ZAP Consulting Engineers (ZAPCE)

ZAPCE profile
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ZAPCE has extensive experiences in applying state of the art non-invasive ground characterization techniques to all areas of the geotechnical, civil, mineral, oil and gas, groundwater and environmental industries. Below is a list of the more popular applications that are routinely carried out by our team of skilled geoscientists:

**Geology**
- Geological Mapping,
- Structural Geology,
- Engineering Geomorphology,
- Engineering Geology,
- Environmental Geology,
- Hydrogeology & Hydrology,
- Ground Water Exploration,
- Hydrocarbon Exploration,
- Hydrocarbon Reservoir Eng.

**Mine Exploration**
- Economical Geology,
- Mineral Prospecting,
- Feasibility Studies,
- Geochemical Exploration,
- Geophysical Exploration,
- Detailed Exploration,
- Ore Deposit Modeling,
- Reserve Computing,
- Financial Analysis.

**Geophysics**

**Seismic:**
- Body waves (Active and Passive),
- Surface Waves (Active and Passive).

**Electric:**
- Resistivity,
- Induced Polarization,
- Self Potential.

**Electromagnetic:**
- Ground Penetrating Radar (GPR),
- Magneto Telluric (MT),
- Time Domain Electro Magnetic (TDEM),
- Audio Magneto Telluric (AMT),

**Magnetic:**

**Gravimetric:**

**Environmental Studies**
- Environmental Audits,
- Waste Water Management & Treatment,
- System Designing,
- Solid Waste Management & Landfills,
- Environmental Impact Assessment (EIA),
- Environmental Pollution & Modeling,
- Social Impact Assessment,
- Site Assessment & Remediation,
- Environmental Health & Safety,
- Legislation & Regulatory Requirements,
- Risk Management,
- Sustainable Development.

**Geotechnics**
- Engineering Geology,
- Bedrock Profiling,
- Soil Mechanics,
- Rock Mechanics,
- Drilling,
- Slope Stability.

**Geological Hazards**
- Geological Hazard Mapping,
- Earthquake Hazard Assessment,
- Seismic Microzonation,
- Landslide & Rockfall Hazard Assessment,
- Ground Subsidence & Sinkhole Hazard Assessment,
- Flood Hazard Assessment,
- Risk Assessment.
Key Benefits of ZAPCE Geological and Geophysical Surveys

Cost Effectiveness
A ZAPCE geological and geophysical survey can provide detailed information of subsurface in a reasonably short time. The costs of such surveys are much lower than direct drilling and excavation methods that yield the same results. Our surveys are generally required to provide information between sparse borehole arrays.

Rapid Ground Coverage
ZAPCE has made a great investment in state-of-the-art equipment enabling us to cover a wide area in a limited time.

Minimal Exposure to Hazards
Our techniques are completely non-destructive that prevents us from risks of exposing harmful wastes or aggravating critical ground conditions which are the main disadvantages of conventional ground exploration methods.

Environment Friendly
ZAPCE investigation techniques are non-invasive and involve minimal disturbance to the environment. We commonly carry out surveys in urban regions and areas of natural protection, and incur few restrictions from the relevant authorities.

Quality Procedures
Our scientists are highly qualified with extensive experience in applied geology and geophysics. We place great emphasis on careful survey design and implementation while maintaining a flexible approach to work on site. Our survey results are integrated with existing information or complimentary datasets using GIS techniques for ease of use by the Clients. We also draw on our experiences from a wide variety of previous surveys carried out in diverse environments in order to deliver the best service to our Clients.

Customer Focused
We understand our Client’s needs and ensure that survey results are delivered in a form that can be easily integrated into their work. We offer a flexible approach to pricing which can optimize the survey design to suit a given budget.
Subsurface Imaging

ELECTROMAGNETIC (EM) EXPLORATION

The electromagnetic (EM) technique is based on the response of the ground to the propagation of natural electromagnetic field or EM field created by the survey instrument. The EM survey technique has a number of different applications and can be applied to both reconnaissance and detailed ground investigations. The EM survey method can be used to map the following sub-surface features:

- Geological and hydrogeological features,
- Contaminant plumes,
- Foundations,
- Archeological structures and artifacts.

The following techniques are the main EM approaches using by ZAPCE:

**Magneto Telluric (MT)**
**Time Domain Electro Magnetic (TDEM)**
**Audio Magneto Telluric (AMT)**

The magnetotelluric (MT) method is a technique for imaging the electrical conductivity (resistivity) and the structure of the Earth, from the near-surface down to the crust and even upper mantle. MT method is a “passive” geophysical method utilizing natural fluctuation of EM field. The depth of the survey in magnetotellurics depends on the period of EM field variations.
Application of audiomagnetotellurics (AMT) in mineral prospecting has a long history, but only in the last decade, thanks to the progress of instrumentation (recorders with a large dynamic range, low noise sensitive electric and magnetic sensors) and data processing methods (robust multi-point methods) it has become a method demanded in the geophysical services market.

AMT in the most cases could not separate ores directly, but it is extremely useful in better understanding of tectonics, geological structure, mapping deep intrusions and/or faults zones. In some favorable cases “blind” ore bodies could be imaged.
Subsurface Imaging
MAGNETOMETRY
Magnetometry survey detects changes in the magnetic field across the surface of a site or landscape. By this method, it is possible to detect buried ferrous objects such as underground tanks and drums, or geologic structures such as igneous dikes, that cause local disturbances in the earth's magnetic field.

Subsurface Imaging
GRAVIMETRY
The gravimetric technique is based on measuring localized variations in the earth's gravitational field, which are caused by the presence of materials of different densities or voids in subsurface. The presences of an anomalously high (or low) density body in subsurface causes a localized high (or low) anomaly in the measured gravitational field. These gravitational anomalies are extremely small; however, modern instrumentation and exhaustive data processing techniques have made it possible to detect both geological and artificial structures. ZAPCE has applied this method in the following applications:
- Detection of sub-surface voids (i.e. caves, graves and mine openings),
- Detection of buried structures (i.e. foundations and storage tanks),
- Mapping of bedrock lithology,
- Mineral exploration.
Subsurface Imaging

**ELECTRICAL RESISTIVITY TOMOGRAPHY (ERT)**

Electrical properties are among the most useful geophysical parameters in characterizing earth materials. Variations in electrical resistivity (or conversely, conductivity) typically correlate with variations in lithology, water saturation, fluid conductivity, porosity and permeability. Resistivity tomography can be used for the following applications:

- Mapping geological features,
- Detection of buried structures,
- Karst mapping,
- Groundwater exploration,
- Landfill waste mass studies.

**Benefits**

- Up to 1.5 line km per day,
- Depths down to 60+ meters,
- Laterally continuous data,
- Non-destructive,
- Exceptionally low cost.

Subsurface Imaging

**Induced polarization (IP)**

Induced polarization (IP) is a geophysical imaging technique used to identify subsurface materials, such as ore. The method is similar to electrical resistivity tomography, in that an electric current is induced into the subsurface through two electrodes, and voltage is monitored through two other electrodes.

IP technology is the most effective approach in mineral prospecting, since chargeability is an essential property of different types of ores. In contrast with the conventional time domain induced polarization, ZAPCE also applies Spectral IP method with phase measurement, which provides better accuracy of the data and productivity in the field.

The DC-IP technology suggested provided with ZAPCE allows to image chargeability and electrical resistivity up to depth of about 400-500 m using DC tomography technique.
Subsurface Imaging
SEISMIC EXPLORATIONS
ZAPCE is actively involved with ongoing research in shallow seismic investigation techniques and their application for engineering problems. Seismic methods can provide detailed information about rock properties between boreholes, so, fewer boreholes are needed to achieve a continuous picture of the subsurface which reduces overall costs and the risk of missing target features. These methods can be classified as active and passive seismic techniques.

ACTIVE SEISMIC TECHNIQUES

BODY WAVE METHODS

SEISMIC REFRACTION

SEISMIC REFRACTION
Seismic refraction is a useful method for investigating geological structure and rock properties. The technique involves observation of a seismic signal that has been refracted from underlain layers of higher seismic velocities. Shots are generated using a hammer/explosive source at the ground surface and the resulting body waves are recorded via a linear array of geophone sensors. The travel-times of refracted signals are derived from the data and are then processed to determine depth profiles of the targeted geological boundaries.

Typical Targets
- Alluvium and bedrock profiling,
- Detection of buried channels,
- Measuring of rock strength,
- Water table detection.

Benefits of seismic profiling
- Cost effective,
- High productivity,
- Continuous profiling,
- Non-destructive,
- Environment friendly.

SEISMIC REFLECTION
ZAPCE has specialist experience in the design and implementation of high resolution seismic reflection surveys for onshore and transition zone environments. The company routinely carries out seismic survey work for geotechnical and environmental applications as well as larger scale work for oil/mineral exploration.

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Subsurface Imaging
BOREHOLE SEISMIC METHODS

Borehole seismic surveying is an important method for determining key in-situ subsurface information and utilized in a variety of geotechnical site investigations, including earthquake site response modeling, foundation design for dynamic loads and rock quality assessment. Borehole seismic data provides detailed information on stratigraphy and the engineering properties of subsurface soils and rocks that are not available from surface seismic surveys and thus are often used for the enhancement and quality control of surface seismic interpretations. Borehole seismic methods largely fall into three categories, namely, down-hole, up-hole and cross-hole.

In down-hole surveys, seismic signals generated at ground surface, are recorded at regular depth intervals in a borehole, while in up-hole method, source is lowered in the hole and sensors are located at the surface. In cross-hole technique, both source and receivers are located in two separate boreholes and signals travelling between holes, are recorded. Cross-hole surveys are often used to perform high resolution seismic tomography.

Typical Targets
• Geological hazards,
• Fracture zones,
• Caves/ stops/ audits,
• Measuring elastic parameters.

Benefits of Borehole Seismic
• Cost effective,
• Images between boreholes,
• Non-invasive,
• Environment friendly,
• Good productivity.
**Subsurface Imaging**

**SURFACE WAVE METHODS**

Active surface wave techniques measure surface waves generated by dynamic sources such as hammers, weight drops, electromechanical shakers, vibroseis and bulldozers. These techniques include the spectral analysis of surface waves (SASW) and multi-channel array surface wave (MASW) methods.

The SASW method is suitable for conducting shear wave-depth soundings. A dynamic source is used to generate surface waves of different wavelengths (or frequencies) which are monitored by two or more receivers at known offsets. An expanding receiver spread is used to avoid near field effects associated with Rayleigh waves and the source-receiver geometry is optimized to minimize body wave signals.

The MASW field layout is similar to that of the seismic refraction technique. This technique is ideally suited to 2D VS imaging, with data collected in a roll-along manner similar to that of the seismic reflection technique.

**Benefits of active surface wave techniques**

- Cost effective,
- High productivity,
- Non-invasive,
- Environment friendly,
- Greater depth of investigation compared to refraction method.
Subsurface Imaging
PASSIVE SEISMIC METHODS

H/V SPECTRAL RATIO TECHNIQUE
Depending on the natural or anthropic origin (i.e. low frequency microseisms or higher frequency microtremor), characteristics of noise is different in both spectral and temporal domains. For this kind of investigations, a portable short period station is required for noise acquisition.

Among the empirical methods, H/V spectral ratio on ambient vibrations is probably one of the most common approaches for local site effect estimation. The method is also called “Nogoshi-Nakamura technique”. The results of this method are clear and simple in case of horizontally layered structures with large impedance contrasts (> 4-5) and become more fuzzy a) for decreasing contrasts and b) for increasing underground interface slopes.

Typical Targets
• Estimation of ground fundamental frequency,
• Quantitative information of soil depth/velocity

Benefits of H/V spectral ratio
• Cost effectiveness,
• Fast data acquisition and processing.
Subsurface Imaging
ARRAY MICROTREMOR TECHNIQUE
The array microtremor technique typically uses 4 or more geophones/seismometers arranged in a two-dimensional array. The most common arrays are linear, triangular, circular, semi-circular and L-shaped arrays.
The method utilizes dispersive property of surface waves collected by passive recording of background surface waves (noises) such as the vibrations generated by passing vehicles, airplanes or trains, as well as added noise created by initiating impacts at the ground surface. The surface waves are recorded using a seismic system consisting of geophones, cables and a seismograph.

Shear wave velocity profiles are constructed by analyzing surface wave phase velocities and frequencies, and performing inversion modeling.
**Subsurface Imaging**

**GROUND PENETRATING RADAR**

Ground penetrating radar (GPR) uses pulsed high frequency radio waves to probe subsurface without disturbing the ground. GPR data are collected continuously as the instrument moves on the ground surface and provides a real time graphic image of the subsurface. The method is based on the reflection of VHF electromagnetic waves at the boundaries of media with different di-electric properties. GPR method can be used to map the following sub surface features:

- Service and foundation structure (i.e. roadbed and railway ballast studies),
- Sub-surface utility engineering,
- Cavities, voids and underground storage tanks detection,
- Rock quality estimation,
- Fracture mapping,
- Geological boundary mapping,
- Hydrogeology and soil stratigraphy,
- Archaeology,
- Environmental site assessment.
Geology
GEOLOGICAL INVESTIGATION
ZAPCE offer a wide range of Geological Services. Our most significant ability is integrating multiple disciplines to achieve practical and technically rigorous geological model that meet the client’s requirements.

Typical tasks include engineering geology, environmental geology, hydrology & hydrogeology, marine geology, geomorphology, stratigraphy (seismic, sequence & structural), remote sensing, GIS and 3D geological modeling.
Geology

GEOLOGICAL HAZARDS

One of our basic studies in ZAPCE is geological hazards. Geological hazards can be single, sequential or combined in their origin and effects. They include earth interior hazards like earthquakes and fault activities, and earth exterior processes hazard like landslides, rock falls, surface collapses, expansive soils and debris or mud flows.

ZAPCE has extensive experience in identification, monitoring and analyzing of all geological hazards to determine their potential, origin, characteristics and behavior. We are also involved with the risk assessment which is the probability of harmful consequences or expected losses (deaths, injuries, property, livelihoods, economic activity disrupted and environmental damages) resulting from interactions between natural hazards and vulnerable conditions.
Geology

INVESTIGATION OF KARST FEATURES

One of the key considerations for property developments in Limestone or Chalk environments is the presence of sub-surface solution features and voids.

The need to fully characterize unstable ground for foundation design is a significant factor for the valuation, construction and post-development phases. Solution features can be mapped using geophysical techniques by virtue of lithological contrasts between fill and surrounding geology, mass deficiencies due to voiding, or subtle effects on drainage.

Caverns and fissures within bedrock are often more difficult to target. Size and depth are important considerations when deciding on the most suitable geophysical technique.
Geotechnics

GEOTECHNICAL INVESTIGATION

ZAPCE is a leading of highly qualified engineers who provides expert advice to a wide range of clients including consultants, contractors, government departments and agencies, private and public companies, legal practices and research organizations.

Our core business is to provide testing and monitoring services to the following disciplines:

- Civil engineering and construction,
- Environmental,
- Geotechnical engineering,
- Water resources engineering.
Geotechnics

LANDSLID INVESTIGATION

Geophysical surveys can be effectively used on landslips, former industrial tips or unstable slopes to characterize their internal structure and material character with respect to factors that may contribute to failures.

The key targets for geophysics include:
- Bedrock profile,
- Variations in the overburden,
- Zones of differential moisture content,
- Low density or poorly compacted material.

Geotechnics

DETECTION OF ABANDONED MINEWORKING & QANATS

In many regions, Qantas and mining activity has left a legacy of bell pits, shafts or subsidence which have a significant influence on present day developments. In most cases, these kinds of activities are not well documented. A geophysics survey coupled with a selective intrusive investigation can provide a rapid and cost-effective means for locating shallow abandoned mine-workings or Qantas. For most sites, ZAPCE usually adopt an integrated survey approach comprising a number of different geophysical techniques, which target both direct (e.g. shaft lining/cap, void space) and in-direct attributes (e.g. localized variations in drainage patterns or anomalous backfill material).
Geotechnics

LANDFILL STUDIES

The problem of characterizing both active and closed landfills and waste sites is an increasing one in the light of increasing environmental legislation and poor historical records. A ZAPCE geophysical survey can be rapidly carried out for a fraction of the cost of obtaining low-resolution information through invasive means, without disturbing the ground.

Typical Targets

• Mapping leachate level within landfills,
• Locating landfill boundaries,
• Mapping “dry” and “wet” zones for leachate control,
• Investigating cap integrity,
• Geological characterization for new cell design,
• Leachate plume mapping,
• Locating voids or poorly compacted zones,
• Locating underground springs.
Mining
MINE EXPLORATION
ZAPCE is engaged in the exploration of all kinds of minerals, specially metallic reserves.

We guarantee the success of ZAPCE mine exploration by providing high quality services, as well as offering reasonable prices.

Mine Exploration Services:
• Economical geology,
• Mineral prospecting,
• Feasibility studies,
• Geochemical explorations,
• Geophysical explorations,
• Detailed exploration,
• Core drilling and sampling,
• Ore deposit modeling,
• Reserve computing.
ENVIRONMENTAL STUDIES
We provide comprehensive consulting services, expertise and project management capabilities in the following disciplines:

- Environmental audits,
- Waste water management and treatment system designing,
- Solid waste management and landfills,
- Environmental impact assessment (EIA),
- Environmental pollution and modeling,
- Social impact assessment,
- Site assessment and remediation,
- Environmental health and safety,
- Legislation and regulatory requirements,
- Risk management,
- Sustainable development.

We are firmly committed to providing services tailored to our clients' needs through effective management and appropriate technologies to promote cost-efficiency and sustainable development goals. We provide consulting for corporations, communities, cities, states and governments for environmental planning, resolution, and solutions. In some cases, planning, policies, and consulting by an independent consulting company provide advice and can help you to avoid problems for years in the future. We do environmental consulting, stressing “solutions”.
### Geophysical equipment

<table>
<thead>
<tr>
<th>Equipment type</th>
<th>Model</th>
<th>Country</th>
<th>Set</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistivity meter</td>
<td>ZAPCE, E.W.S</td>
<td>IRAN</td>
<td>3**</td>
</tr>
<tr>
<td>Geoelectric IP/SP/RS</td>
<td>ABEM, SAS 1000</td>
<td>SWEDEN</td>
<td>1</td>
</tr>
<tr>
<td>24 channel seismic recording system</td>
<td>ABEM, MK6-V2</td>
<td>SWEDEN</td>
<td>1</td>
</tr>
<tr>
<td>Electromagnetic and electric prospecting system</td>
<td>NORD-WEST, MARY-24 &amp; ASTRA-100, VP-1000</td>
<td>RUSSIA</td>
<td>2*</td>
</tr>
<tr>
<td>Borehole 3C seismometer</td>
<td>JARFKAV, 30 Hz</td>
<td>IRAN</td>
<td>1</td>
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<tr>
<td>Short period seismic recording system</td>
<td>GURALP SYSTEM, CMG-6T &amp; DM24</td>
<td>U.K.</td>
<td>4</td>
</tr>
<tr>
<td>Ground penetrating radar system</td>
<td>MALA, RAMAC</td>
<td>SWEDEN</td>
<td>1</td>
</tr>
<tr>
<td>Ground penetrating radar system</td>
<td>LOZA (V &amp; M series)</td>
<td>RUSSIA</td>
<td>3*</td>
</tr>
<tr>
<td>Ground penetrating radar system</td>
<td>LOZA (N series)</td>
<td>RUSSIA</td>
<td>2*</td>
</tr>
<tr>
<td>3D Ground penetrating radar system</td>
<td>INDES 3D</td>
<td>IRAN</td>
<td>1**</td>
</tr>
<tr>
<td>Magnetometer</td>
<td>GEOMETRICS, G-856</td>
<td>USA</td>
<td>2</td>
</tr>
<tr>
<td>Micro gravimeter</td>
<td>SCINTREX, CG-5 &amp; CG-3</td>
<td>CANADA</td>
<td>***</td>
</tr>
<tr>
<td>Time Domain Electro Magnetic (TDEM)</td>
<td>LOGIS-GEOTECH, Cycle 7</td>
<td>RUSSIA</td>
<td>1</td>
</tr>
<tr>
<td>Magneto Telluric (MT)</td>
<td>MTU-5, MTU-5A, MTU-2E from PHONIX Geophysics Ltd. (Represented by NORD-WEST Ltd.)</td>
<td>CANADA &amp; RUSSIA</td>
<td>Many*</td>
</tr>
</tbody>
</table>

* ZAPCE is official representative for sales and services. Available in unlimited number.
** ZAPCE is the manufacturer of the equipment
*** Required number of instruments is accessible by ZAPCE as representative.

### Surveying equipment

<table>
<thead>
<tr>
<th>Equipment type</th>
<th>Model</th>
<th>Country</th>
<th>Set</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total station</td>
<td>TRIMBLE, 3605 ELTA</td>
<td>GERMANY</td>
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<tr>
<td>GPS</td>
<td>GARMIN, 60</td>
<td>TAIWAN</td>
<td>many</td>
</tr>
<tr>
<td>Satellite phone</td>
<td>THURAYA, XT-LITE</td>
<td>SOUTH KOREA</td>
<td>2</td>
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</tbody>
</table>

### Environmental test equipment

<table>
<thead>
<tr>
<th>Equipment type</th>
<th>Model</th>
<th>Country</th>
<th>Set</th>
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</thead>
<tbody>
<tr>
<td>Conductivity meter set</td>
<td>WTW LF 325-A/SET</td>
<td>GERMANY</td>
<td>1</td>
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<tr>
<td>PH meter set</td>
<td>WTW PH 325-A/SET</td>
<td>GERMANY</td>
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### Geotechnical equipment

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<th>Equipment type</th>
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<th>Country</th>
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<tbody>
<tr>
<td>Geotechnical field test equipment</td>
<td>Different models</td>
<td>Different countries</td>
<td></td>
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<tr>
<td>Geotechnical lab. test equipment</td>
<td>Different models</td>
<td>Different countries</td>
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</tr>
</tbody>
</table>
Equipment

Ground penetrating radar system
(MALA GEOSCIENCE, SWEDEN)

Ground penetrating radar system
(VNIISMI “LOZA-N,V,M”, RUSSIA)

Total station (TRIMBLE, GERMANY)
Geoelectric IP/SP/RS equipment (ABEM, SWEDEN)
Resistivity meter (ZAPCE, IRAN)

Magnetometer equipment
(GEOMETRICS, USA)

Micro gravimeter equipment
(SCINTREX,” CG-5 & CG-3”, CANADA)

Electromagnetic and electric prospecting system
(NORD-WEST, RUSSIA)
24 channel seismic recording system (ABEM, SWEDEN)
Borehole 3C seismometer (JARFKAV, IRAN)

Short period seismic recording system (GURALP, UNITED KINGDOM)

MT-AMT equipment “MTU-5, MTU-5A, MTU-2E”
(PHONIX GEOPHYSICS LTD., CANADA & NOED WEST LTD., RUSSIA)
### International Partners

<table>
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<tr>
<th>Partner</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>INSI Construction Holding Company</strong></td>
<td>Consists of 6 plants and 25 branches, which provide the whole range of goods and services. INSI is involved in engineering and construction of the most sophisticated projects. In 2008 the annual turnover of the company was more than 100 million Euros. INSI offers a wide range of prefabricated buildings: hangars, workshops, livestock complexes, logistics centers, detached houses, country houses, mansards.</td>
</tr>
<tr>
<td><strong>A.P. Karpinsky Russian Geological Research Institute (VSEGEI)</strong></td>
<td>A successor and custodian of traditions of the first state geological institution in Russia which was established in Saint Petersburg on 31 January 1882. VSEGEI has scientific, methodical, and laboratory analytical divisions with high-skilled and experienced experts in all developed scientific lines.</td>
</tr>
<tr>
<td><strong>OAO VNIISMI</strong></td>
<td>Is a leading Russian company in the Ground Penetration Radar (GPR) technology. ZAPCE as an exclusive agent of OAO VNIISMI is authorized to promote OAO VNIISMI products and services. The parties agreed to implement information and technical exchange to improve and enhance the quality of work on geo-radar survey objects in the solution of environmental, archaeological and other humanitarian tasks.</td>
</tr>
<tr>
<td><strong>Nord-West Company</strong></td>
<td>Is a Russian leading provider of electromagnetic imaging services, including surveying, data processing, and data interpretation services. Nord-West Company was set up in 1995 as a spinout from Geophysical Department of the most prestigious Russian Moscow State University. ZAPCE and Nord-West Ltd. agreed to implement joint research for geophysical investigations and ground water, mineral, oil and gas exploration.</td>
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<tr>
<td><strong>MAGE</strong></td>
<td>Is one of the leading Russian companies providing a wide range of services for study of geological structure of the shelf areas, transition zones and adjacent onshore areas of the Ocean of the world. The Mission of MAGE is to promote scientific and technological progress and well-being of society by providing geological information that is necessary for reproduction of the mineral and energy resources base of the continental shelf.</td>
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### Subsidiaries

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<td>Ravis consulting engineers</td>
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### Local Partners

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<td>Shahid Bahonar University of Kerman</td>
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Some of our clients

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<td>National Iranian oil company (NIOC)</td>
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<td>Iran water resources management company</td>
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<td>Geological survey and mineral exploration of Iran (GSI)</td>
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<td>Ministry of industry, Mine and Trade</td>
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<td>National water and wastewater engineering company</td>
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<td>Ministry of Agriculture</td>
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<td>Forests, Range and Watershed Management Organization</td>
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<td>Gol-E-Gohar Iron ore company</td>
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