Remote Exploration of Mineral Deposits

ESTBRAND OU

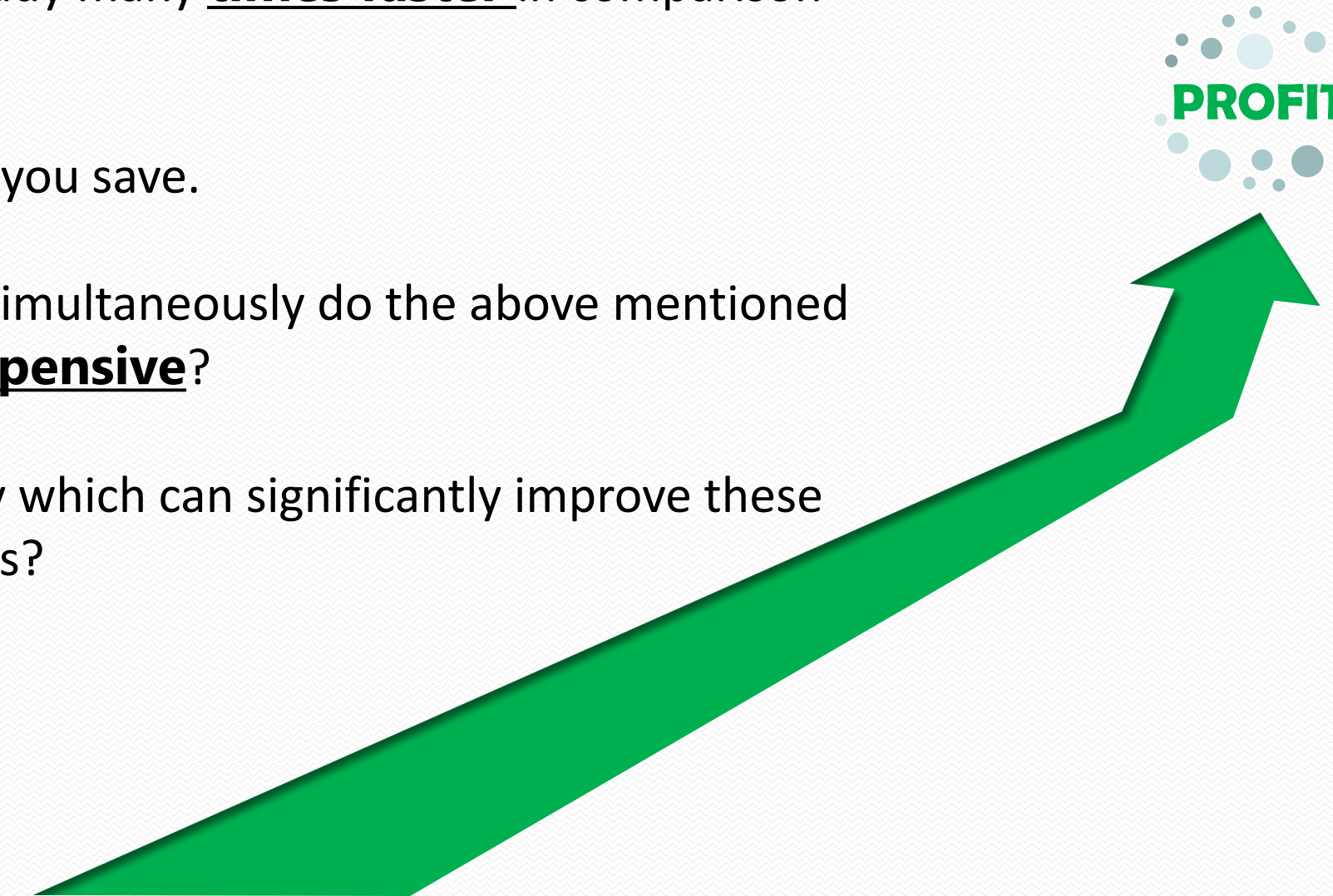
WHAT IF...

you can do your geophysical study many **times faster** in comparison with your traditional survey

Imagine **how much time** can you save.

But what do you say if we can simultaneously do the above mentioned survey up to **10 times less expensive**?

Who can compete technology which can significantly improve these two most important parameters?



WHY US?

Who we are?
We are a team of people who are keen in what we do.

What we can offer?
Rapid and effective solution: Innovative technology of geophysical survey

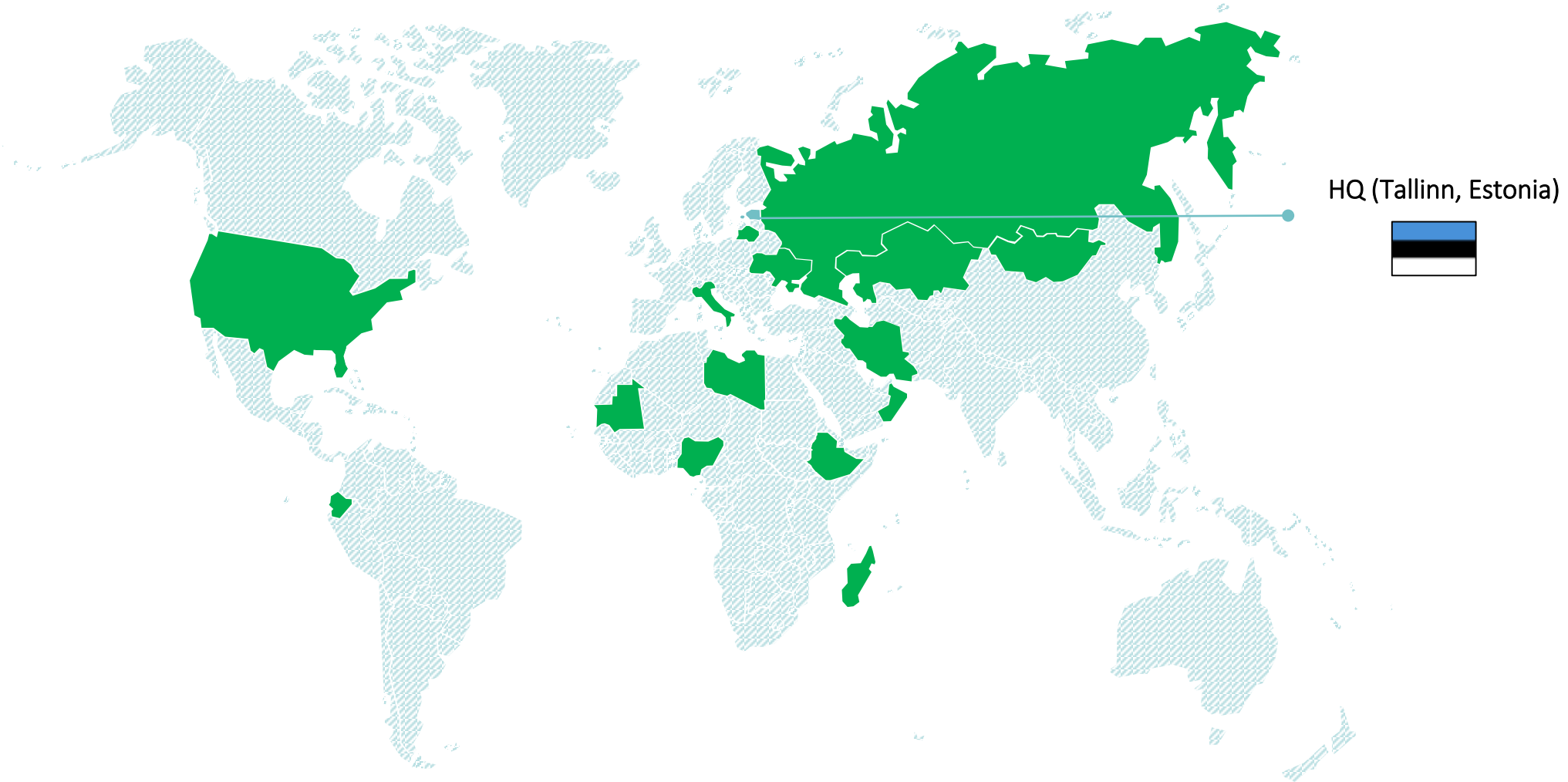
Where do we operate?
All over the world, inshore and offshore on the depth of up to 5000 m.

How do we do this?
Our method includes strong scientific bases. Main principles that we use are nuclear magnetic resonance (NMR) and remote sensing.

Why are we interested to you?
We can do the job times faster and times cheaper in comparison with conventional survey. We can survey up to 600000 sq.km per 1 year. No one can compete this.

MAP OF COMPLETED PROJECTS

(our own, partner and pilot projects)



Our company’s key indicators

- **60+ successful projects all over the world starting from 2017**
- **50+ highly experienced team members**
- **Eco-friendly approach**
- **We operate in hard geographical conditions**
- **We do the survey up to 5000 meters depth**
- **We provide our clients with 95%+ accuracy and efficiency**

Geophysical Exploration Technology

The technology is based on the principle of resonance, which allows directly identify and record the required mineral.

Technology classification of Nuclear Magnetic Resonance (NMR) and Remote diagnostics and sensing of the Earth (RDSE)

The "direct" method of prospecting and exploration of mineral deposits

↓

Nuclear magnetic resonance (NMR)

↓

Remote survey based on resonance processing of analogue infrared space imagery.

The technology involves NMR for remote inspection of territories, sites, and points. Therein, an operational research is performed for solid and liquid minerals (including hydrocarbons), underground freshwater and thermal waters on large and small areas of land and shelf.

Technology’s key pros

Territory:
without limitations (land and shelf)

Searched minerals:
oil, gas, water and other liquid and solid minerals

Survey area:
without limitations

Efficiency:
for hydrocarbons and water > 90%

Depths of research:
from 0 to 5000 m

Duration of the research stages:
up to 1 month

Environmental safety: the method is absolutely safe for people and the environment

3D Seismic Exploration VS RDSE

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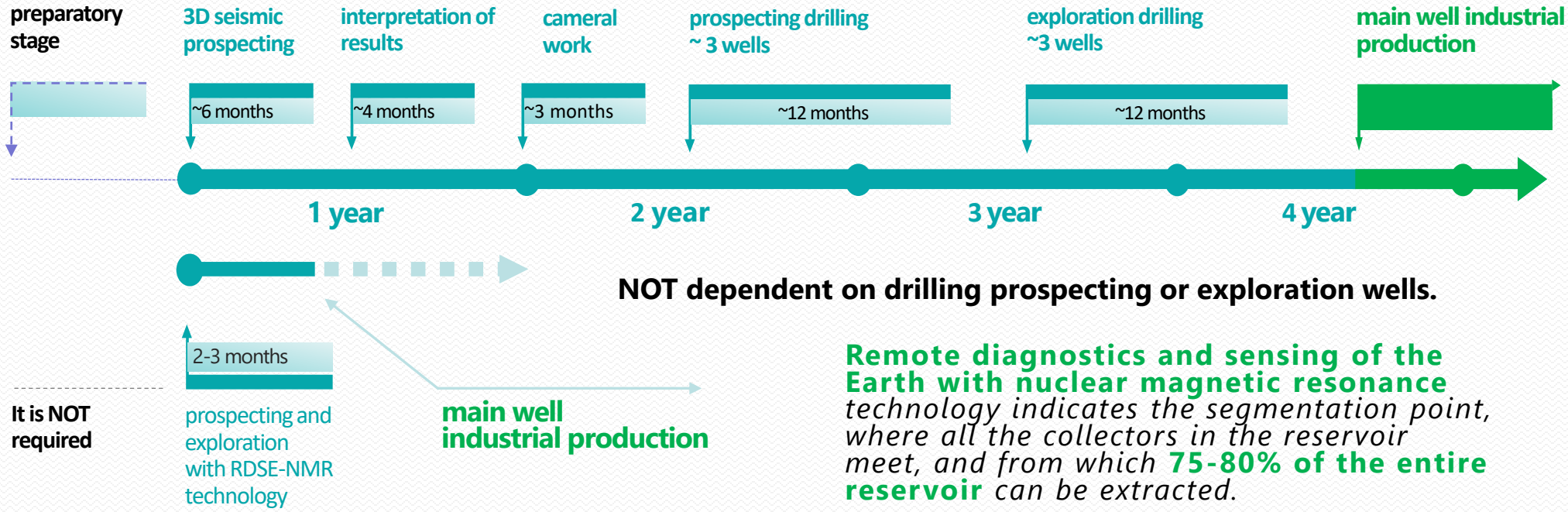
Timing comparison

Work and limitations:
- environmental impact assessments
- environmental deterioration due to equipment
- access permits
- restricted access according to climatic seasons

Exploratory wells:
- experimental or exploratory wells
- delimitation or appraisal wells
- non-productive (dry) wells

Discovery / development well (industrial well)

Advanced wells



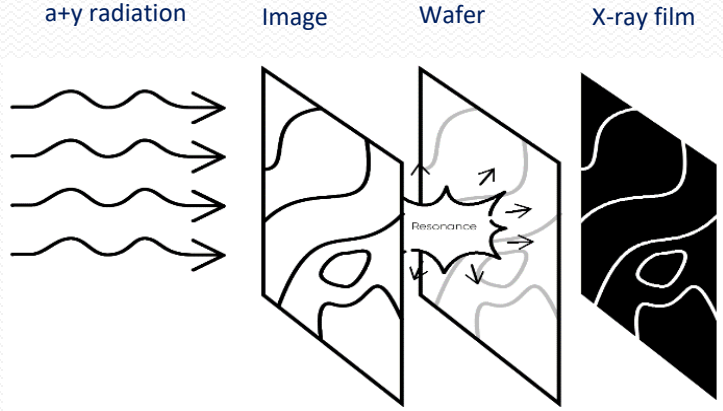
Remote diagnostics and sensing of the Earth with nuclear magnetic resonance *technology indicates the segmentation point, where all the collectors in the reservoir meet, and from which* **75-80% of the entire reservoir** *can be extracted.*

RDSE-NMR

Remote diagnostics and sensing of the Earth with nuclear magnetic resonance

RDSE: GENERAL IDEA

Previously, the spectrum of the desired substance is recorded on special test wafers.



Space images

Test wafers are used as a resonator in the radiation-chemical processing of analog satellite images of the territory obtained in the infrared spectrum.

The result - is a direct visualization of the ground contours of the deposits and its depth.

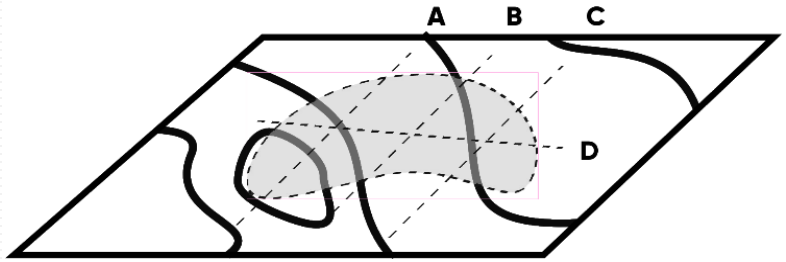
Ground expedition *(in certain cases)*

Point-to-point resonance sounding of the area:

Precise detailing of deposit contours, obtainment of longitudinal and cross sections.

Selection of optimal drilling points, calculation of prospective reserves.

Test wafers are used for spectral modulation of transmitter's radiation



RDSE: TECHNICAL PROCESSES

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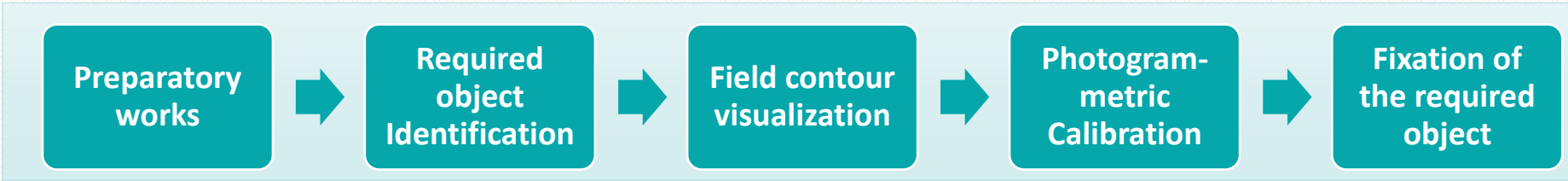
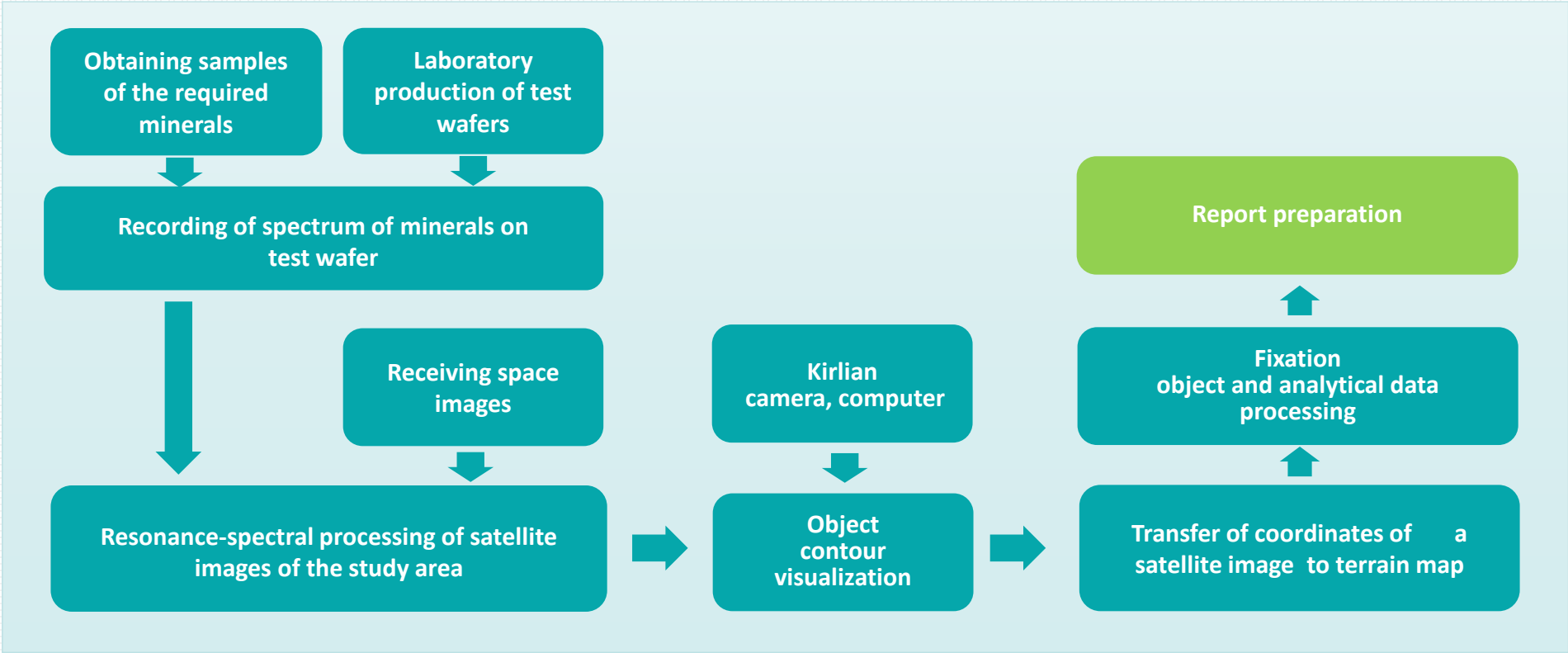
Generalized scheme



Technological scheme



Technological operations

1	**Preparatory works** Order and obtaining of aerospace photographs of the surveyed territory and ultra-pure chemical agents. Laboratory manufacture of test gel- wafers. Registration of electromagnetic spectrum of the required mineral on test wafers.
2	**Object identification** Spectral resonance processing of satellite images upon the availability of test wafers in accordance with the patented technology. Chemical processing of X-ray films after NMR.
3	**Interpretation of object Contours** Visualization of the contours of identified objects with the Kirlian camera. Obtaining a digital 2D image of the objects.
4	**Photogrammetric calibration** of digital image of the object (geographic reference of the image's points and the surveyed area).
5	**Object fixation:** definition of its size, form and location on the area. Transfer of the contours of an object to geographical map.
6	**Analytical data processing** to obtain 3D parameters of the reservoir and the calculation of predicted reserves .
7	**Preparation of the report** and providing it to the Customer.

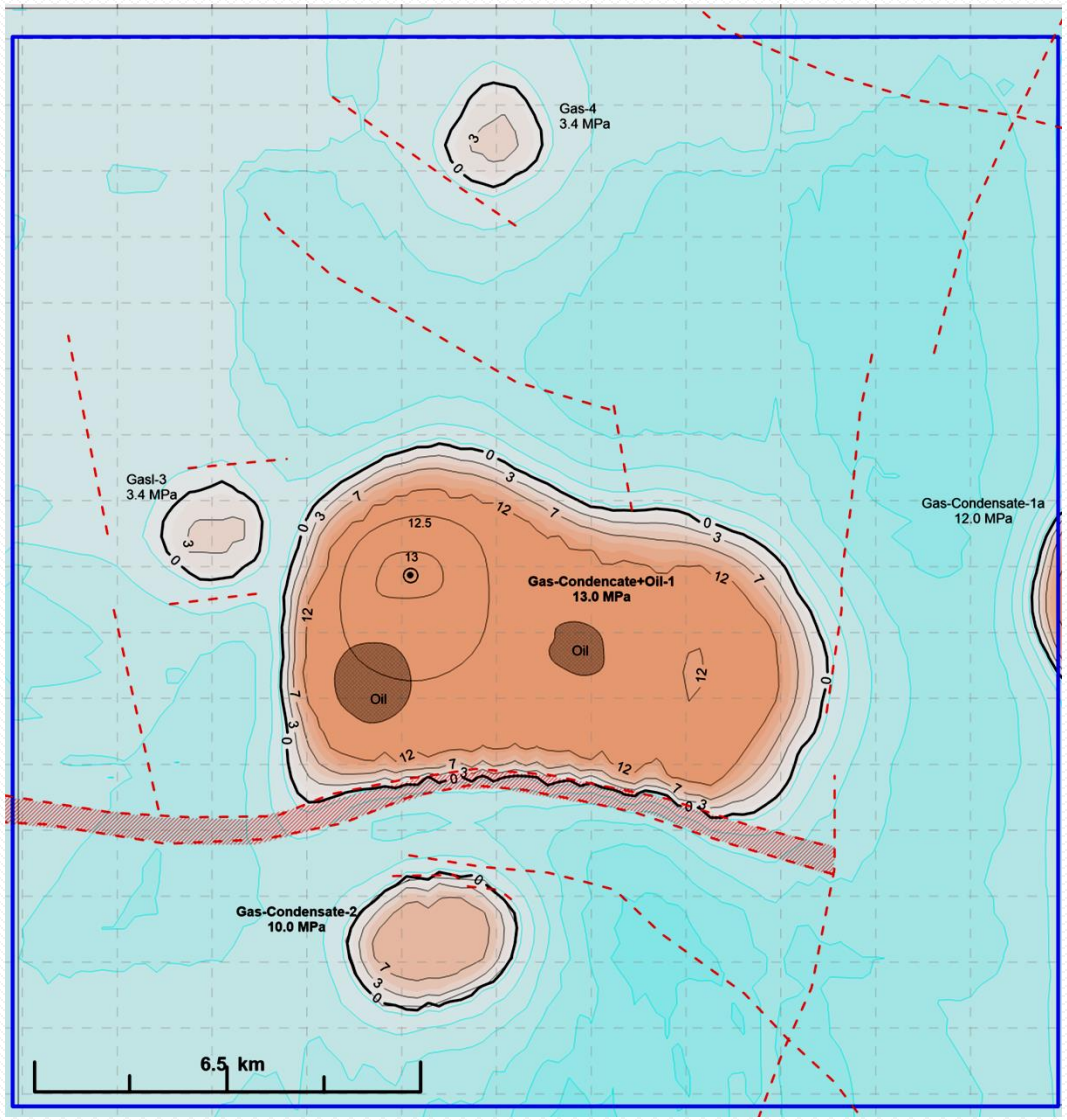
Area Survey: Regional Stage

Square of survey areas may vary from 50 up to tens of thousands square kilometers.

Duration of works: within 1 month

As a result of the survey we get the following data:

- ground contours of the identified deposits;
- isolines of signals response rate;
- contours of fault zones;
- zones and points of maximum signal responses;
- maximum gas pressure in the horizons.



Detailed remote survey of deposits (3D)

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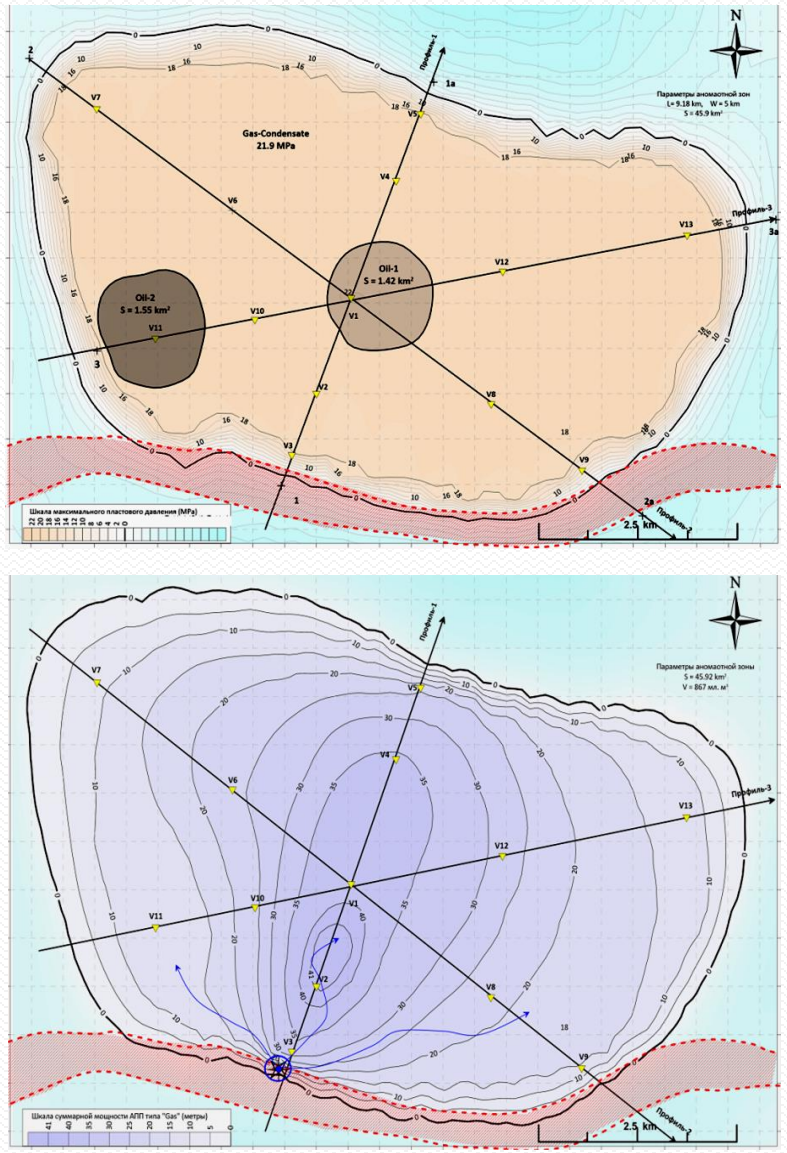
Survey Areas may range from 50 up to hundreds square km.

Duration of work: within 1 month.

As a result of the survey we get the following data:

- updated ground contours of deposits and fault zones;
- zones and perspective points for drilling wells;
- the number of horizons, its thickness and depth;
- the presence of gas caps, its pressure;
- longitudinal and cross-sectional plans of deposits, 3D model;
- predicted reserves of the deposit.



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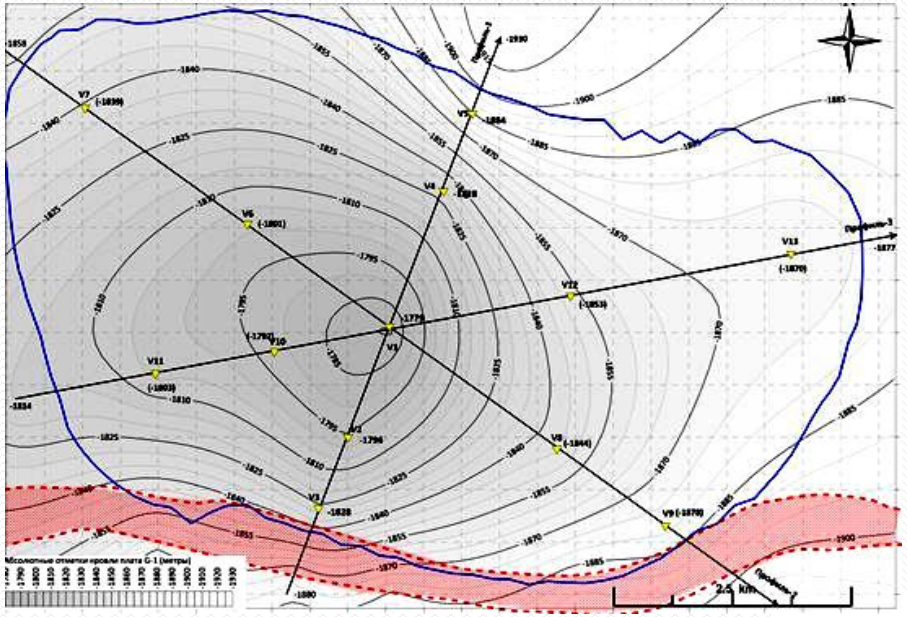

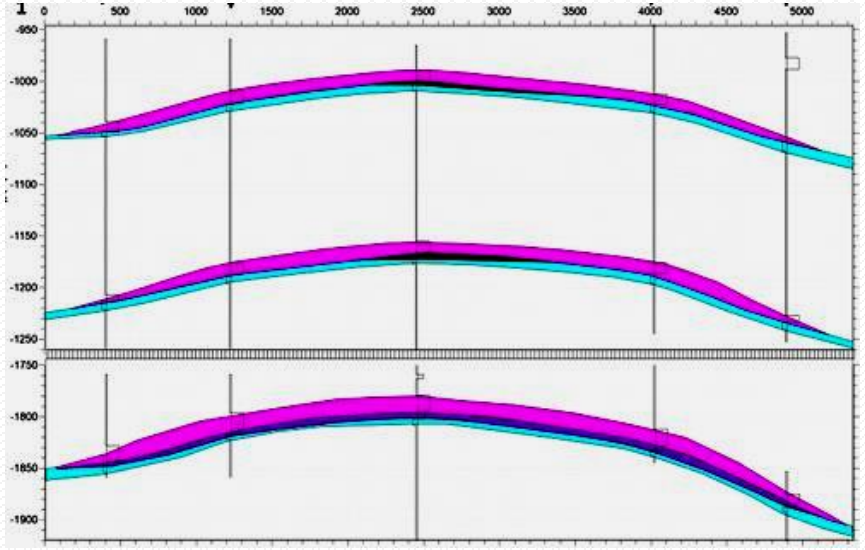

Figure 1. Structural map where black lines stand for longitudinal and cross-section of deposits.

Figure 2. One of longitudinal sections of deposits.

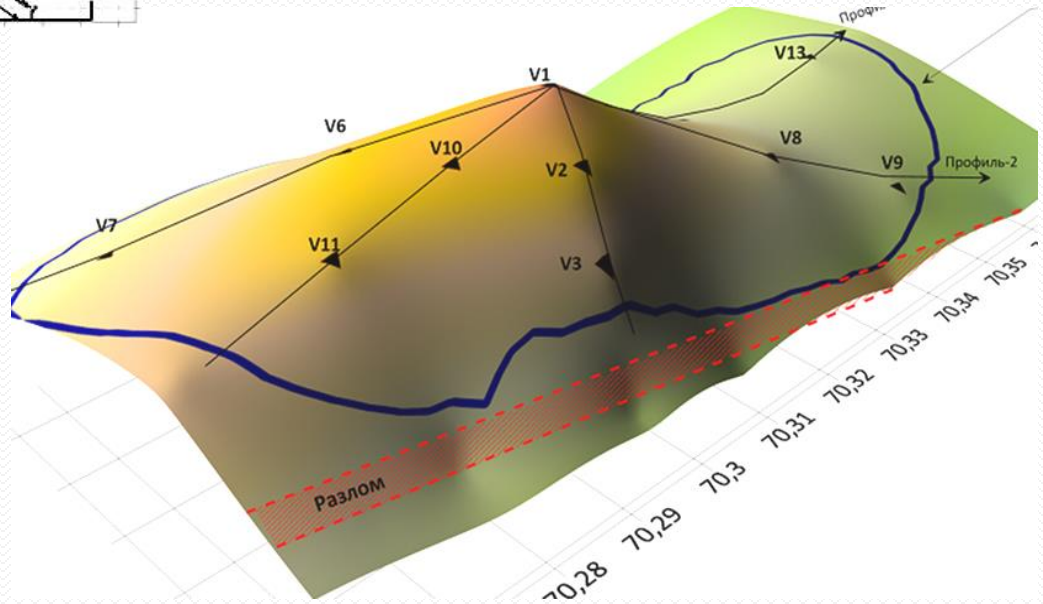

Figure 3. 3D gas horizon model.

Remote survey of drilling points

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Survey area - several square kilometers.

Duration of works: 3-4 weeks

As a result of the survey we get the following data:

- presence or absence of hydrocarbons at a datum mark;
- ground reservoir boundary;
- zones and points of maximum signal responses;
- the number of horizons at drilling point, its thickness, and depth of occurrence;
- the presence of gas caps and its pressure;
- contours of the nearest deposits in case of a "dry" drilling point.

Example of detected horizons (crude oil+gas)

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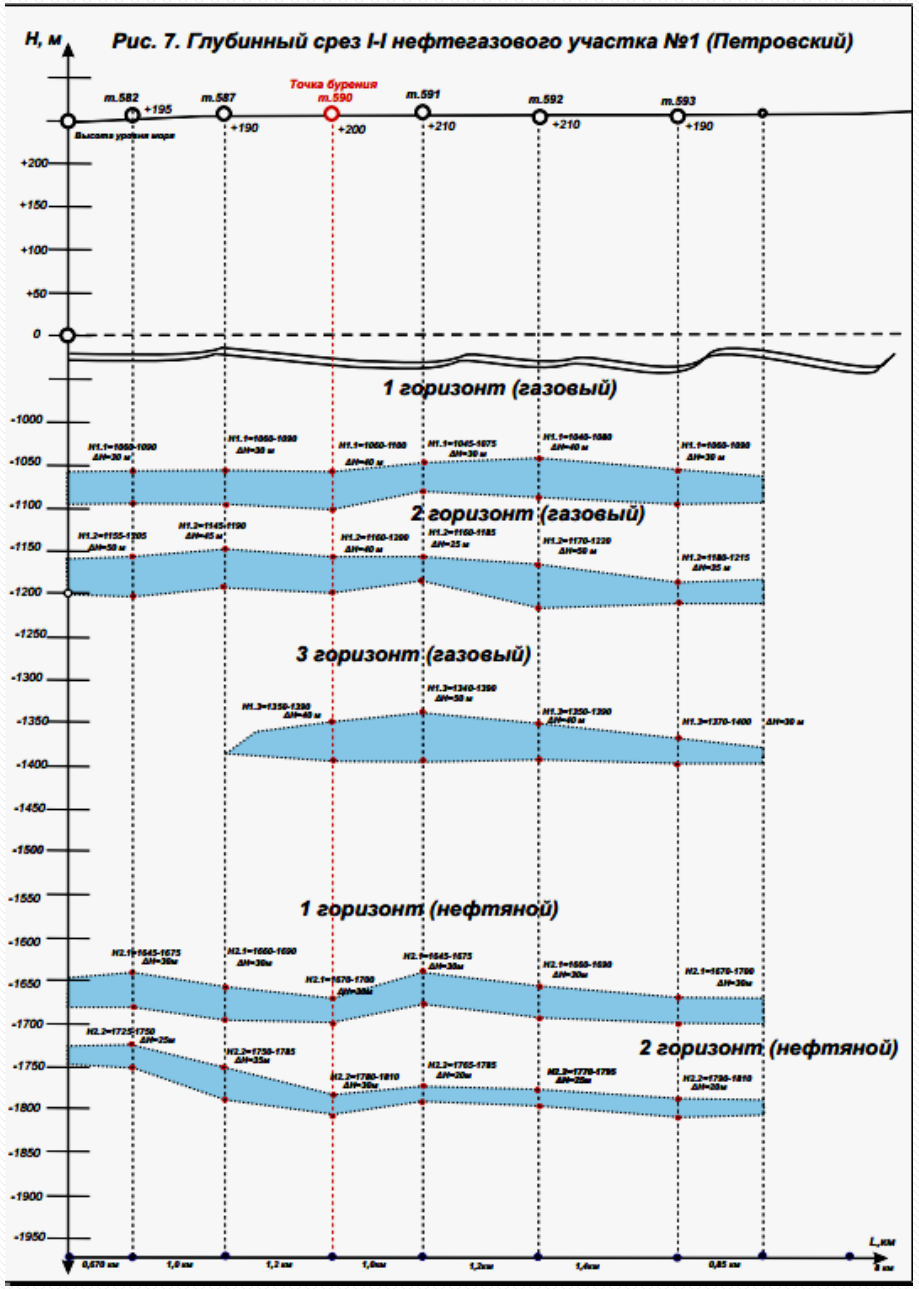
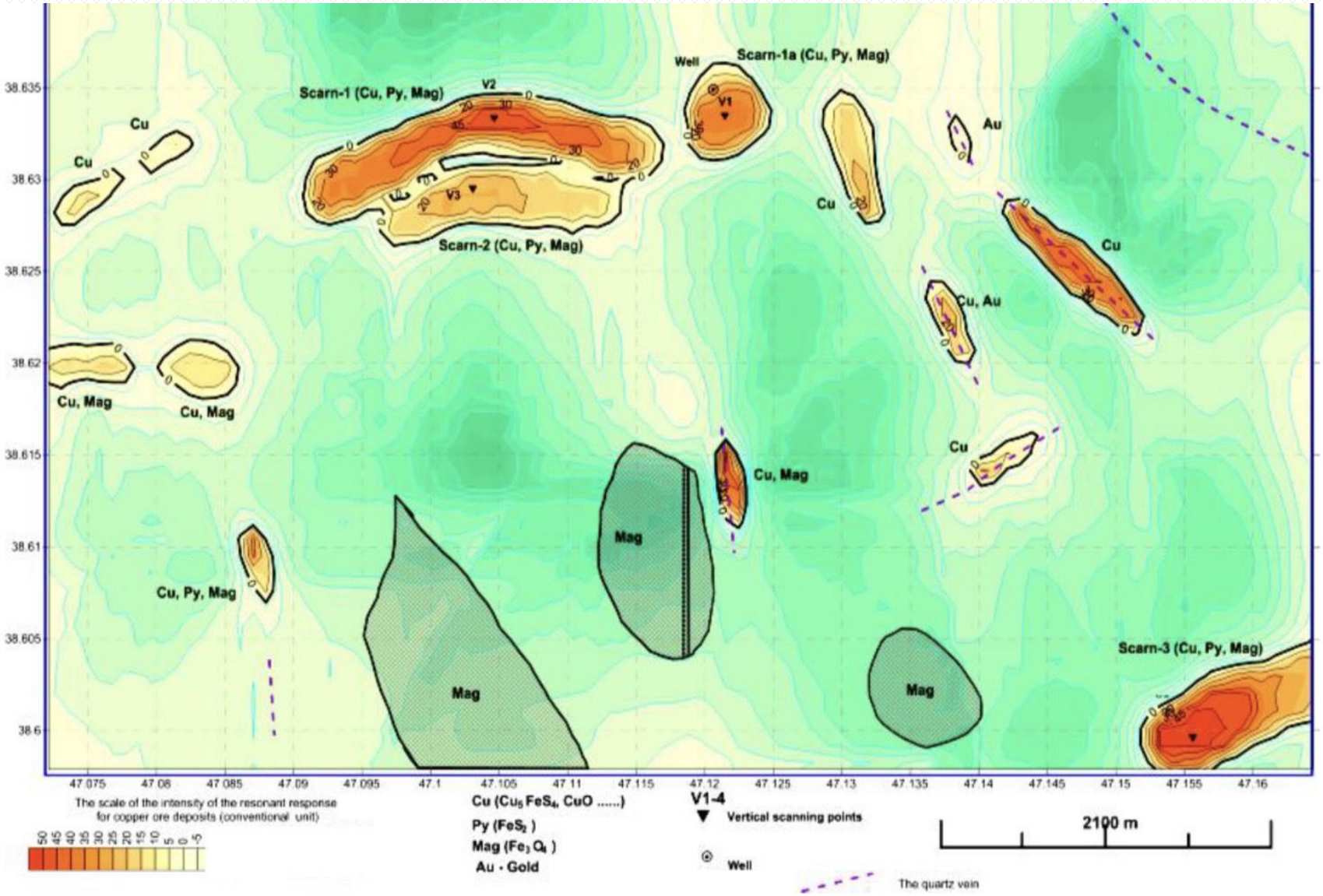


Example of detected horizons (copper ore)



Example of detected horizons (depth and thickness)

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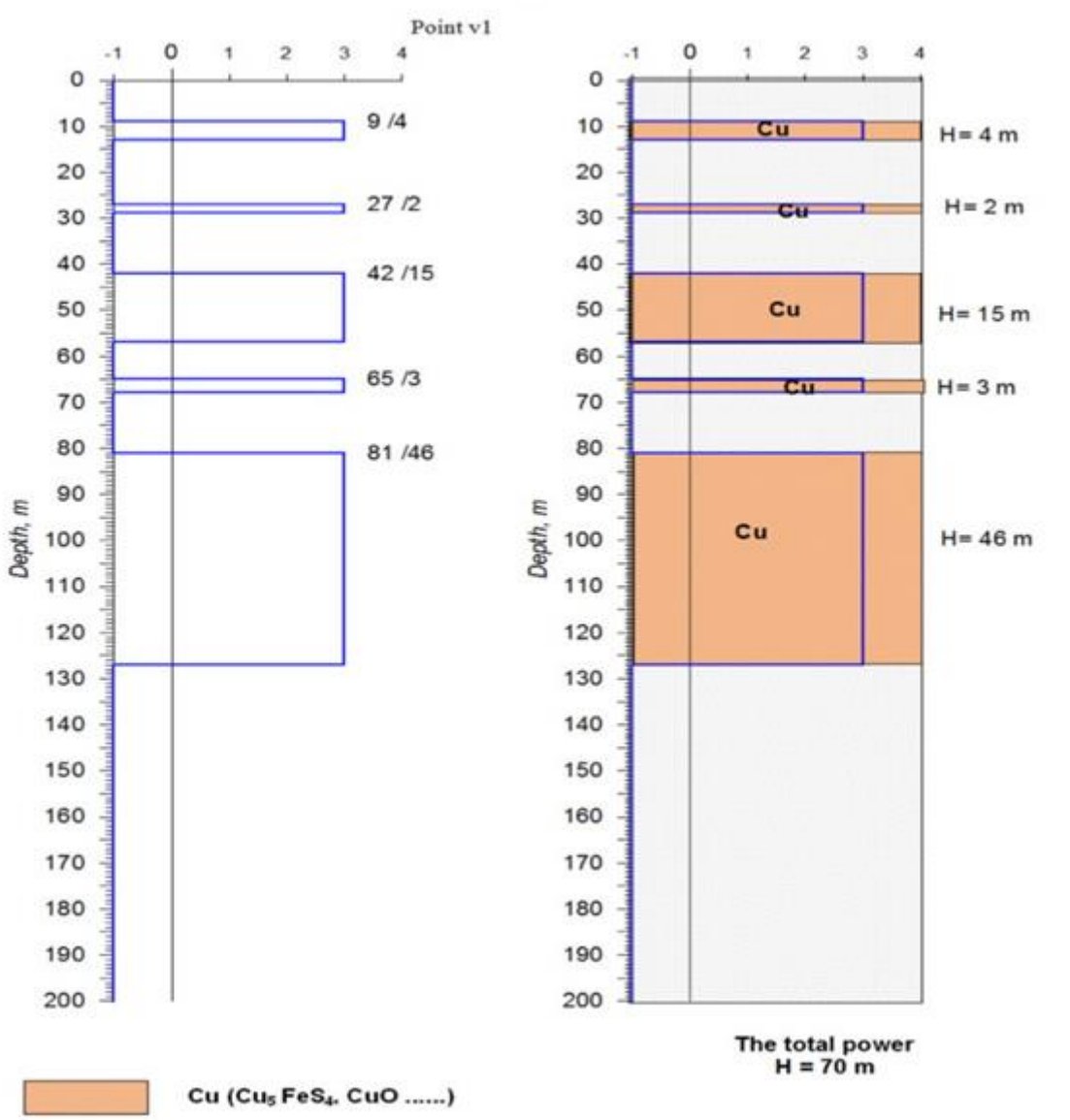
The results of the vertical scanning at the point V1.Abnormal skarn zone 1a



Remote survey of drilling points

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Comparative efficiency in hydrocarbon example

Method	Executable jobs	Results (for an area of ~1000 sq. km)		
		Efficiency	Duration	Average number of mining wells
Conventional methods	Spatial survey Geological survey Geophysical survey Prospecting drilling	30 - 40 %	1 – 2 years	6
Technology RDSE-NMR	Remote diagnostics and sensing of the Earth with nuclear magnetic resonance	> 90 %	2 months	1

Comparative characteristics with 3D Seismic

	Parameters	3D-Seismic	RDSE
1	Topographical adjustment	+ (geophysical anomaly)	+
2	Construction of 3D models of objects	+ (geophysical anomaly)	+
3	Search of unstructured oil and gas traps	-	+
4	Detection of gas caps in oil-bearing horizons	-	+
5	Detection of gas pressure in gas caps	-	+
6	Detection of oil mobility presence	-	+
7	Detection of water horizons over oil and gas reservoirs	-	+
8	Working in any climatic and geological zone	-	+
9	Detection of deposits in the regional stages of the works	-	+

Technology patents and tests

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Testing in the USA at 5 wells showed 100% effectiveness and 95% accuracy for depths of horizons

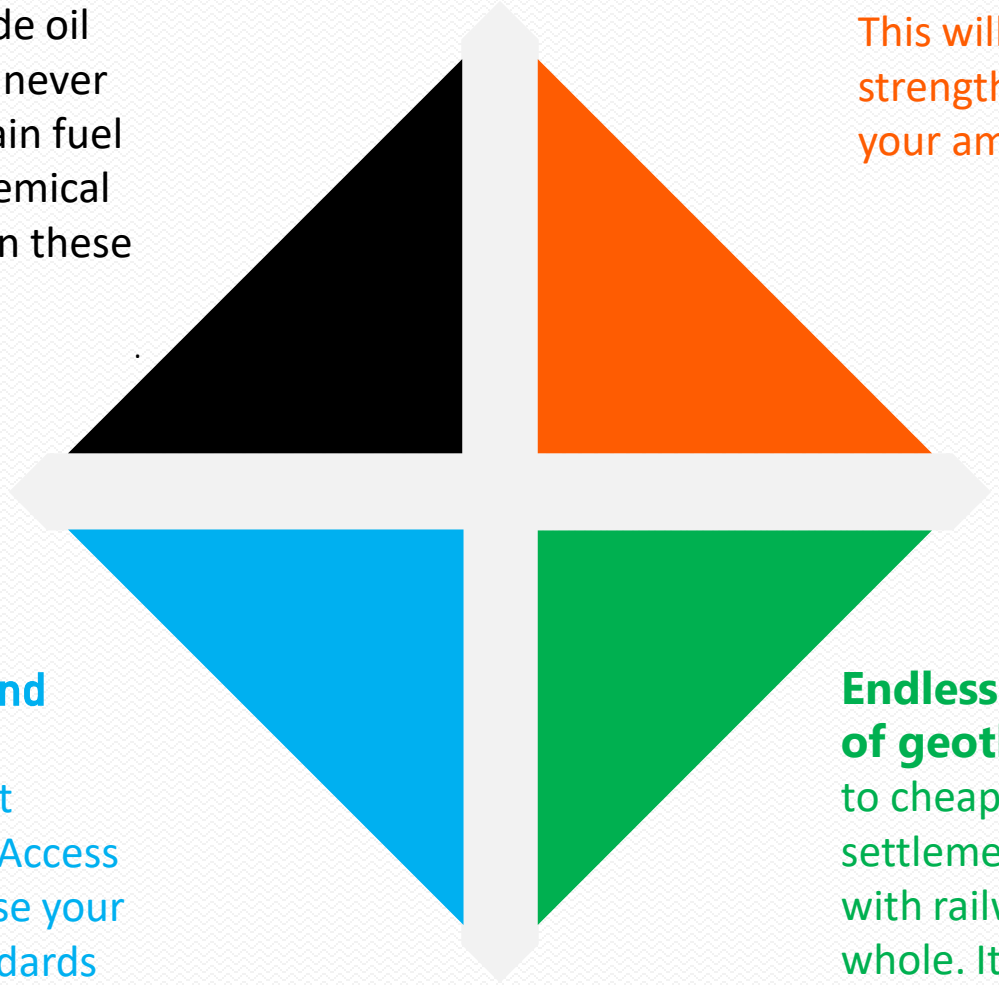
InterEcoForum 2019

The 1st prize for the best technology for water exploration – an a figure of honor the "Crystal drop of water"

http://interecoforum.org/

FUTURE: 4 PARTS FOR PROSPERITY

FUEL: Map of hydrocarbons deposits. We can discover new deposits of crude oil and natural gas so that your land will never be exhausted. Despite of usage as main fuel for engines and resource for petrochemical industry mankind is still dependent on these traditional fuels.



INDUSTRY: map of solid minerals. This will serve as a strong base to strengthen your machinery and make your ambitious plan come true.

FRESHWATER: map of underground freshwater reservoirs. Freshwater is a substance you can not replace and you cannot live without. Access to freshwater can enormously increase your agricultural field as well as living standards of habitants who lives around.

Endless sources of GREEN ENERGY: map of geothermal hot springs. Having access to cheap energy you can build new settlements, connect existing and new ones with railways and organize infrastructure at a whole. It will be huge step to country development.