SUBSURFACE MAGNETICS: ACCURATE, RAPID & TOUGH

JESSY SMART

GEO-MAGNETIC **GROUND SCANNER**

supracon®

SQUID and Microfabrication Technologies

SUPRACON AG

is a leading high tech company in the sector of superconducting electronics and has specialized in the development, fabrication, and marketing of ultra-sensitive superconductive sensors, read-out electronics and measuring systems. The sensors are based on an unique microfabrication technology.

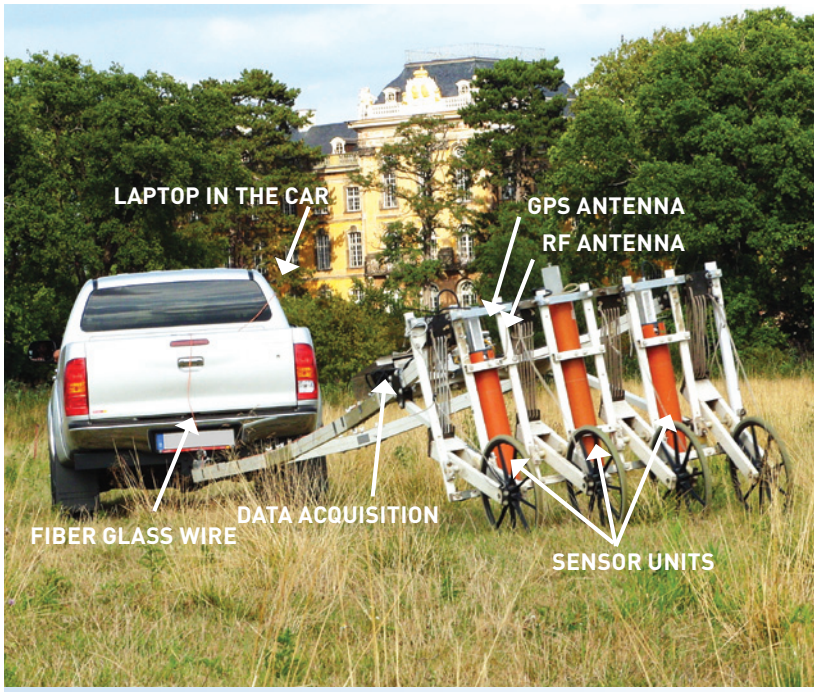
TÜV CERT
DIN EN ISO 9001:2008
Certificate 15 100 21403

All Supracon products are being fabricated under the German TÜV (German Association for Technical Inspection) controlled quality management system to ensure the highest standards.

"This advanced geomagnetic scanner is available for sale, for rent, or alternatively we provide the measurements as a service."

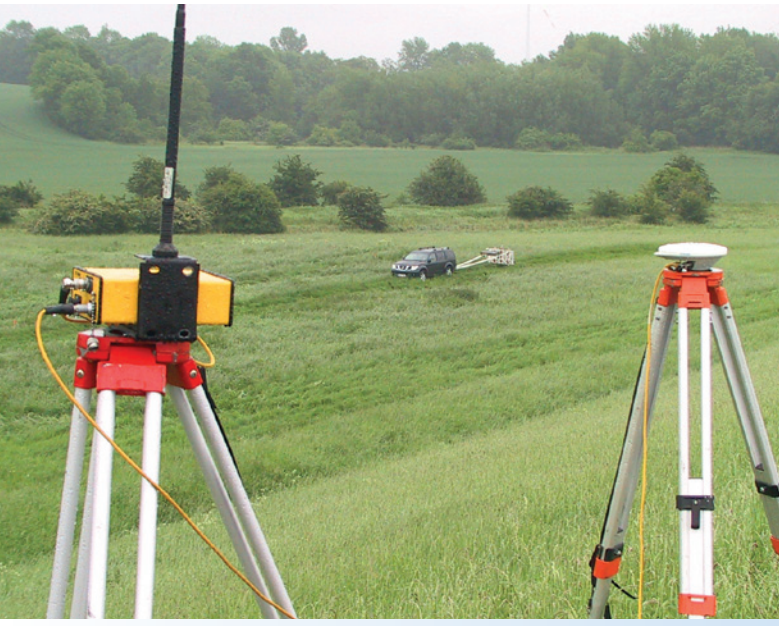
JESSY SMART

In more than 10 years of research and development work Supracon and the Leibniz Institute of Photonic Technology (IPHT) have achieved to make the ultimate sensitivity of Superconducting Quantum Interference Devices (SQUID) applicable for geomagnetic prospection systems. The system JESSY SMART is designed for a fast, 3-dimensional geomagnetic mapping of buried near surface magnetic anomalies. The potential applications vary from building ground evaluation to archaeological prospection and unexploded ordnances detection. JESSY SMART is approved and successfully applied in many exploration campaigns worldwide. It is robust and field proof.



COMPONENTS OF JESSY SMART SYSTEM

YOUR ADVANTAGES WITH JESSY SMART

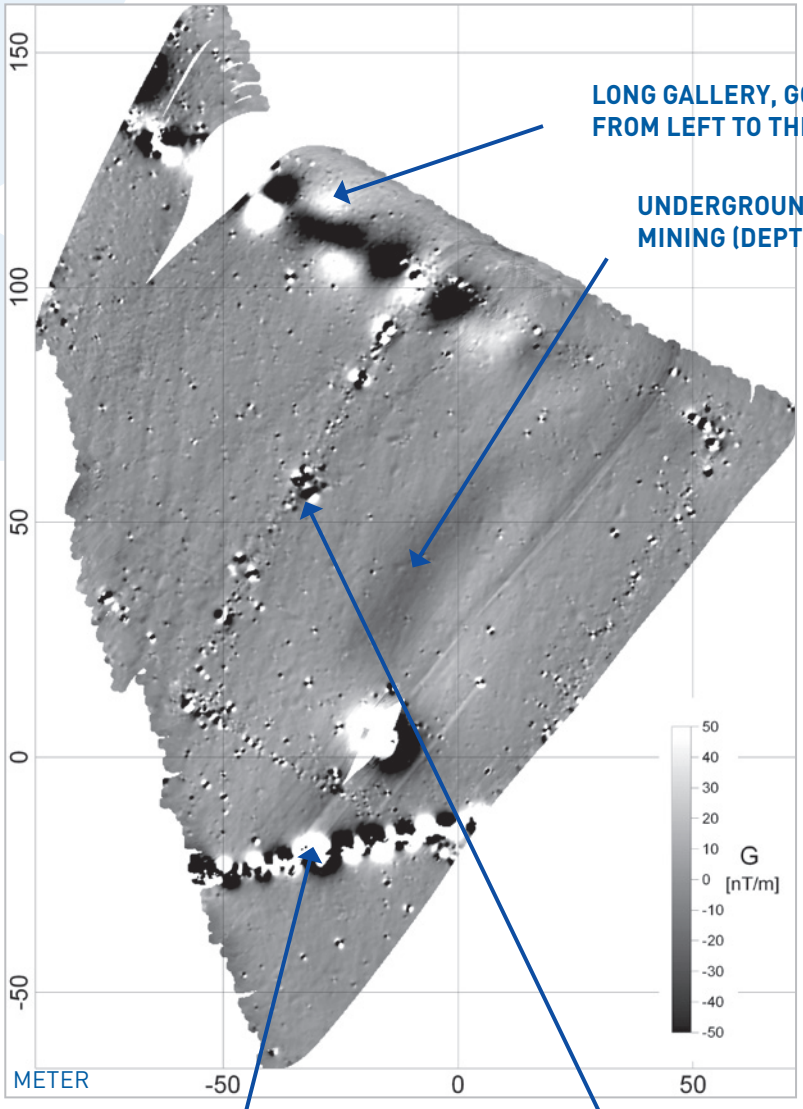


MEASUREMENT IN THE FIELD

- High sensitivity for small or deep-seated magnetic anomalies
- Fast mapping of up to 3 ha/hour
- 1000 data/sec readings allow high spatial resolution in the cm range
- 2-D magnetic maps for optimized probing and highest detection certainty
- In measuring terrain unsuitable for driving there is the option of using a small hand pushed cart
- Differential GPS enables highest precision locating the magnetic anomalies in the cm range
- The scanning process is supported by GPS track control for complete and consistent data acquisition

MEASUREMENT DATA

- Fast data processing algorithms allow first data analysis directly in the field
- Locating and identification of objects in a geo-referenced magnetogram see left
- Detailed post processing analysis for precise determination of location and dimensioning of magnetic anomalies
- Detection of building and foundation remnants, power lines, pipelines, cavities, unexploded ordnances, brownfields, charcoal, ashes, clay, ceramics, bricks, geological structures
- Precise digital terrain model information in a height resolution of 10 centimeters



LONG GALLERY, GOING TO DEPTH FROM LEFT TO THE RIGHT

UNDERGROUND OPENING OF THE MINING (DEPTH > 10 METER)

GEOLOGICAL STRUCTURES (DIKE OF BARITE)

MAGNETIC TRACES OF A PREVIOUS METALLIC FENCE

EXPLORE WITH OPTIMAL RESULTS

MAGNETOGRAM OF AN OLD MINING AREA

ARCHAEOLOGY

JESSY SMART in winter conditions

CASE HISTORY – NIEDERZIMMERN (THURINGIA), GERMANY

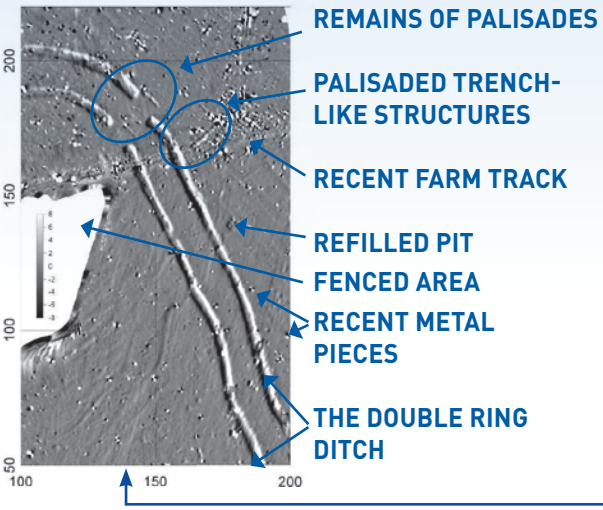
Measuring task:
Investigation of a 5600 years old
Neolithic double ditch ring structure

Client:
Thuringian State Office for Cultural
Heritage Preservation

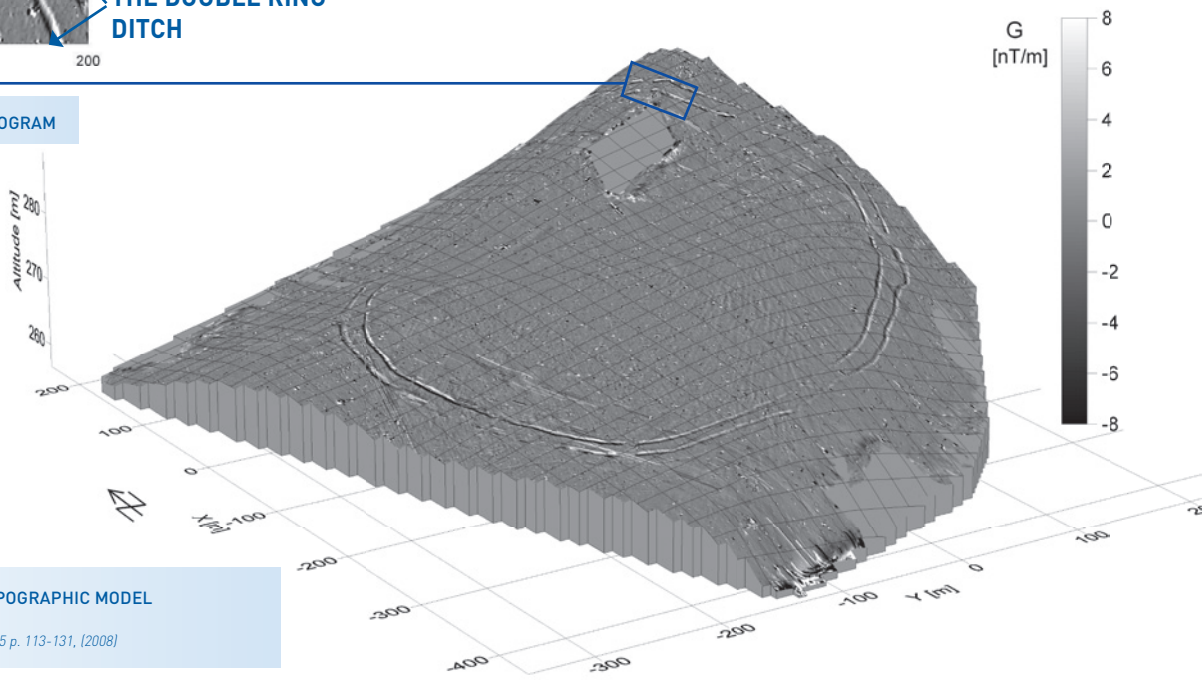
Area:
27 ha

Measuring time:
3 days

Measurement conditions:
Frozen soil, small snow cover,
high frequency disturbing signals



DETAIL OF THE MAGNETOGRAM



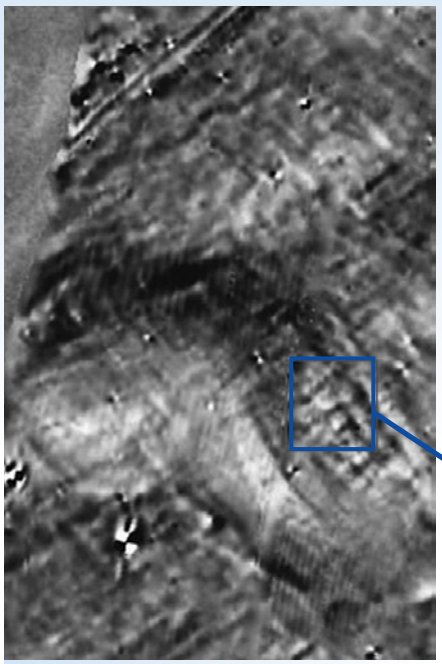
MAGNETOGRAM IN A TOPOGRAPHIC MODEL

© V. Schultze, S. Linzen et all
Archaeological Prospection 15 p. 113-131, (2008)

ARCHAEOLOGY

JESSY SMART in arid conditions

CASE HISTORY – PALPA, PERU



2-D MAGNETOGRAM

S. Linzen et al. in Reindel, M., Wagner. G. A. (editors): New Technologies for Archaeology, Springer Verlag p. 71 – 85, (2009)

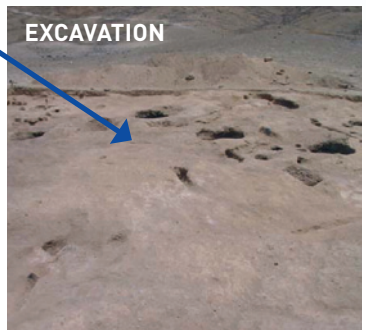
Measuring task:
Locating settlement structure of the Ancient Nasca Culture

Client:
Deutsches Archäologisches Institut (DAI)

Area:
9 ha

Measuring time:
1 day

Measurement conditions:
Dry, dusty and hot weather



RESULTS FOR ARCHAEOLOGIST

- Fast and easy 2-D maps (magnetogram) in grey scale Picture
- Detection of archaeologic anomalies and exact location
- Interpretation of the measurement results
- Data integration of magnetogram with maps and aerial pictures
- Unique 3-D information about anomalies based on full gradient tensor data in post processing

BUILDING GROUND ANALYSIS

MOTIVATION

- Detection of magnetic anomalies problematic for the construction project such as archaeological features, remains of buildings and brownfield situation, detection of cavities and geological structures
- Higher security of building ground stability

RESULTS FOR CLIENTS

- Planning reliability by prevention of unforeseen construction ground problems
- Minimization of exploration time
- Minimal residual risk in comparison with selective drilling exploration

JESSY SMART in revitalisation industrial area

CASE HISTORY – NORDHAUSEN (THURINGIA), GERMANY

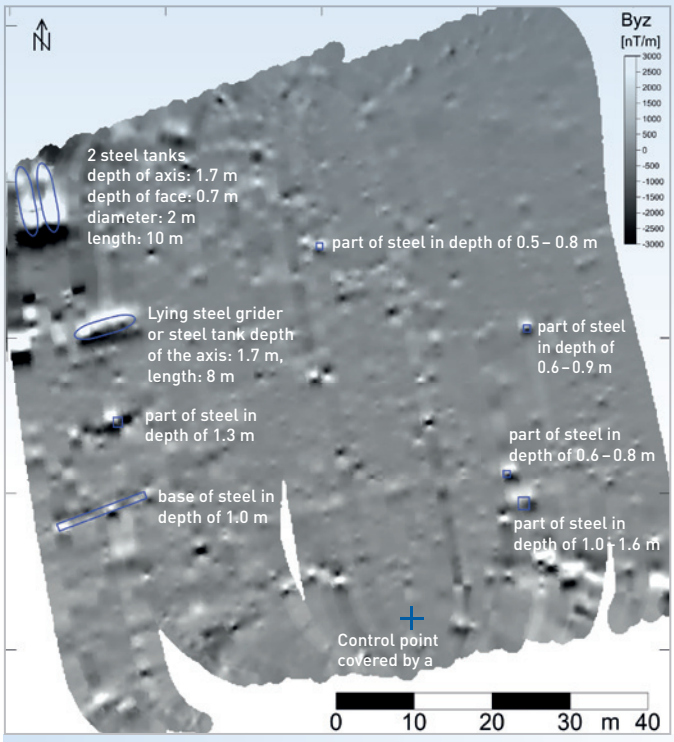
Mission:
Detection of amount remains of building foundations hidden underground

Client:
JENA-GEOS® – Ingenieurbüro GmbH

Area:
0,7 ha

Measuring time:
1,5 h

Measurement conditions:
Sunny day, decommissioned premises



MAGNETOGRAM OF A RECULTIVATED INDUSTRIAL AREA

BUILDING GROUND ANALYSIS

JESSY SMART in action before road construction

CASE HISTORY – ROAD CONSTRUCTION IN SOUTH THURINGIA, GERMANY

Mission:
Ground examination for road construction in old mining area

Client:
JENA-GEOS® – Ingenieurbüro GmbH

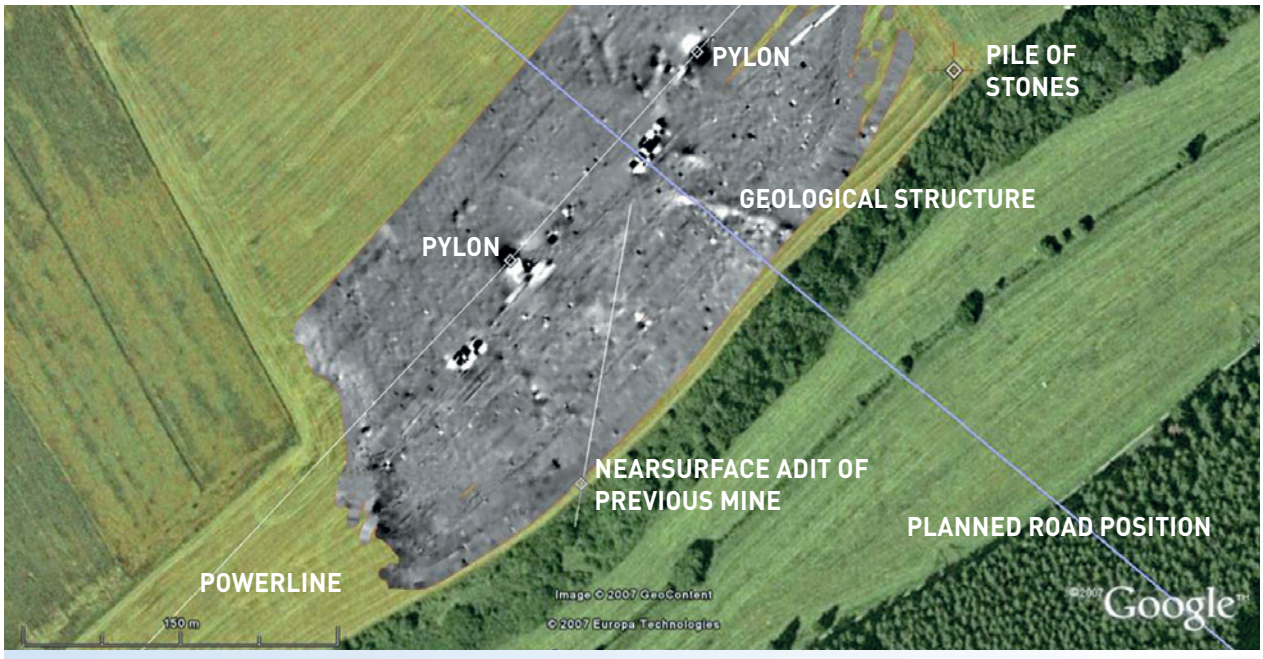
Area:
5,7 ha

Measuring time:
2,5 h

Measurement conditions:
Rain, wet ground

RESULTS FOR CUSTOMERS

- No indication of old mining activities in the area envisaged for road construction
- Localisation of geological structures in the underground



MAGNETOGRAM IN AN AERIAL PICTURE

DETECTION OF UNEXPLODED ORDNANCES (UXO)

MOTIVATION

Detection and location of:

- unexploded bombs
- remains of weapons and munitions
- bomb craters and cavity backfills
- metal objects

RESULTS FOR CUSTOMERS

- Fast measurement covering large areas
- Detection range up to 10 meters
- Exact location of anomalies
- Positional accuracy by differential GPS
  > high resolution in 3D (cm range)

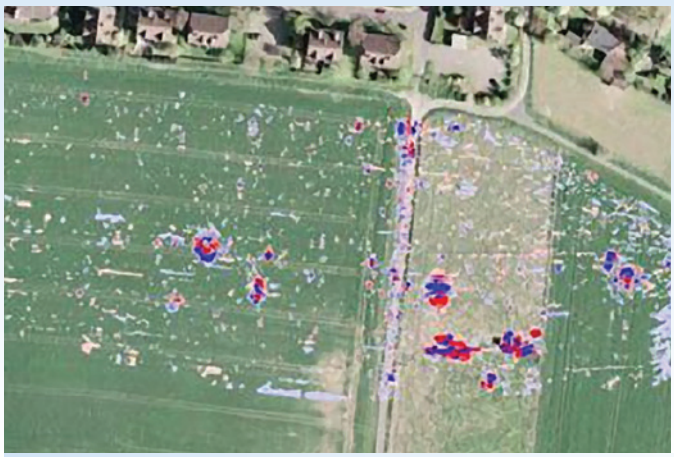
CASE HISTORY – RESIDENTIAL AREA EXTENSION NEAR KASSEL, GERMANY

Mission:
Localisation of remains of World War II aircarft bombs, munition and bomb craters before municipal construction work

Client:
Society of Property Conversion Schorfheide

Area:
4 ha

Measuring time:
6 h



SQUID-GRADIOMETER MEASURING DATA , GEO-REFERENCED AND EMBEDDED IN AERIAL IMAGE BLUE – RED CONTRAST REPRESENTS MAGNETIC ANOMALY LIKE AIRCRAFT BOMBS AND FILLED CRATERS

© H.G. Meyer et al., Detection of buried magnetic objects by a Squid-Gradiometer, Proceeting of SPIE Volume 7303, (2009)

RESULT FOR CUSTOMERS

Magnetogram as greyscale image or with colored anomaly highlithing measurement grid can be georeferenced and embedded in maps or aerial images to allow very accurate location.

DETECTION OF UNEXPLODED ORDNANCES (UXO)


magnetogram embedded in an aerial picture

CASE HISTORY – CITY CENTRE, PLAUEN, GERMANY

Mission:
Investigation and clearing of unexploded ordnances before road construction

Client:
Regulatory Agency Plauen, Germany

Area:
Length about 400 meter (0,2 ha)

Measuring time:
1,5 h

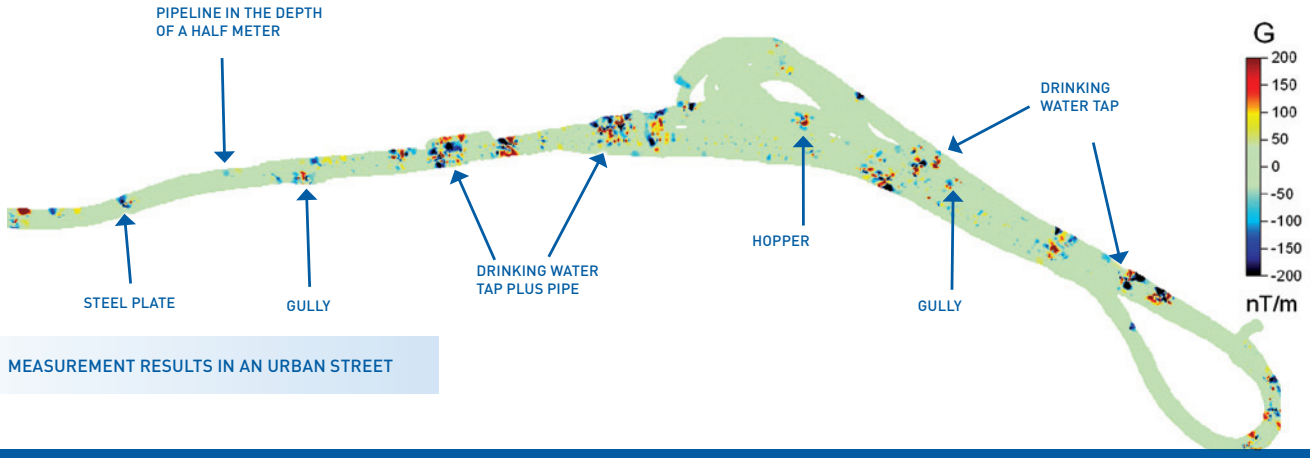
Measuring conditions:
Measurement at night time to minimize the road traffic and construction work disturbing influence


PLAUEN AFTER 1945


ROAD CONSTRUCTION IN PLAUEN 2009

RESULTS FOR CUSTOMERS

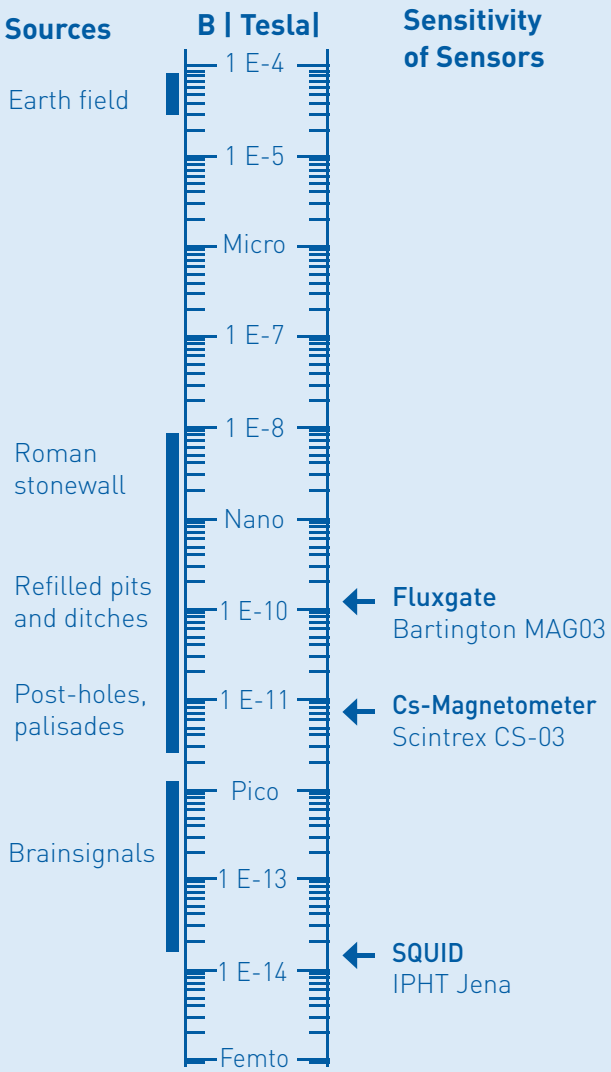
Detection of many magnetic objects, but no sign of unexploded ordnances.



MEASUREMENT RESULTS IN AN URBAN STREET

Sensitivity

of various magnetic field sensors



MOST SENSITIVE MAGNETIC SENSOR

EFRE
EUROPA FÜR THÜRINGEN
EUROPÄISCHER FONDS FÜR REGIONALE ENTWICKLUNG

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LAYOUT & GRAPHIC DESIGN: timespin

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