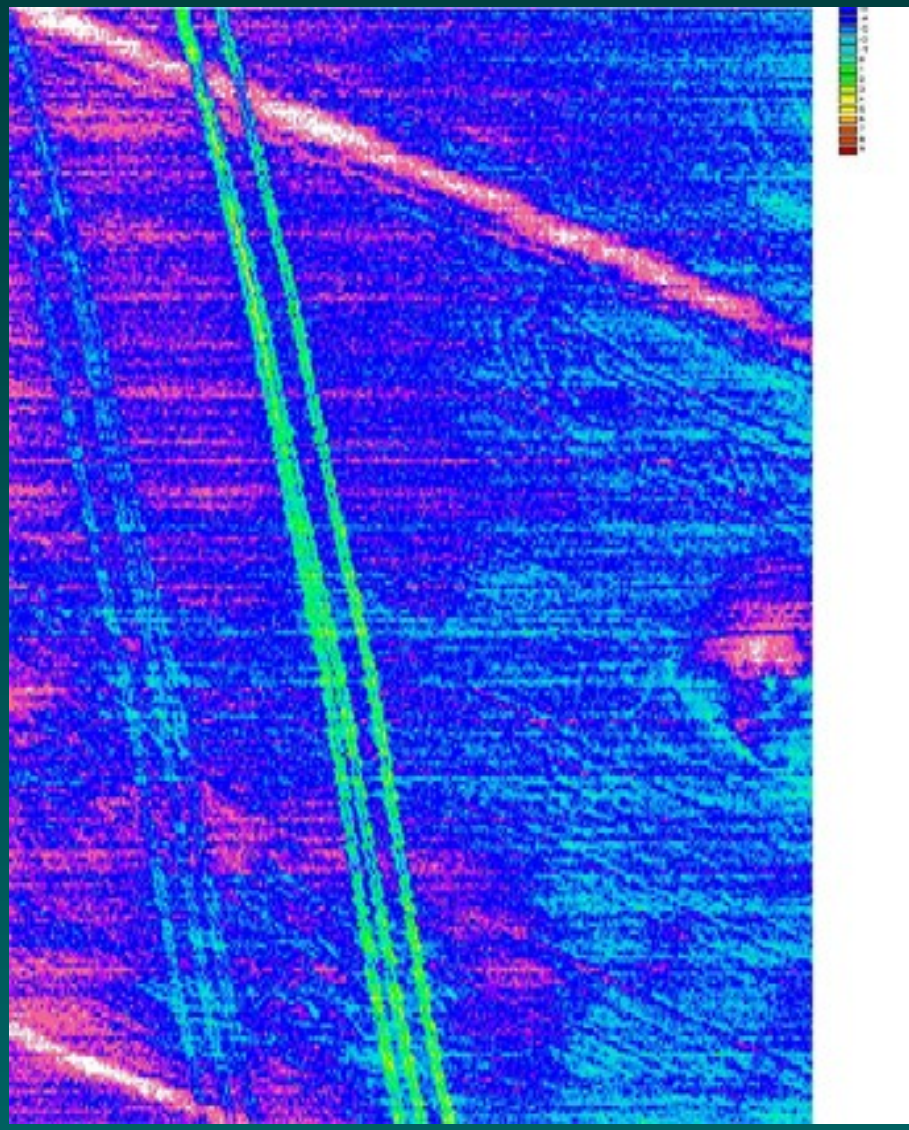


Industrial waste leakage (Russia, Smolensk region)

Thermal Imaging Applications

Electrical grid monitoring.

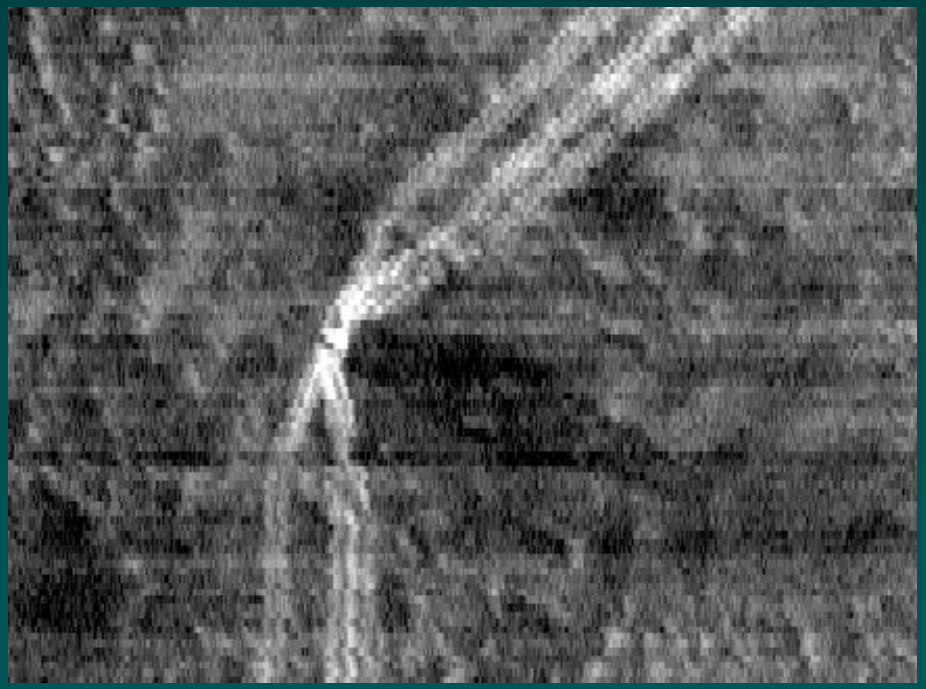




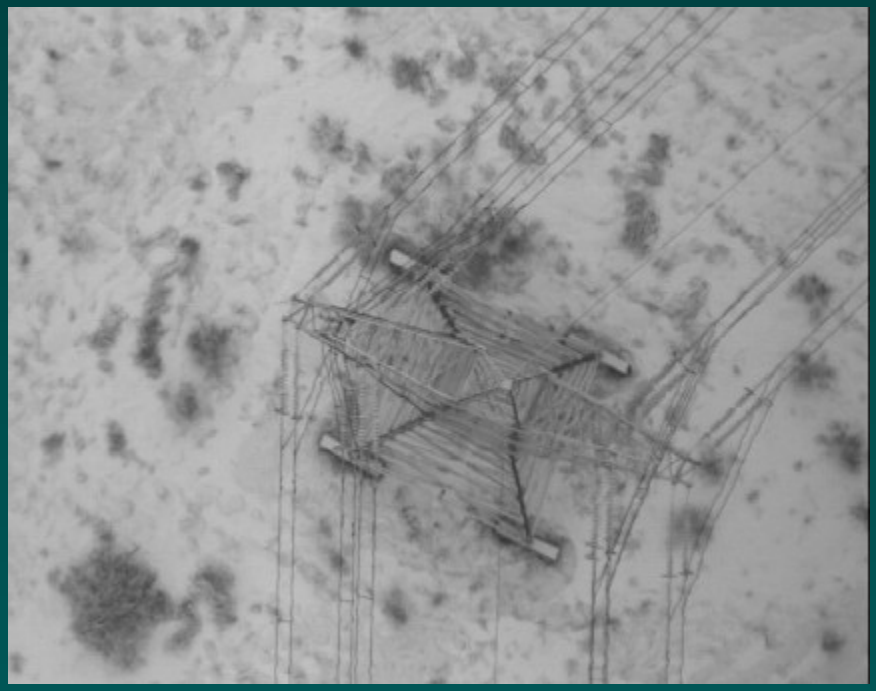
Wires heating analysis.

Thermal Imaging Applications

Electrical grid monitoring.



Zoomed fragment of the infrared image

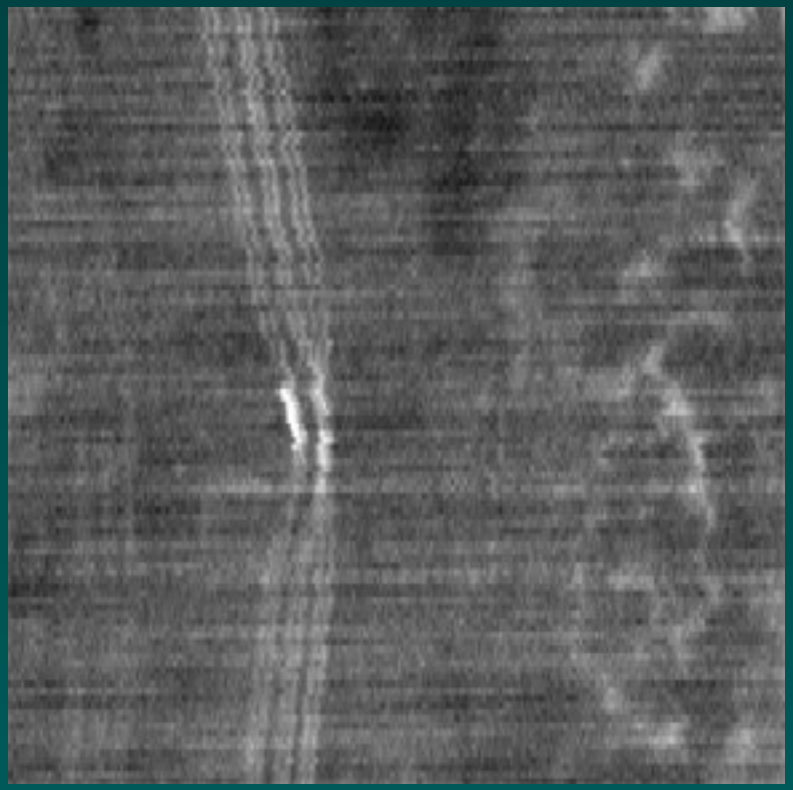


Photo

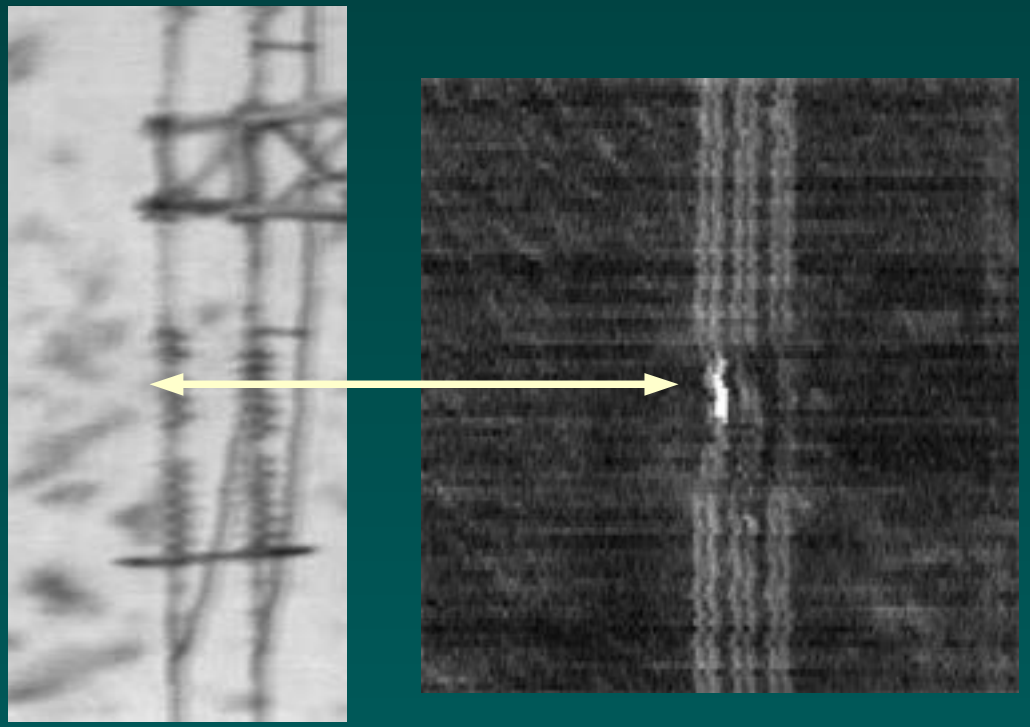
Overheated wires are easily seen on a thermal image; heat emission of wires in normal condition (right group of wires on these images) corresponds to a background temperature.

Thermal Imaging Applications

Electrical grid monitoring.



Zoomed fragment of the infrared image.
High energy resolution of the scanning system allows to detect temperature differences through electric lines.



Combined thermal and photography aerial survey allows to define more exactly the localization of overheated components

Thermal Imaging Applications

Electrical grid monitoring.

Photo

Infrared image

Electrical substation.
Components with increased heat losses are easily seen.

Thermal Imaging Applications

Engineering geology. Roadway monitoring.

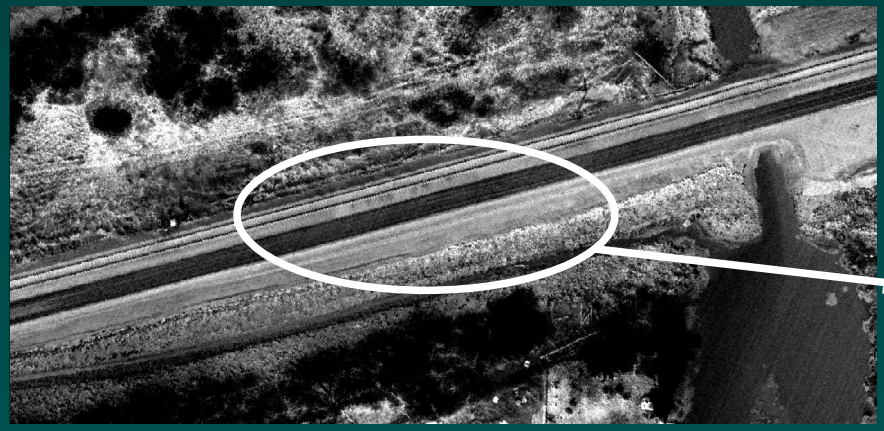
Roadway destruction

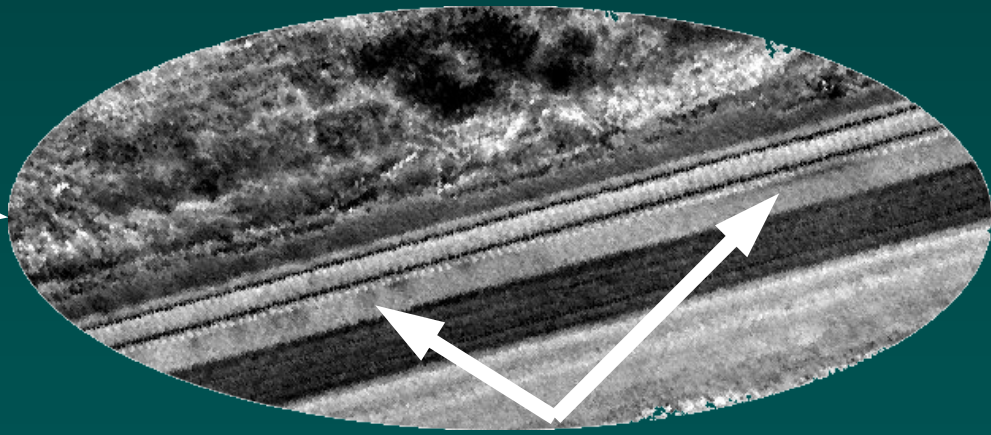
Moderate damage

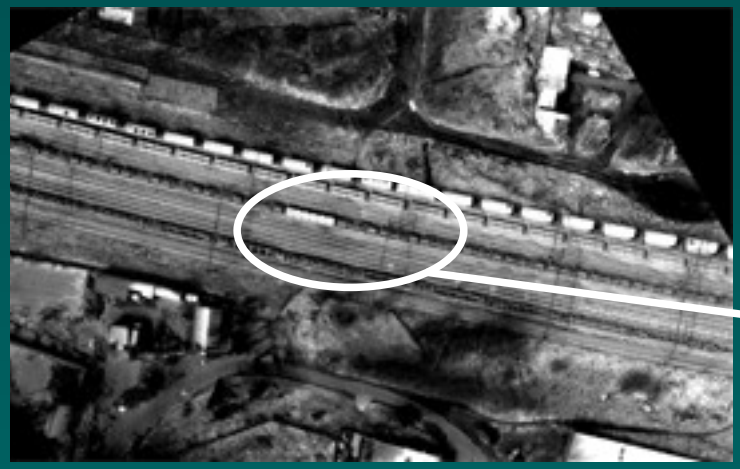
Heavy damage

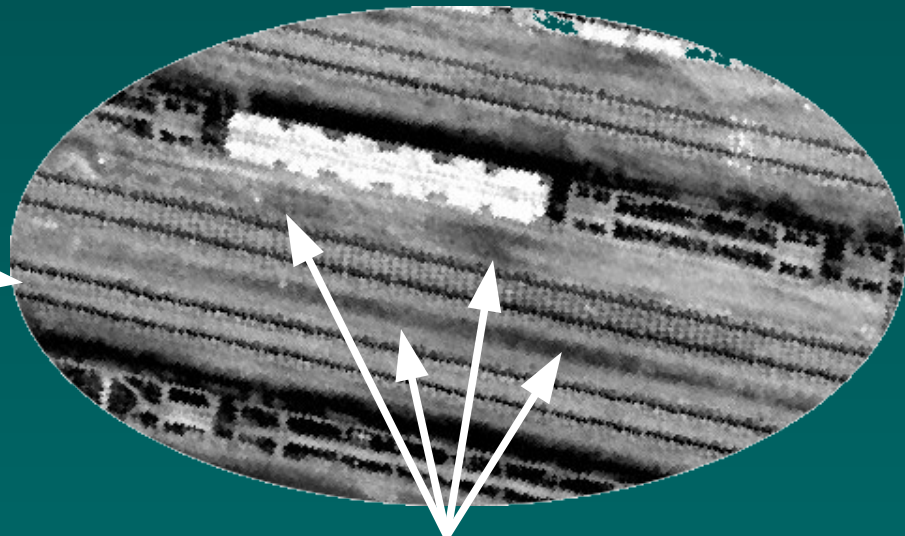
Thermal Imaging Applications

Engineering geology. Railway monitoring. Arrows show moistured zones.



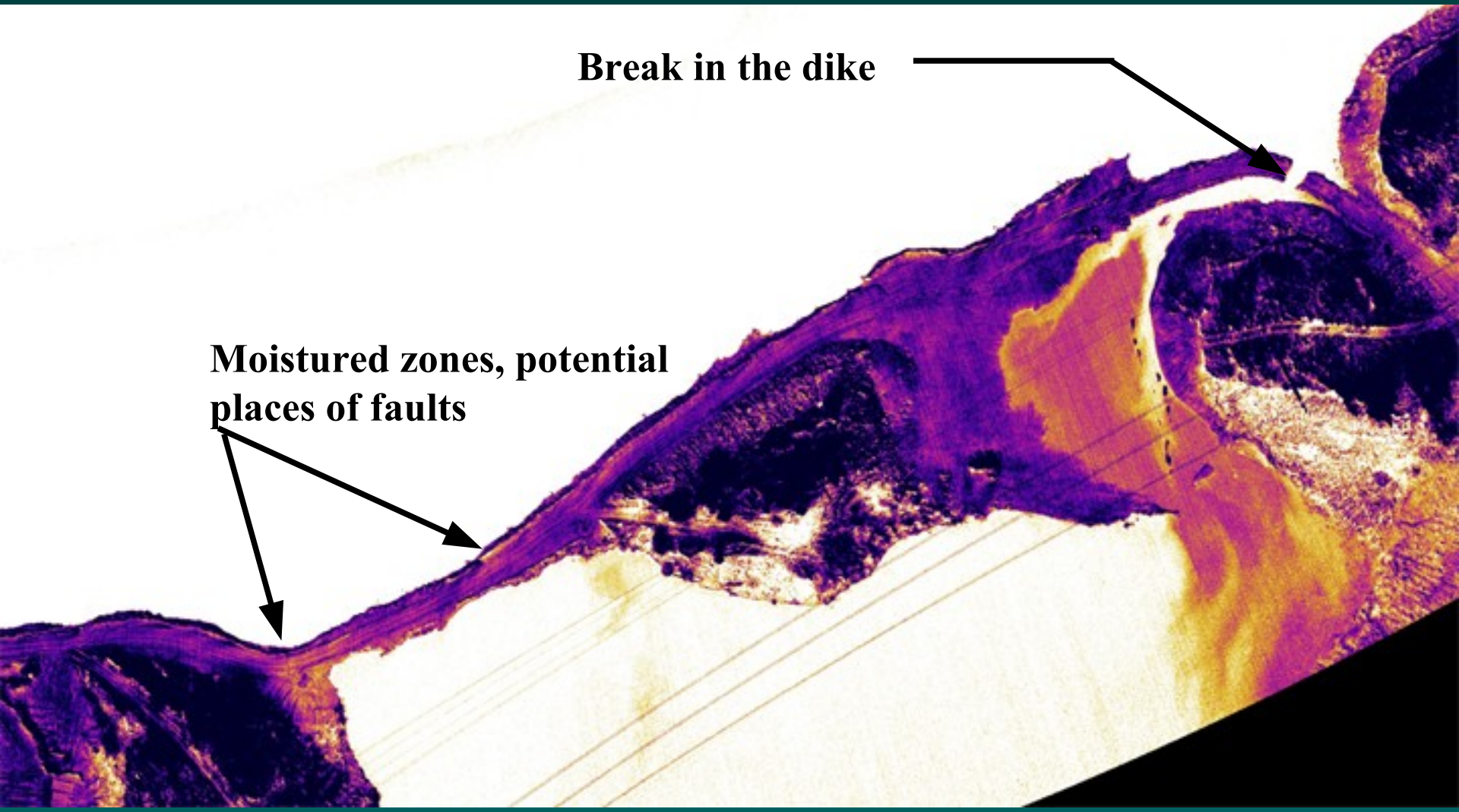






Thermal Imaging Applications

Hydrogeology.



Thermal Imaging Applications

Engineering geology. Spring thaw monitoring.