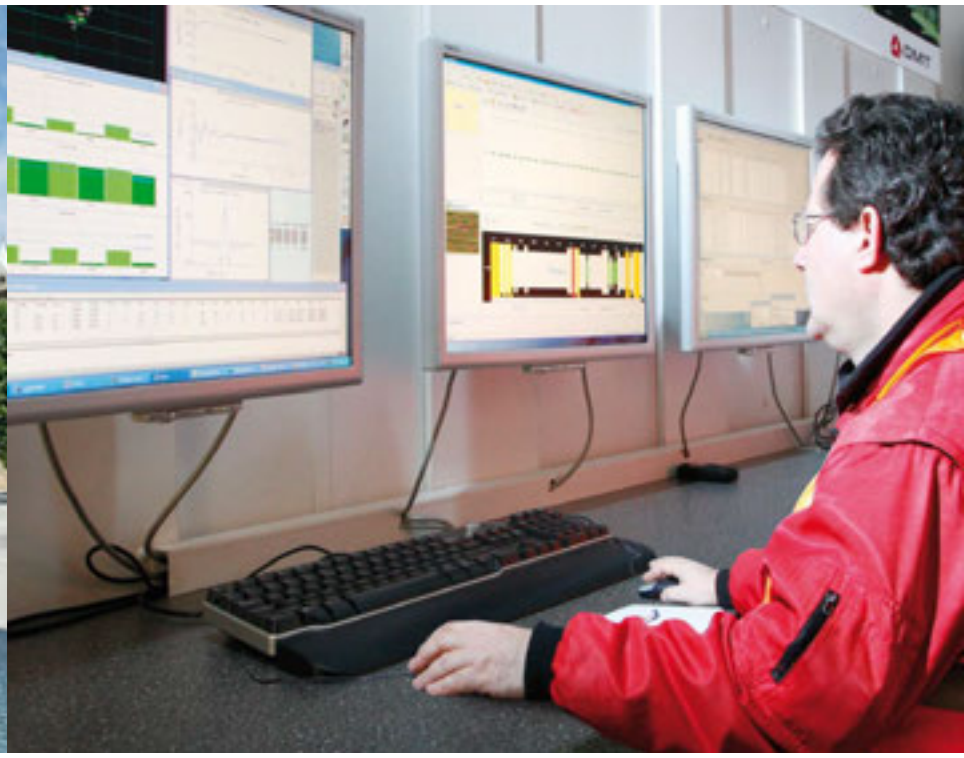
Explore The Difference!

Exploration Seismics



Add value to your prospects

The development of hydrocarbon reservoirs presents more and more of a challenge. However, it is often possible to gain decisive economic benefits already as early as during the exploration stage. Therefore, when carrying out a project, the basics of success are formed by precise planning, thorough investigation and the application of an interdisciplinary approach. After all, investing in know-how and quality at an early stage yields a long-term gain in efficiency and performance.

Seismic exploration services from A to Z

DMT stands for expertise and high quality services. For over 100 years, we have been in the business of exploration for natural ressources. This experience lets us always carry out everything technically possible to satisfy our customers' needs. As a matter of fact, we do all that we can to ensure that our customers have access to the latest and most efficient technologies. This results in projects becoming more economical and safer.

Of course, this also applies to our Seismic Exploration Services. For more than ten years, our team of interdisciplinary engineers, boasting considerable specialist exper-tise, has been operating internationally, applying the most up-to-date equipment. This enables us to offer our customers a comprehensive range of services in all aspects of seismic exploration. Under one roof all of that is provided by a single company delivering the highest quality. Discover DMT and our innovative project-related exploration!

Planning

Preparing the equipment

Line planning

Detail planning for protected areas

Basic framework

- 2D or 3D exploration
- Depth and required resolution of the exploration target
- Geological/geophysical characteristics of the survey area
- Surface conditions
- Topography
- Surface and subsurface infrastructure
- Ecological, archaeological, structural and seasonal restrictions

Survey design and permitting

Depending on what is required, we can provide either an entire exploration package or just specific parts of it. The preliminary work in the run-up to seismic data acquisition is divided into two parts:

Survey design

To achieve a final product of the best quality and, at the same time, with the greatest possible cost-effectiveness we take into account all the parameters that could influence a survey.

Using the OMNI™ Seismic Image Software (SIS) an analysis can - amongst other things - provide the necessary acquisition parameters, such as the number of recording channels, how they are best arranged in the field, and the optimum application of the various seismic sources.

Permitting

When permitting is required we support your efforts in dealing with the public authorities and administration offices. Our experience comes in usefully, in particular when special areas are involved such as landscape conservation areas, nature reserves and water protection areas. At the same time, we assist you in arranging access permission with various landowners. Permitting is done hand in hand with the surveying work and all relevant data are regularly entered into our database.

Shallow water seismics in Kurdistan

Acquisition

Seismic on Ethiopian salt pan

Urban survey

Transition Zone (TZ)

Shallow water seismics

The right vibro technology whatever the task

We supply valuable basics

DMT's seismic exploration combined with up-to-date computer-aided interpretation, for instance interactive 3D interpretation, optimises the planning of drilling and increases the reliability and success of your projects. DMT has suitably qualified employees as well as the best possible equipment for carrying out any project you may have.

Seismic Surveying

Our surveying is DGPS supported and performed by putting into action the most up-to-date recording instruments and interpretation techniques. The latest Leica and Trimble equipment is used for surveying work. Calculations, quality control, data management and display are carried out applying programs of the GPSeismic™ suite and DMT's Seismic Information Management System (SIMS).

Recording

For data acquisition we use internationally established instruments: Sercel 428/408, Unite, and SUMMIT – a DMT in-house development. This equipment puts us in a position to cover efficiently large survey areas or to carry out high-resolution seismic surveys with a large number of channels.

Sources

For investigating the subsurface conditions of potential hydrocarbon reservoirs we carry out our surveys using the most appropriate seismic source. The bandwidths applied range from the high frequency MiniVib with a peak force of 7000 lbf to the UniVib with 26000 lbf and up to the AHV-IV Vibro with a peak force of 61800 lbf. In addition, our specialists also apply explosive seismic sources and wave generation using accelerated weight drops to achieve the best results in every situation whatever the ground surface conditions are like.

Vibro in the desert

Acquisition

GPS survey for line determination

Seismic in the African savanna

Overview of exploration seismic services

- 2D, 3D and 4D reflection seismics
- Refraction seismics
- 3-component (3C) recording
- Onshore seismics independent of surface conditions
- Shallow-water seismics (TZ) in water depths up to 100 m
- Vertical seismic profiling (VSP)

Supplying you with even more valuable basics

Transition zone and shallow marine surveys and other techniques
Besides surveying on land, DMT is also well equipped for performing shallow-water seismic operations in water depths up to 100 metres. For these surveys we use our own special boats whose airguns are appropriately adapted to suit the frequency spectrum and output power required in each case. Moreover, our teams have expertise in other geophysical techniques such as gravimetry, aerial electromagnetics (airborne EM), vertical surveys in boreholes (VSP), magnetic surveying (TDM) and so on.

In-field quality control and processing
Along with constant monitoring of the employed acquisition systems, the quality of registered data is also constantly surveyed and recorded. In case the established tolerances are exceeded, the measurements can be repeated.

This guarantees that you get the highest data quality throughout. Your benefit is quality that can be verified at any time. Besides the constant quality control in the survey truck, further final control is made during field processing. Systems such as ProMAX™, OMNI™ and GPSeismic™ are employed for this.

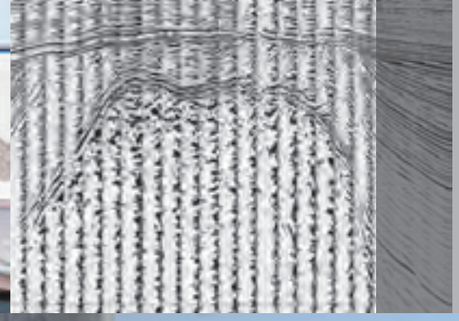
QHSE control and assurance
We have developed our own Quality, Health, Safety and Environment Management System (QHSE MS) based on the guidelines of the international standards ISO 14001 and OHSAS 18001. Our QHSE MS is SCC certified ("Safety Certificate Contractors") and is subjected to an annual internal audit to ensure it functions properly and is verified by an external accredited organisation.

Quality, Health, Safety and Environment are integral parts of how we think and act.

Processing centre

Processing

In-field processing



Seismic section of a salt dome

Overview of the techniques

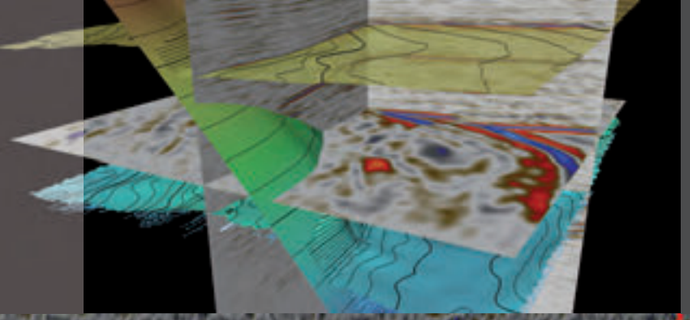
- Standard 2D and 3D processing of new and old data
- Reliable static corrections
- Multiple attenuation
- CRS – Common Reflection Surface technology
- Prestack time migration
- Creation of geological models and prestack depth migration
- AVO
- Acoustic and elastic inversion
- Multi-component processing

Seismic data processing

A significant step in the overall procedure of an exploration project is the processing of the seismic data. Our experienced geophysicists supply you not only with individual solutions, but also optimal results.

Thanks to more than 30 years of experience we can offer solutions whatever the challenge. Regardless of whether it's 2D or 3D, poststack or prestack imaging, the time or depth domain, our team works to a standard that satisfies the high quality demanded by the industry.

DMT and Petrologic only use equipment that is fitted with modern hard- and software. This way, we can ensure that the huge quantities of data are efficiently processed by state of the art programs on Linux clusters.

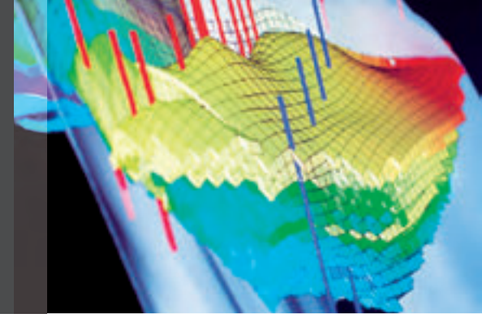


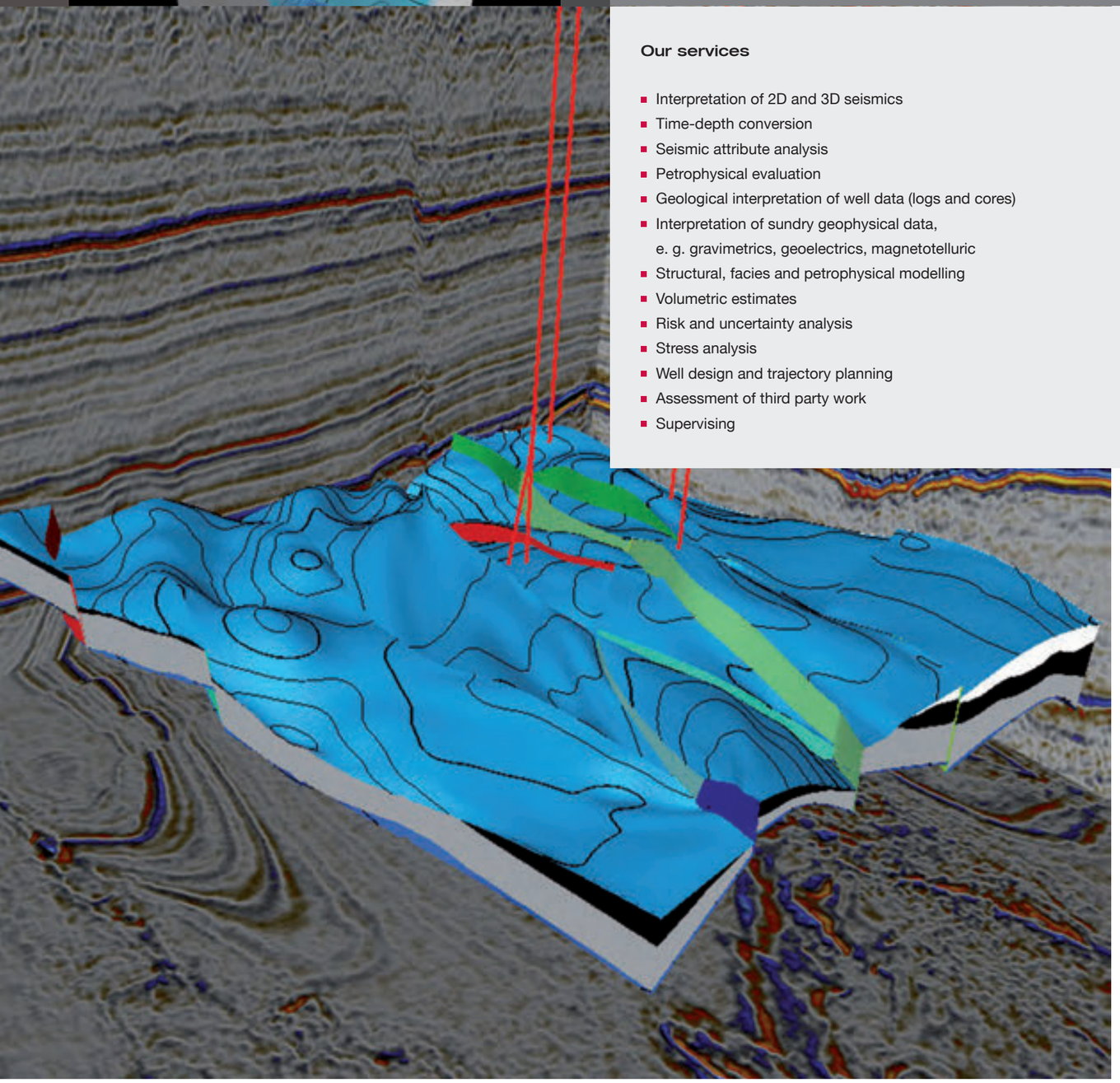
Seismic
interpretation

Interpretation and Modelling

Interactive
interpretation
with Petrel®

Geological
block modell





Our services

- Interpretation of 2D and 3D seismics
- Time-depth conversion
- Seismic attribute analysis
- Petrophysical evaluation
- Geological interpretation of well data (logs and cores)
- Interpretation of sundry geophysical data, e. g. gravimetrics, geoelectrics, magnetotelluric
- Structural, facies and petrophysical modelling
- Volumetric estimates
- Risk and uncertainty analysis
- Stress analysis
- Well design and trajectory planning
- Assessment of third party work
- Supervising

Visualising complex situations

Combining geophysical and geological information makes it possible to create accurate 3D subsurface models. Data obtained from a range of exploration methods such as geophysical surveys (seismics, gravimetrics, geoelectrics, well-logs and so on), drilling and remote sensing can be integrated into a single data model.

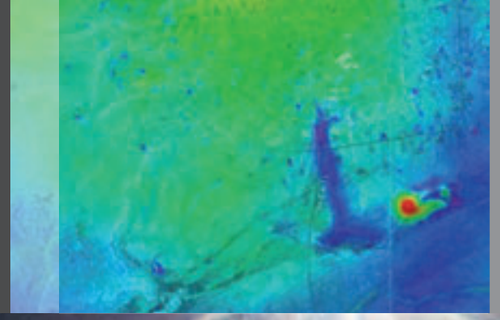
The 3D approach allows us to visualise, analyse and interpret even very complex structural and depositional situations in a consistent way.

A comprehensive picture of the underground reduces uncertainties and, consequently, supports the geologist's task.

Very detailed models describe the overall structure and the spatial distribution of reservoir properties, e. g. porosity, permeability and fracturing.

They provide a sound basis for subsequent well planning, reservoir simulation and field development.

For more than 15 years, our highly skilled team has been preparing 3D models for conventional as well as unconventional hydrocarbon exploration, appraisal and development. We mainly apply Petrel® and GOCAD®, both well recognized as highly efficient software packages.

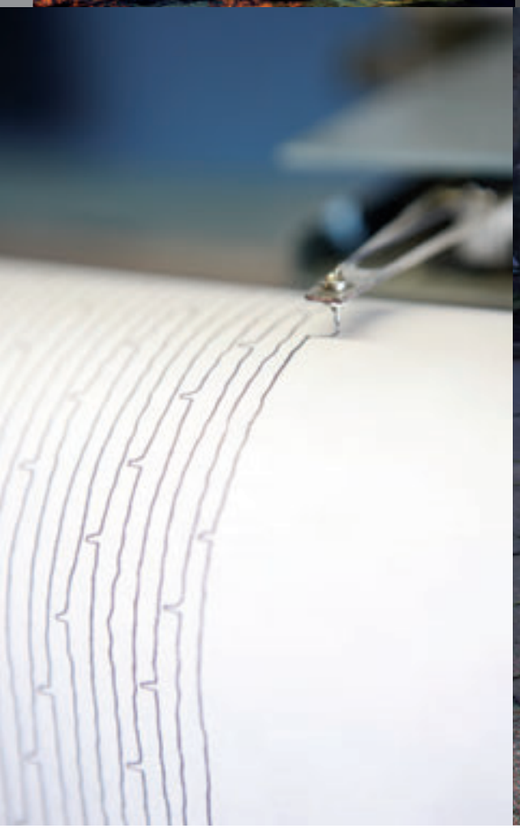


GPS monitoring of platforms

Subsidence measured via satellite borne laserinterferometry

Beyond Seismics

GPR measurement to explore ground water



Beyond seismics

Besides exploration seismics, DMT applies a broad range of other investigative methods to acquire quantitative and qualitative information on resource deposits. Whatever the target – whether it's high resolution near-surface information or data from deep down – we have the right equipment and know-how to carry out exactly the service you need.

Not only do we carry out surveys to accompany up-hole measurements and vertical seismic profiling which can be performed using various seismic sources, but we also have the technical expertise in all other types of geophysical techniques: magnetics, electromagnetics, electrics and radar methods – ground based as well as airborne. In fact, our strength and also the benefits for our customers lie above all in the combination of different techniques.

During our more than 100 years of experience in geo-monitoring, we have provided for instance a surveillance network in Northern Germany for an oilfield monitoring project headed by Exxon. There are also position and inclination recording systems on Total's oil drilling and production platforms in the North Sea as well as off the coast of Myanmar. We are furthermore actively involved with systems for monitoring hydraulic stimulation.

Ever since the pioneer Ludger Mintrop developed the technique and equipment for using seismic waves to investigate mineral deposits, we have been evolving and building innovative geophysical, geotechnical and geodetic surveying systems for special applications.

Seismic exploration in Unterhaching (D), St. Gallen (CH), and Jeddah (SA)

References

Our services

- Borehole Surveys
- Exploration Geology
- Exploration Geophysics
- Exploration Seismics
- Engineering Geomeasurement Systems
- Gas Emission and Utilisation
- Geomonitoring
- Hydrogeology & Water Management
- Engineering Geophysics
- Special-Purpose Geosurvey

Seismic ground investigation in Jeddah

Selected references around the World

Make your projects a success

The best results for science and business: DMT is both a reliable and flexible partner when it comes to acquiring seismic data for the exploration of natural ressources – whatever the conditions. Our references speak for themselves. We would be more than happy to serve you and to make your projects as rewarding as possible for you and your customers.

A selection of our worldwide exploration customers:

Addax Petroleum Ltd. | AET | ANDRA | Akzo Nobel nv | BG Group plc | DNO International ASA | Dove Energy Group Ltd | earthsolution SA | Endesa SA | Enel S.p.A. | Endesa SA | E.ON AG | European Gas Ltd | ExxonMobil | Forum Energy s.r.o. | Gazprom Germania GmbH | Gdf Suez | Geisum Oil Co. | GERD Ltd. | Geotec SpA | INA-Industrija nafte | Interoil E&P ASA | Mag Industries International Inc | Mahan Glob Co. | Megatron NVK LLC | NAM BV | N.I.O.C. | Oil and Gas Skills S.A. | OMV Aktiengesellschaft | OMV Petrom S.A. | ONGC | PDO LLC | PNYG: GULF LLC | RAG Hungary Kft | Rhein Petroleum GmbH | Rohöl-Aufsuchungs AG | RWE Gas Storage s r.o. | RWE Dea AG | Saudi Aramco | ShaMaran Petroleum Corp. | Schlumberger Ltd | SHELL BV | Statoil ASA | Tasbulat Oil Corp | The Dow Chemical Company | Total S.A. | Tractebel BV | TTOPCO Ltd. | Vattenfall A/S | VEBA Oil Ops | VITO NV | Wintershall AG

Regular management review of QHSE performance

Safety First: Tool-Box meeting in the morning

Special training and equipment for exceptional challenges

QHSE

Excerpt from the DMT QHSE policy statement

Within the framework of the QHSE (Quality, Health, Safety, Environment) policy statement, DMT is committed to providing high quality services and, at the same time, to doing the utmost to protect its personnel and the environment in which we live and work. Accordingly, improving the quality of our services as well as the health and safety of our employees, customers, contractors and any third party plus, moreover, protecting the environment are integral parts of DMT's daily operations.

As part of our efforts to achieve these ambitious goals DMT has put systems in place to improve the quality of our services, identify hazards as well as assess risks and set up appropriate measures to prevent them. A continuous audit and review programme by line management ensures the effectiveness of the DMT Management System – for the good of both mankind and the environment.

Four objectives of the QHSE Management System

Q as in **Quality**:
A clear organisation, structure and guidance for all personnel minimise the risk of incidents due to personnel not knowing how to perform their job.

H as in **Health**:
Measures to protect the health of all our personnel at the workplace minimise the risk of work-related illnesses and disabilities.

S as in **Safety**:
A safe working environment minimises any hazardous incidents that could lead to personal injury or death.

E as in **Environment**:
Operating in an environmentally responsible manner minimises the risk of environmental pollution, irreversible damage and the loss of natural biotopes.

Elements of our QHSE Management System

DMT uses a top-down approach ranging from institutional level to our separate departments and down to the single workplace. Our QHSE system consists of seven elements. A committed leadership and a clear distribution of roles and responsibilities are supplemented by a thorough evaluation and risk management. Further elements comprise planning, implementation, monitoring and concluding audits and reviews.

Certificates of our QHSE system

The QHSE management system is based on the following international standards:

- ISO 9001 – Quality Management
- ISO 14001 – Environmental Management
- OHSAS 18001 – Occupational Health and Safety Management

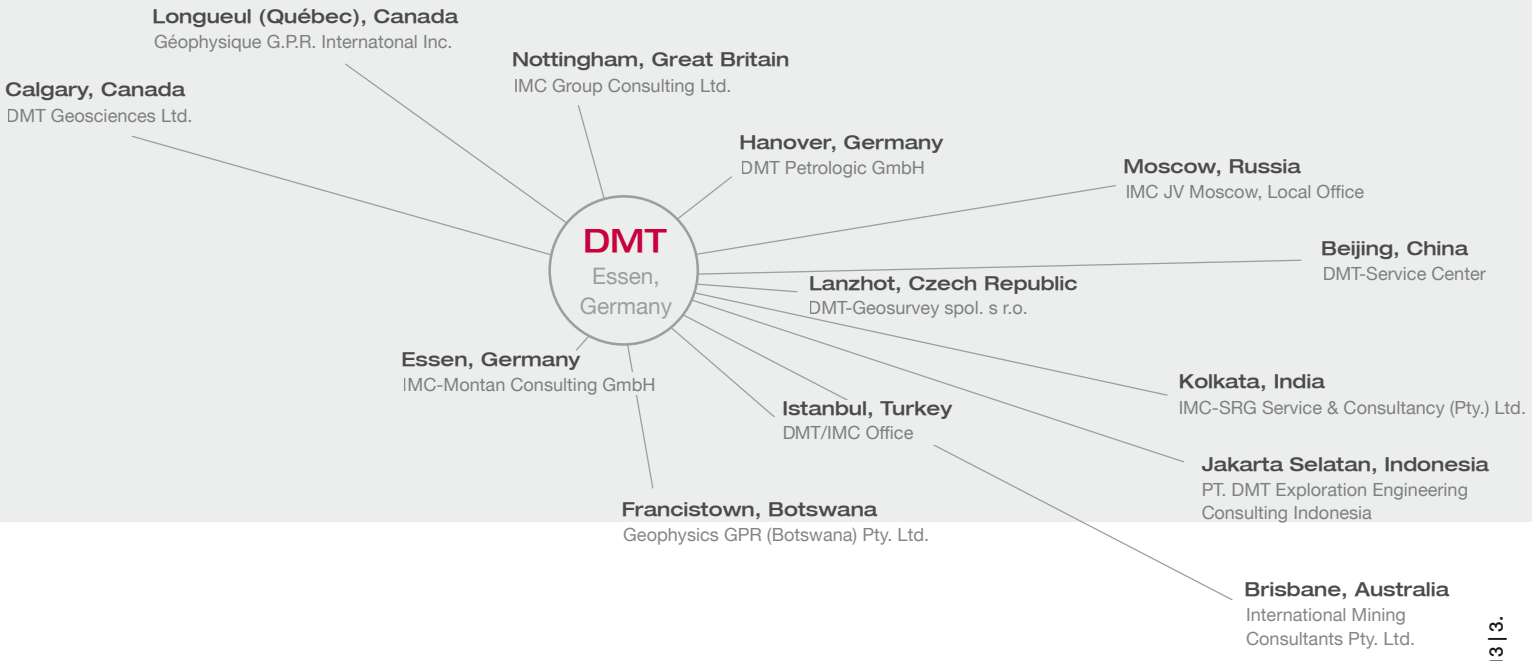
Moreover various guideline documents of the following industry-specific bodies were referred to:

- OGP – International Association of Oil and Gas Producers, London, UK & Houston, USA
- IAGC – International Association of Geophysical Contractors, Houston, USA

Your professional partner

DMT is a member of TÜV NORD Group and represents the business unit of natural ressources as a brand. Once DMT is your partner, an internationally operating, independent engineering and consulting company stands by your side that focuses on the investigation and exploration of these natural ressources, its mining and coking plant engineering, building and infrastructure, product testing and building safety as well as industrial testing and measurement.

Global presence
Wherever you need us, we're there to help you. We'll advise you and accompany you all over the world. In the past, we have been able to provide our know-how, our manpower and our pool of equipment for diverse projects all over the globe, for instance on the Canadian oil sands, in the Columbian coalfields, the salt deposits of Ethiopia and on the building sites of Saudi Arabia. We have been continually developing our portfolio of services to such an extent that DMT is nowadays recognised as a leading international, independent consulting company in the natural ressources sector and a reliable, proficient partner for operating companies, banks and private investors.



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