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Direct Detection Technology for Exploration and Delineation of Multiple, Stacked Hydrocarbon- Bearing Horizons and Shale Plays

Dr. Jim Combs

Chief Geophysicist

Oil and Gas Discoverer, LLC

SHALETECH™

Introduction and Background

- Demands for new economic hydrocarbon deposits are increasing worldwide and the urgent need to decrease costs and time for exploration as well as better define the footprint of hydrocarbons are critical environmental and economic issues.
- This is an excellent time to think outside the box and consider applying the unique, proprietary, environmentally benign, and space-based geophysical technology, i.e., the Direct Detection Technology of Oil and Gas Discoverer, LLC (“OGD”) to extend presently producing hydrocarbon reservoirs as well as better define the vertical and horizontal extent of hydrocarbon deposits and prospective drilling locations in frontier projects.

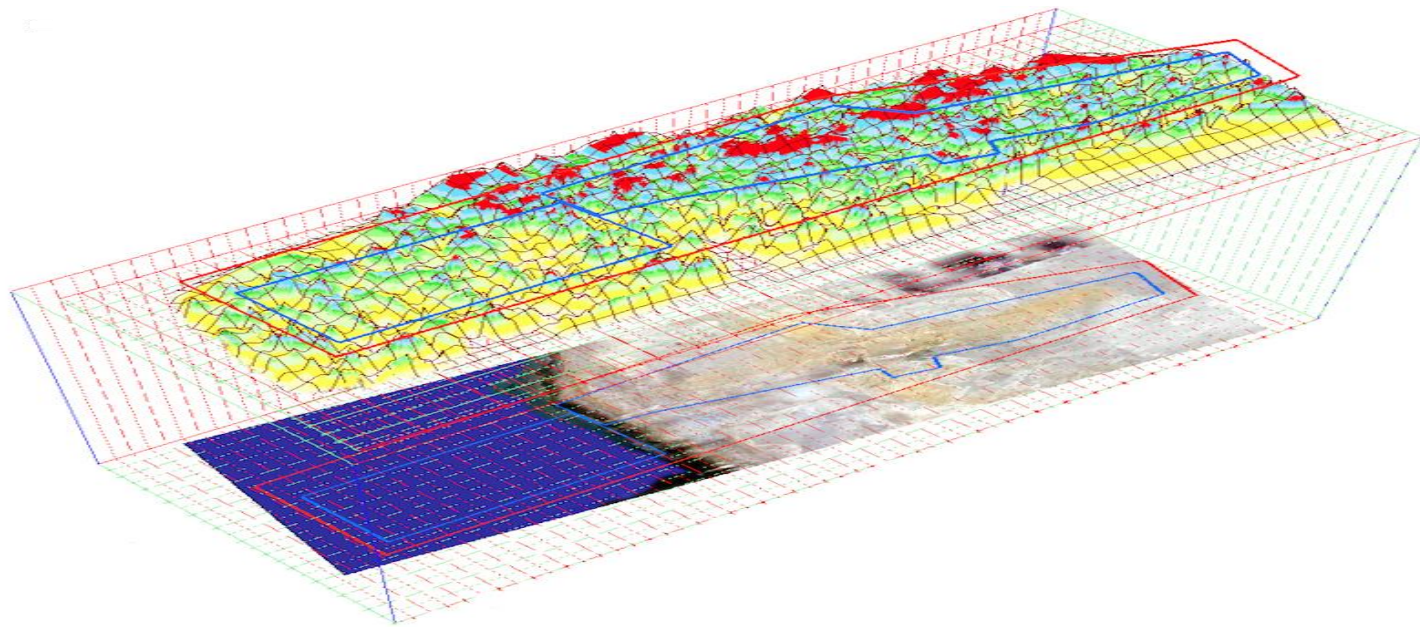
Introduction and Background

- During the past several years, OGD has successfully completed 70 DDT surveys for the identification and delineation of hydrocarbons with a success ratio of about 92% in defining locations for economic hydrocarbon wells.
- From 2000 to 2018, DDT has been used to delineate hydrocarbon deposits in **Russia, Sri Lanka, Mauritania, Uzbekistan, Australia, Moldova, Kalmykia, UAE, Qatar, Kazakhstan, Paraguay, Columbia, and the United States.**

BRINGING GEOPHYSICAL SURVEYS INTO THE 21ST CENTURY

Every element and compound in the Earth's crust exists in an excited state and emits an intrinsic radiation spectrum. The spectrum of each element and compound has a unique amplitude, frequency, and phase.

Direct Detection Technology (DDT) was developed to discover these mineral resources. DDT does so by tracking the reflections and echoes of their intrinsic emissions reflected on satellite imagery.



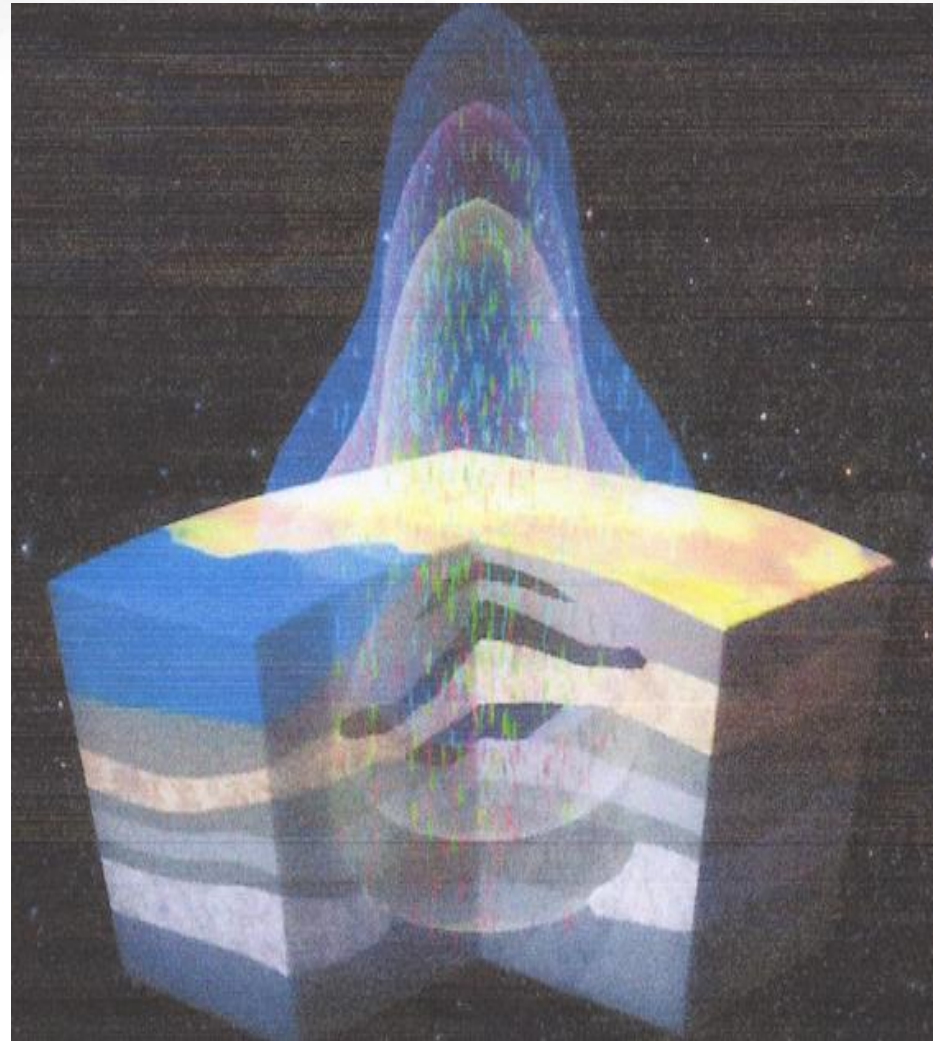
DIRECT DETECTION TECHNOLOGY FUNDAMENTALS

DDT is a revolutionary technology for direct detection and delineation of mineral-bearing formations in the subsurface.

The basic essence of DDT rests on the premise that all physical objects have unique properties of energy represented by light elementary Super Small Subatomic Particles (3SP) from the lepton family. The best known of all leptons is the electron.

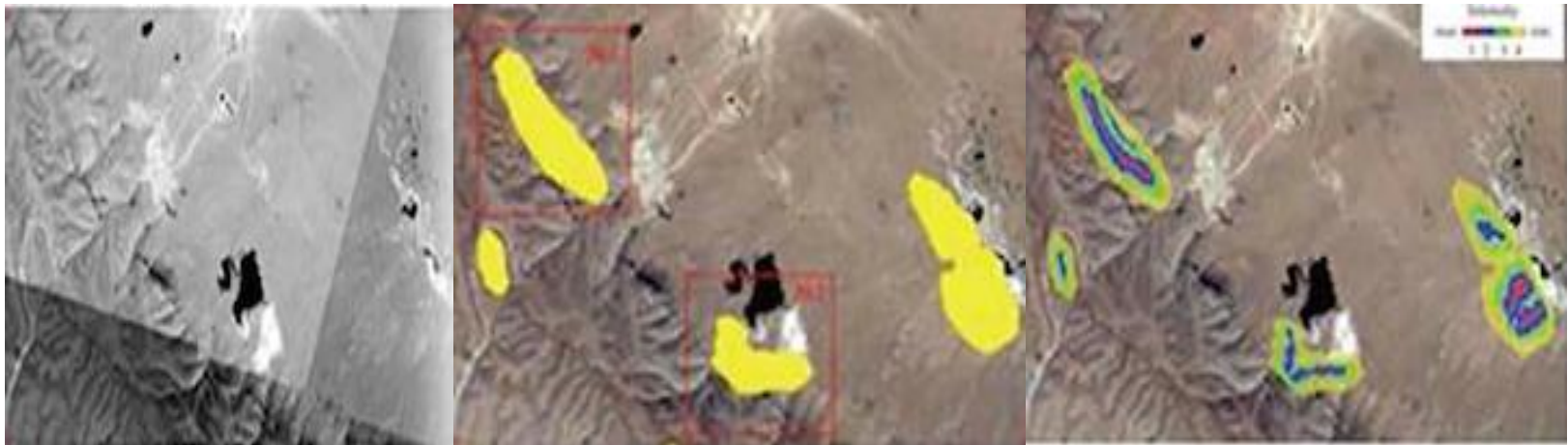
Earth's crust exist in an excited state and is constantly emitting what can be called its intrinsic radiation, which forms cluster and macro-cluster field structures. Such cluster structures, which ostensibly have a spherical shape initially, form something of a pear-like shape as they rise to the surface, apparently as a result of gravitational and other affects.

OGD laboratory and field equipment can detect reflections, shadows, and/or tracks of 3SP, i.e., intrinsic radiation, but not the super small particles.



DIRECT DETECTION TECHNOLOGY FUNDAMENTALS

DDT is a revolutionary two-stage technology for direct detection and delineation of hydrocarbon-bearing formations in the subsurface. All substances are subject to natural decay. All decay leaves traces of its passing. DDT has particular and unequalled advantages by exploring the earth using satellite images (i.e., Stage One Surveys) to define whether a particular **Customer Designated Area** contains hydrocarbons or has no hydrocarbons; followed by field expeditions from inside low-level aircraft (e.g., helicopters, Stage Two Surveys) to identify and precisely locate hydrocarbon deposit(s) with the depth, perimeter, and approximate size of the deposit(s) as well as specification of drilling locations and anticipated depth estimations for encountering the deposits.



DIRECT DETECTION TECHNOLOGY STAGE ONE SURVEYS

- OGD has specially written confidential and proprietary software programs with which to determine the level of the hydrocarbon signal based on its intrinsic radiation level. The signal is presented on a scale of 0.1 to 1.0.
- The hydrocarbon anomalies are delineated on maps of the **Customer's designated area** in a Final Report for the completed DDT Stage One Survey.
- Anomalies on the **Customer's designated area** with signal strength of 0.3 or higher will be recommended by OGD for the completion of DDT Stage Two Surveys.
- As noted before, DDT Stage Two Surveys are helicopter or ground based surveys depending on size of the prospect and the terrain.

DIRECT DETECTION TECHNOLOGY STAGE ONE SURVEYS

The laboratory stage of DDT is conducted to provide a predictive evaluation regarding the presence of the sought-after hydrocarbon formations. Visualization of the natural formations being searched for is achieved as a result of the resonant expression of data carried on the satellite image(s). With a specially designed and proprietary generator, OGD activates silver crystals on the satellite image. A confidential and proprietary optical-subatomic filter tuned to a specific chemical element or compound (e.g., hydrocarbons, gold, etc.) using a monospectrometer that blocks all other element's intrinsic radiation except for the specific filter designed to pass hydrocarbon intrinsic radiation. Under the filter, OGD places x-ray film which captures the locations for excited hydrocarbons in the **Customer's designated area**.



DIRECT DETECTION TECHNOLOGY STAGE ONE SURVEYS

- Application of DDT allows a Customer to achieve significant reductions in exploration costs since the Customer can conduct a full feasibility study of a prospect without the need for conducting any indirect exploration methods, e.g., gravity, magnetics, as well as 2D and 3D seismics or direct techniques such as drilling and well logging.
- In other words, data obtained from a DDT Stage One Survey will definitely indicate whether there are hydrocarbons in the **Customer designated area**, or in fact, that there are no hydrocarbon-bearing deposits in the surveyed area.
- With the increasing cost per acre associated with acquiring prospects in many of the plays being actively explored and developed, such as the Permian Basin, it is prudent for an E&P company to conduct a low cost DDT Stage One Survey to determine the actual extent of hydrocarbons before making a final decision to acquire new acreage.

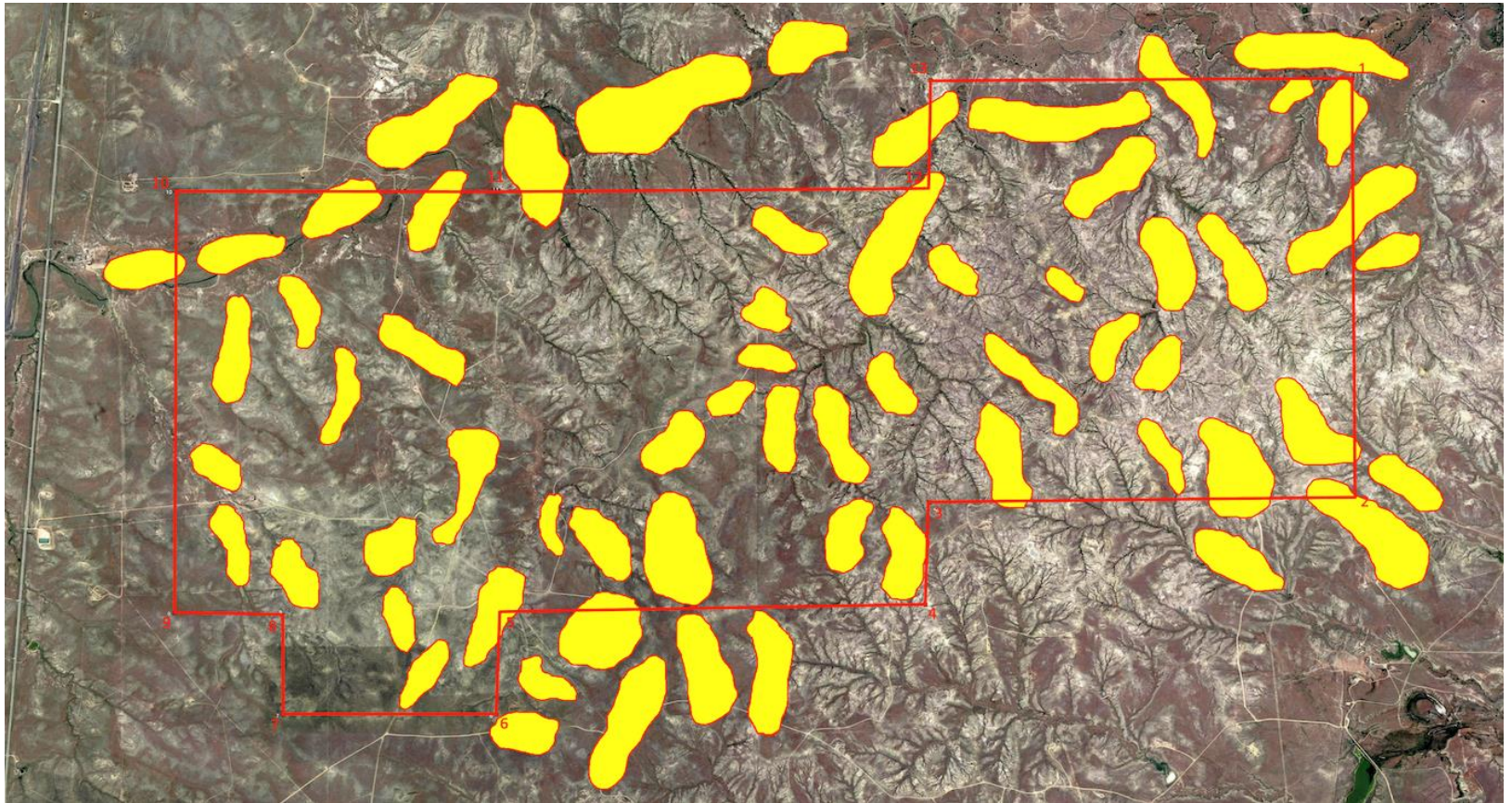
DIRECT DETECTION TECHNOLOGY STAGE ONE SURVEYS

Satellite Image with Customer's Designated Area for DDT Stage One Survey.



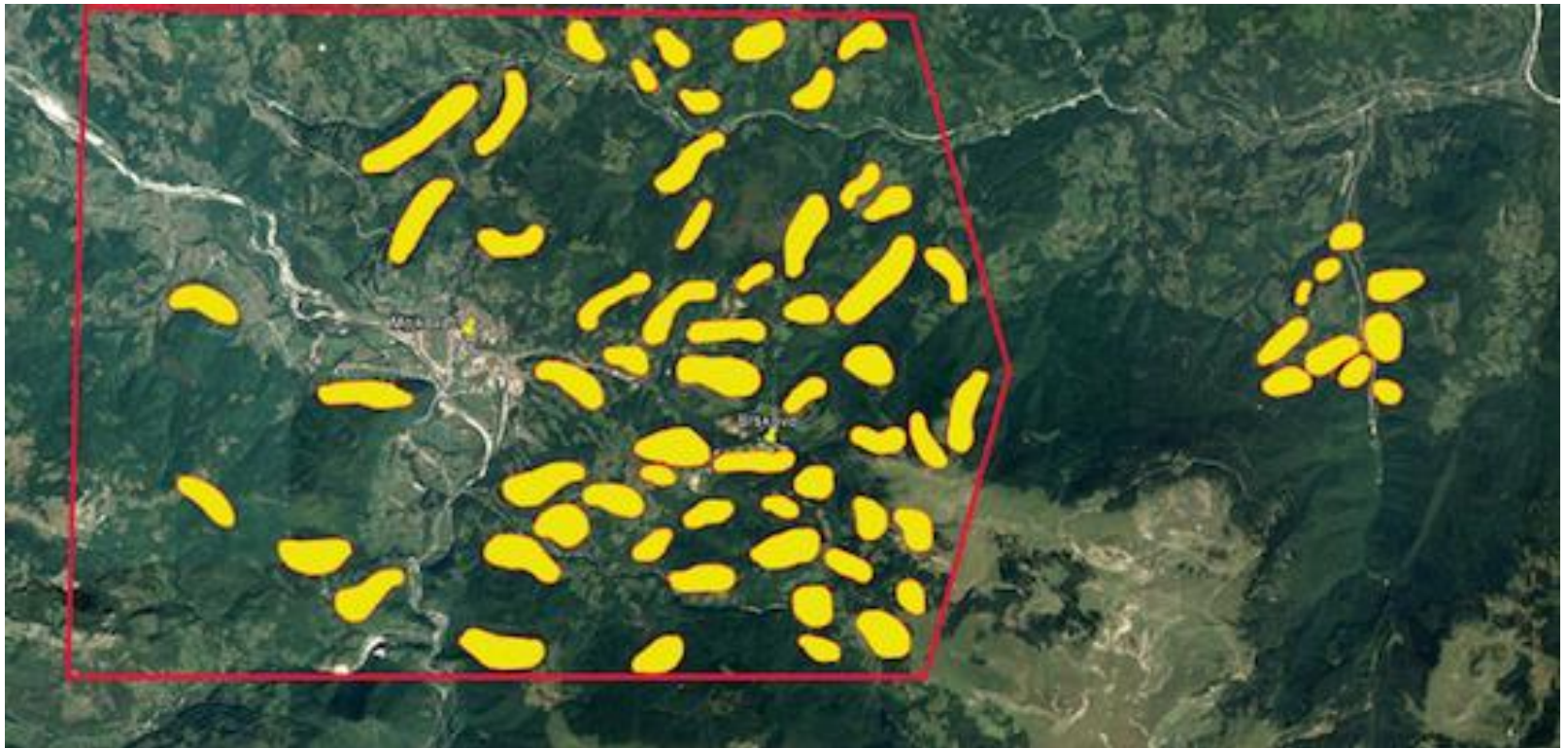
DIRECT DETECTION TECHNOLOGY STAGE ONE SURVEYS

Since the laboratory stage of DDT is conducted to provide a predictive evaluation regarding the presence of the sought-after hydrocarbon formations, the hydrocarbon intrinsic radiation anomalies are colored yellow for better visual presentation and delineated on the Customer's survey area.



DIRECT DETECTION TECHNOLOGY STAGE ONE SURVEYS

Thus, in the first stage of DDT, the collected data is processed using a specially designed laboratory equipment and software program to identify the location of anomalous hydrocarbon deposits recorded on satellite images. The first stage DDT data identifies whether the target underground resource is present in the surveyed area and how it is territorially confined.



DIRECT DETECTION TECHNOLOGY STAGE TWO SURVEYS

With the results of the DDT Stage One Survey, OGD determines whether the target underground resource is present in the surveyed territory and how it is territorially confined. In other words, in the first stage of DDT the collected information is processed using a special software program to identify the location of anomalous hydrocarbon deposits. The data will be analyzed and narrow survey areas, which include the anomalous prospective parcels of land, will be recommended for DDT Stage Two Surveys.

As noted before, DDT Stage Two Surveys are field expeditions (usually, a helicopter or ground based survey of the area depending on the size of the prospect and the terrain) and data processing with a final report of hydrocarbon-bearing formations, their depths, thicknesses, and relative size of the reserves as well as drilling recommendations for hydrocarbon-bearing zones.

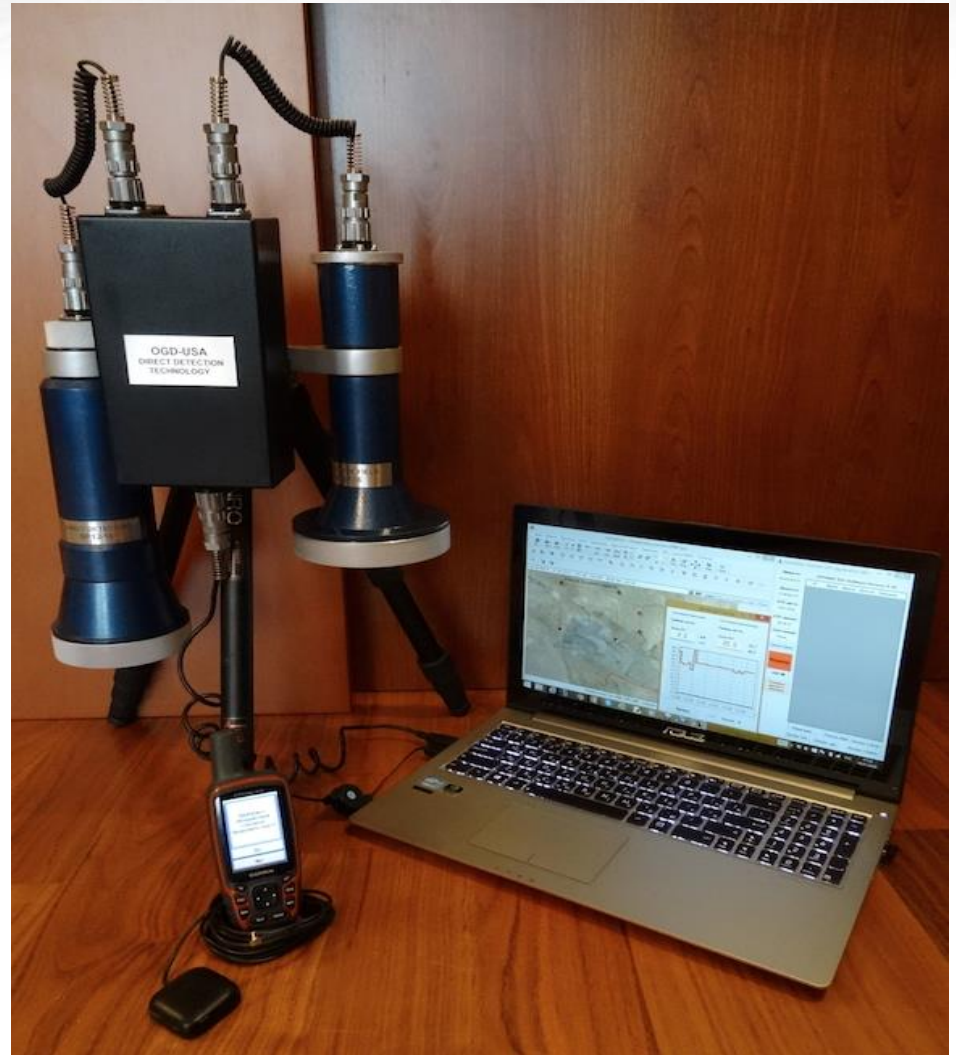
DDT Stage Two Survey data provides digital images of the fields, their intensity, and areal extent. With these data, OGD conducts mathematical and cartographic modeling of the deposits and with second stage data processing different depths of multiple, stacked hydrocarbon deposits are defined.

DIRECT DETECTION TECHNOLOGY STAGE TWO SURVEYS

Field expeditions include measuring anomalous deposits using our GEO-SCAN ML2 field equipment.

One of the important characteristics of the DDT field equipment is that OGD designs, builds, and incorporates Mono-Spectrometers into our field equipment.

The Mono-Spectrometer is integrated in one of the components of the field equipment and is calibrated for specific or a particular single element or compound that is being sought in the Earth's subsurface.

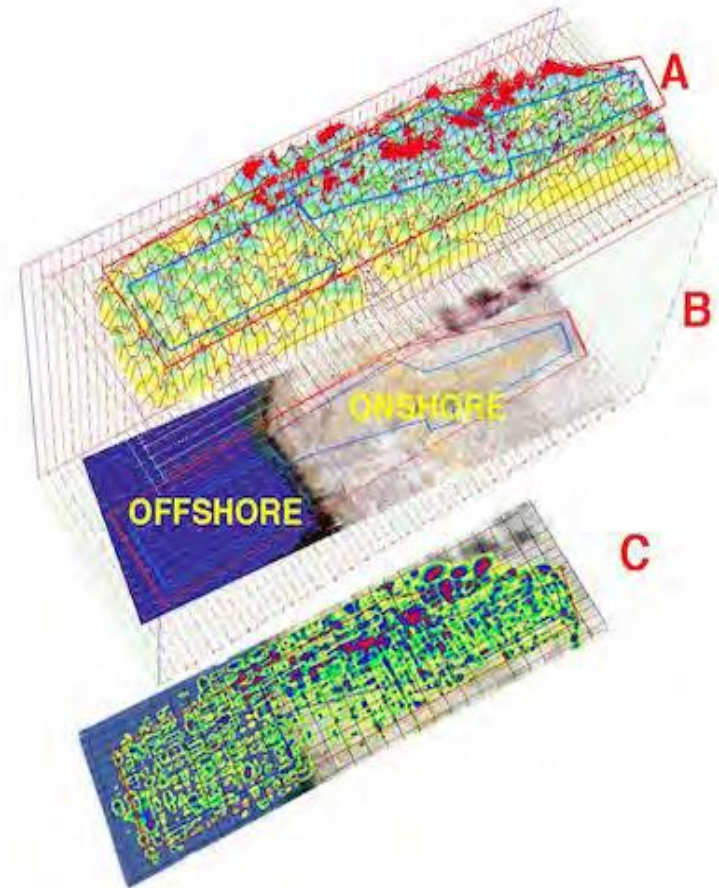


DIRECT DETECTION TECHNOLOGY STAGE TWO SURVEYS

Similar to the development of seismic exploration data collection and presentation, OGD advanced from 2D to 3D presentations of DDT data with the development of new software and the exploitation of nanotechnology has enabled downsizing the field equipment.

Predominate red areas in A and C indicate the highest hydrocarbon intrinsic self-radiation anomalies; however, 3D data presentation in A provides an excellent representation of the hydrocarbon intrinsic self-radiation spectra with its frequency and amplitude readily apparent.

The current OGD field crew requires only 2 individuals compared to the need for 3 with 4th generation field equipment. By minimizing the weight of the crew and equipment, OGD has an ability to extend the flight capability of the helicopter, which is very important for conducting offshore DDT Stage Two Surveys.

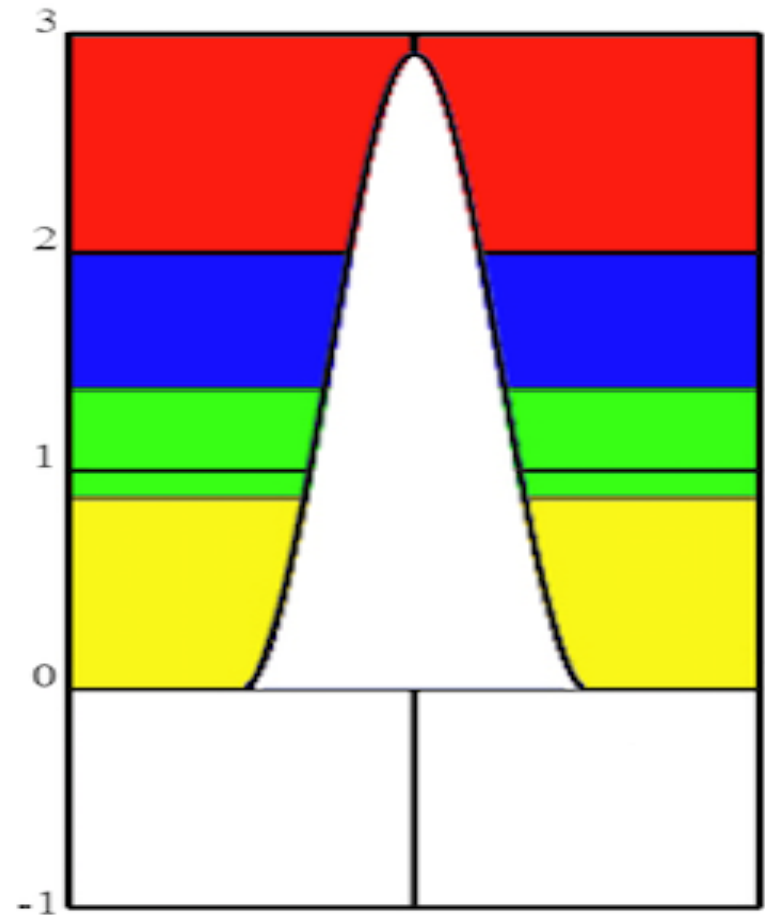


DIRECT DETECTION TECHNOLOGY STAGE TWO SURVEYS

Through years of successful surveys and constant experimenting and improvements based on data from hydrocarbon fields around the world, OGD has identified and determined that resonance has different strength for each potential signal level.

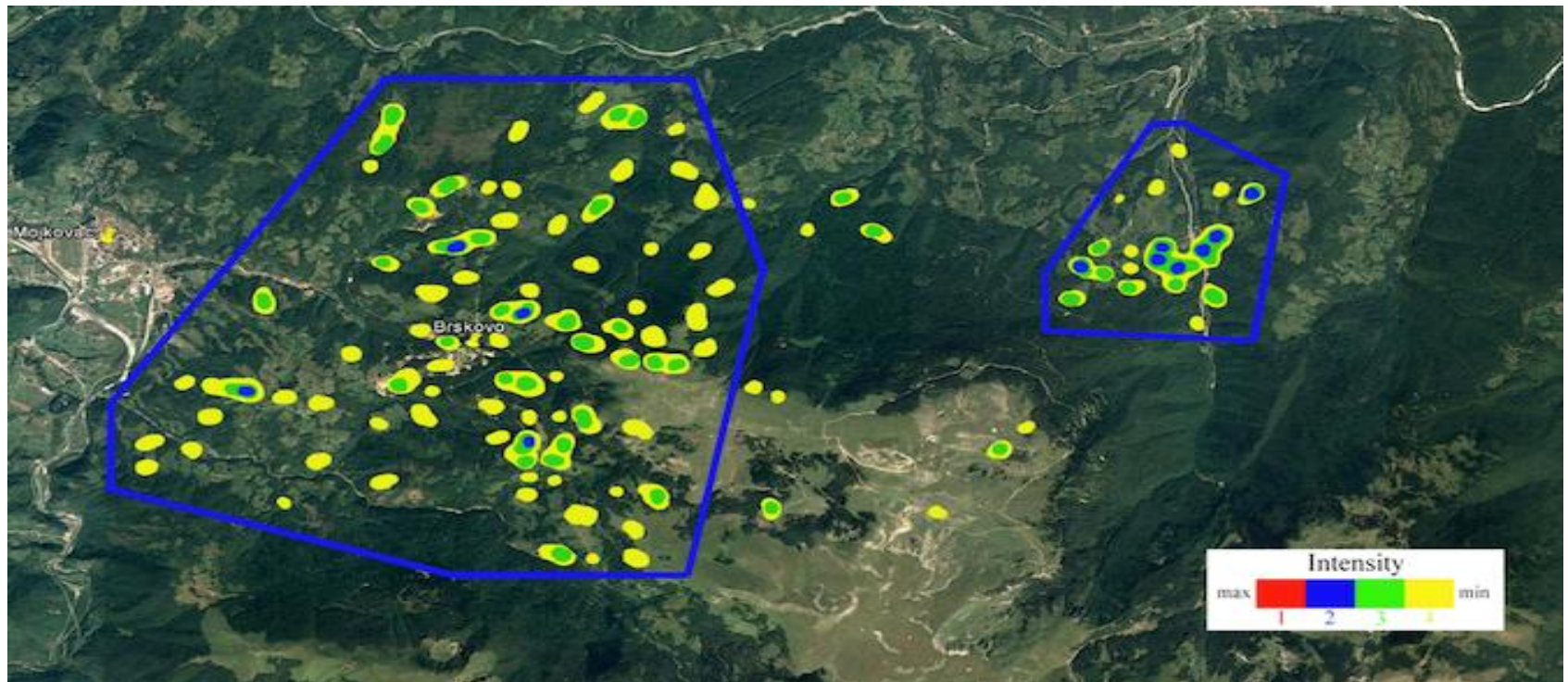
This very important discovery has allowed OGD to identify areas with hydrocarbons presence with 100% accuracy versus non-hydrocarbon areas.

Different levels (strength) of identified signals has enabled OGD to create a scale of relative intensity of self-radiation. OGD has created a scale of five (5) gradual colors for visual presentation. Intensity of self-radiation is an integral factor in describing the general level of energy created by hydrocarbon matter in the area of the DDT surveys.



DIRECT DETECTION TECHNOLOGY STAGE TWO SURVEYS

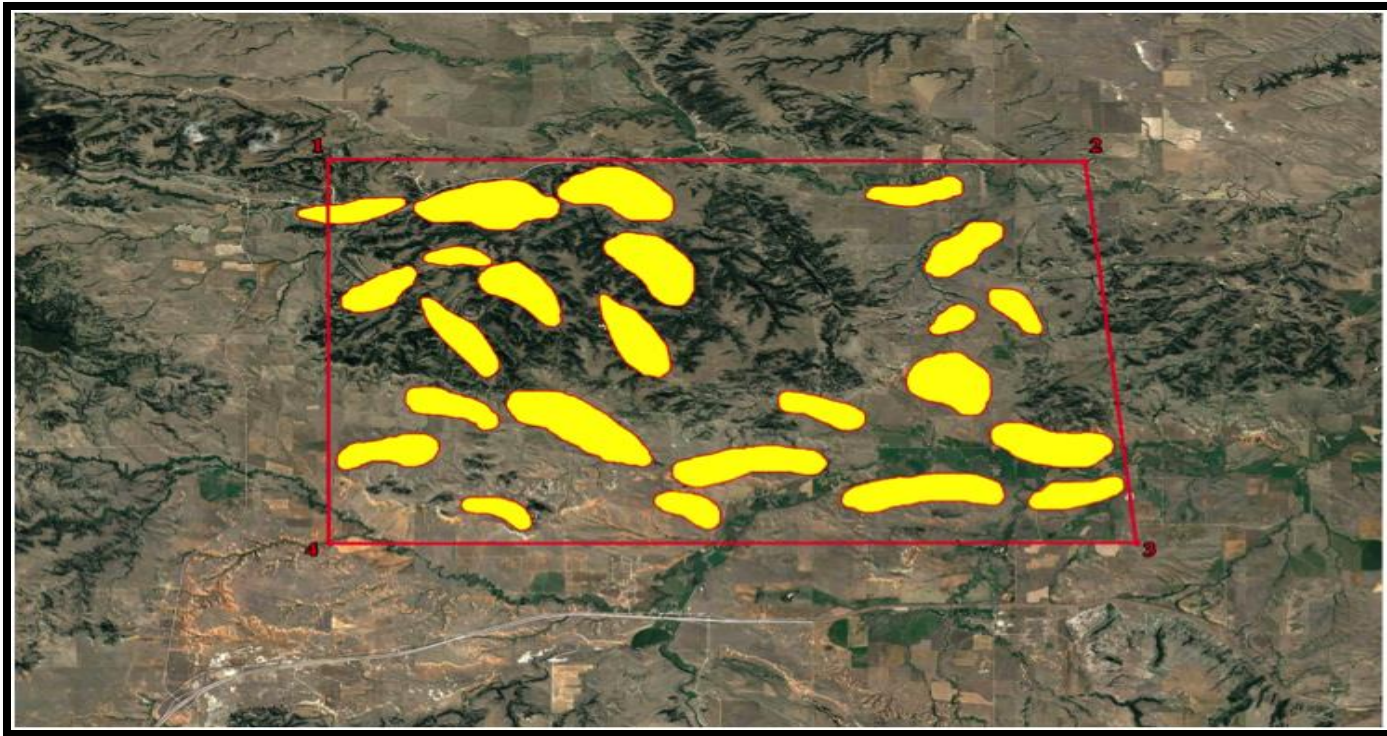
Processing during DDT Stage Two creates digital imaging of the anomalies, their intensity and areal extent, to be utilized to conduct mathematical and cartographic modeling of the deposits to identify anomalous areas for construction of a spatial model of the deposit and preliminary estimation of reserves. With second stage data processing, different intensity of hydrocarbon self-radiation are defined and presented on satellite images and topographic maps.



DIRECT DETECTION TECHNOLOGY SURVEY RESULTS

With the data and results from DDT Stage One Survey, OGD determines the most intense self-radiation hydrocarbon anomalies for our recommended helicopter fly-over to obtain the necessary DDT Stage Two Survey data.

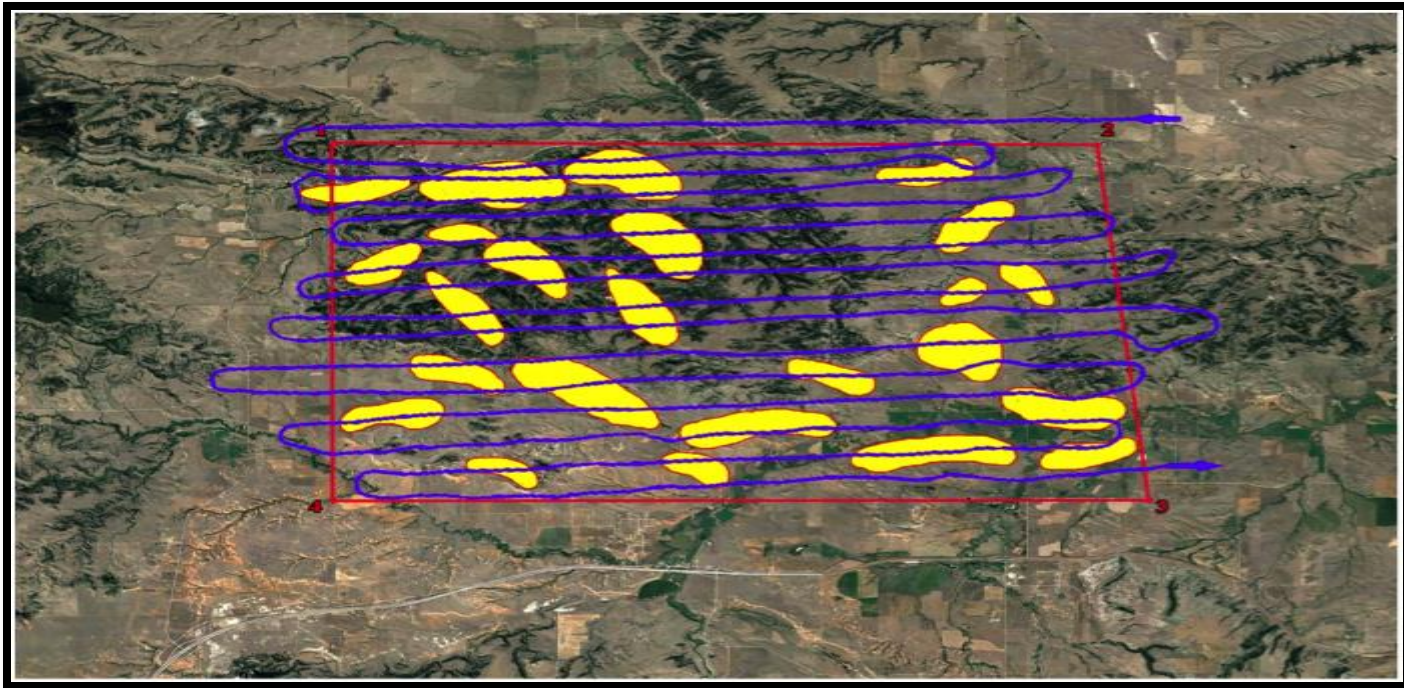
DDT Stage One Hydrocarbon Anomalies on Satellite Image



DIRECT DETECTION TECHNOLOGY SURVEY RESULTS

An example of the helicopter fly-over tracking for the DDT Stage Two Survey, note the detailed coverage of the stage one hydrocarbon anomalies.

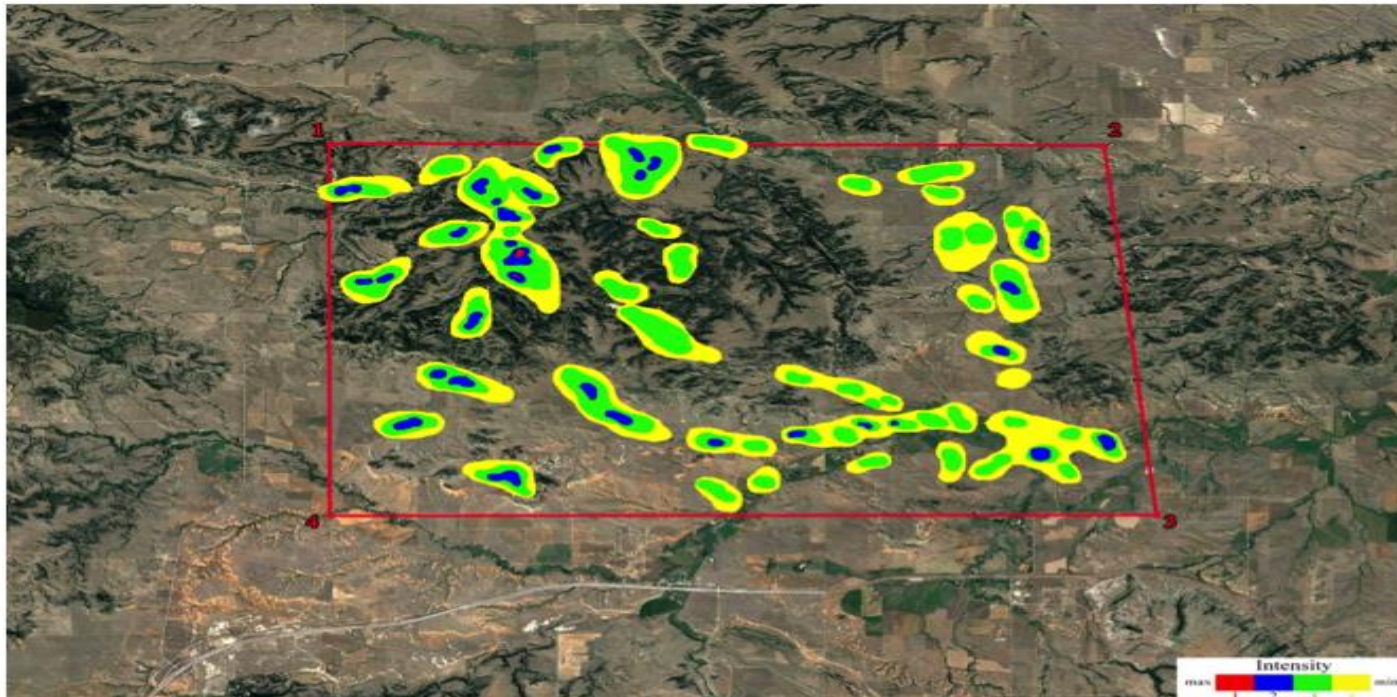
DDT Stage Two Helicopter Fly-over Tracks on Satellite Image



DIRECT DETECTION TECHNOLOGY SURVEY RESULTS

With the data and results from DDT Stage One and Two Surveys, OGD conducts mathematical and cartographic modeling of the deposits and with second stage data processing different depths of multiple, stacked hydrocarbon deposits are defined and presented on 3D block diagrams.

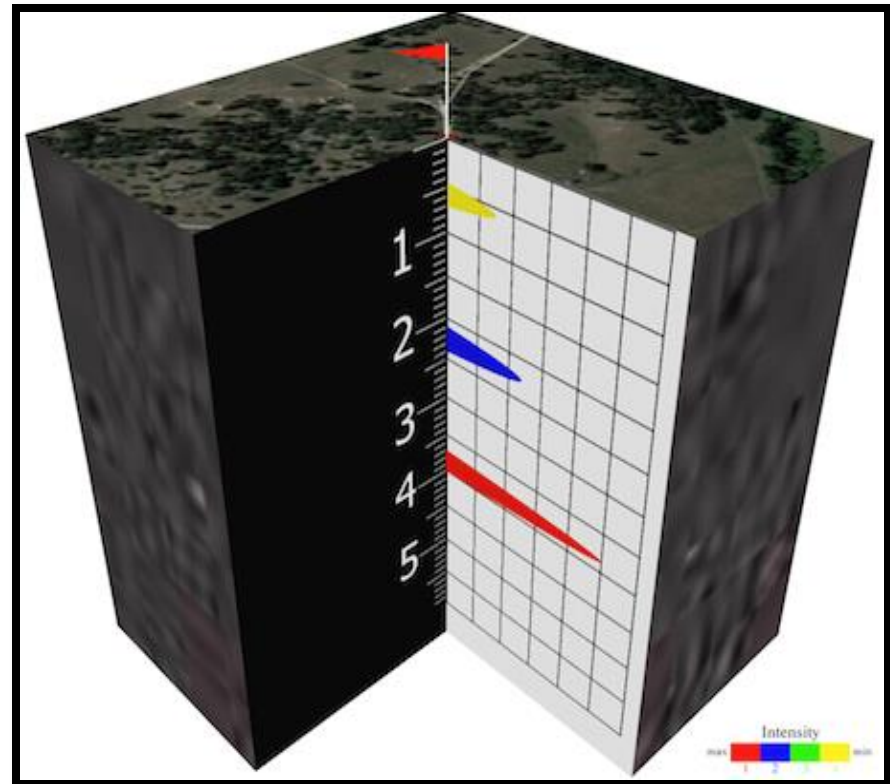
DDT Stage Two Hydrocarbon Anomalies on Satellite Image



DIRECT DETECTION TECHNOLOGY SURVEY RESULTS

DDT Hydrocarbon-bearing Deposits on Block Diagram

With the data and results from the detailed analyses of the DDT Stage Two Survey, OGD conducts mathematical and cartographic modeling of the deposits and with second stage data processing different depths of multiple, stacked hydrocarbon deposits are defined and presented on 3D block diagrams.

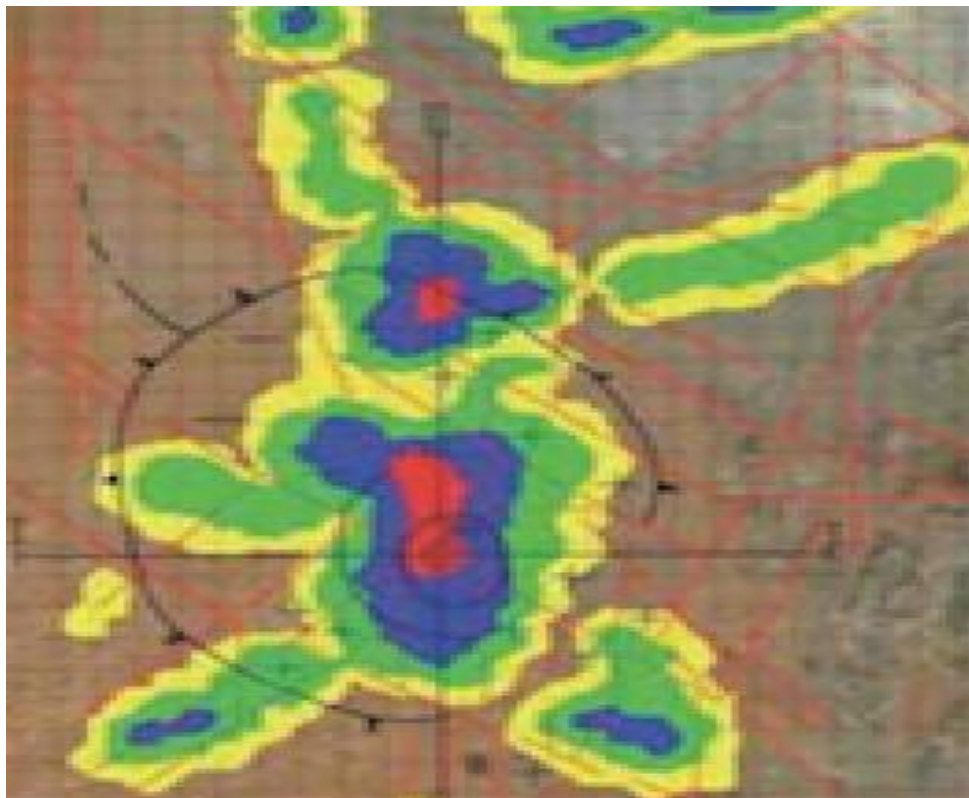


DIRECT DETECTION TECHNOLOGY SURVEY RESULTS

- The exploration data presented in this example is a very good example of the commercial capabilities and economical advantages for utilization of DDT Stage One and Two Surveys versus conventional hydrocarbon exploration methods.
- An even more useful comparison is based on the time and costs for the present DDT Stage One and Two Surveys versus conventional hydrocarbon exploration methods.
- Using DDT Surveys the time for completion of the entire project was **125 days** whereas the time for traditional exploration methods would possibly be between **2 and 3 years** depending on the E&P company budgets.
- The cost of the DDT Stage One Survey of **146 km²** was **\$146,000** plus the cost of the DDT Stage Two Survey of **42 km²** was **\$249,400** for a combined cost of **\$394,400** compared to the probable cost for traditional exploration methods which might be between **\$25 and \$50 million dollars**.

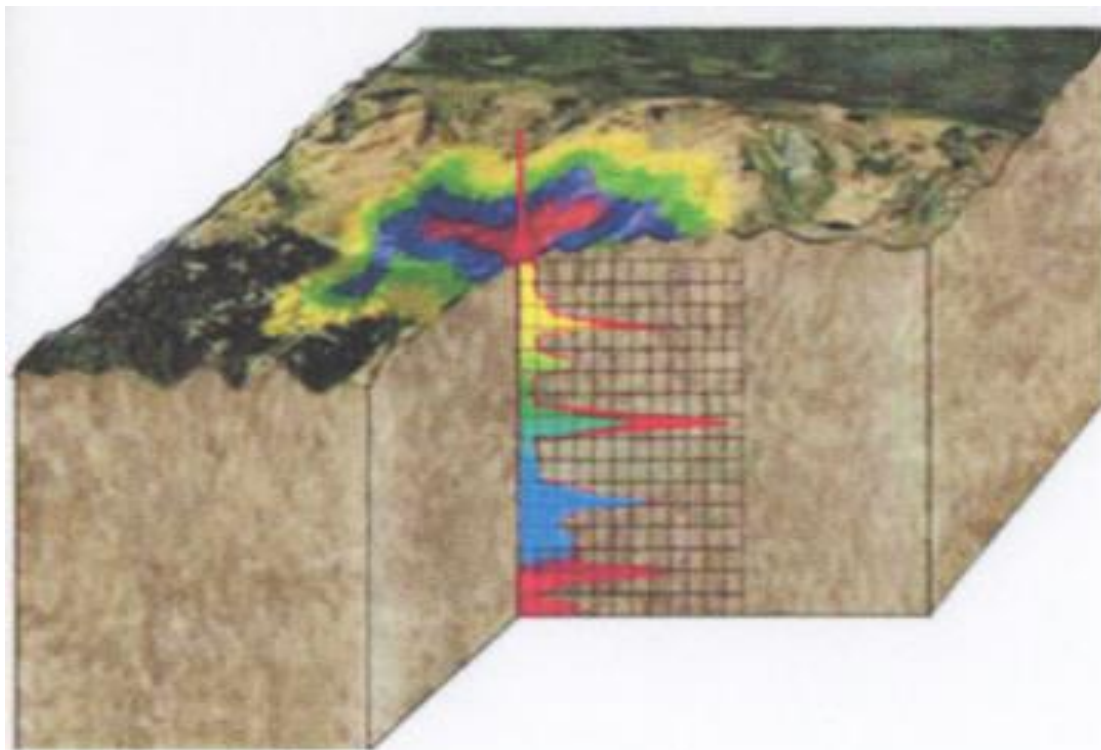
DIRECT DETECTION TECHNOLOGY SURVEY RESULTS

Typical DDT Stage Two Survey Hydrocarbon Anomalies on Satellite Image.



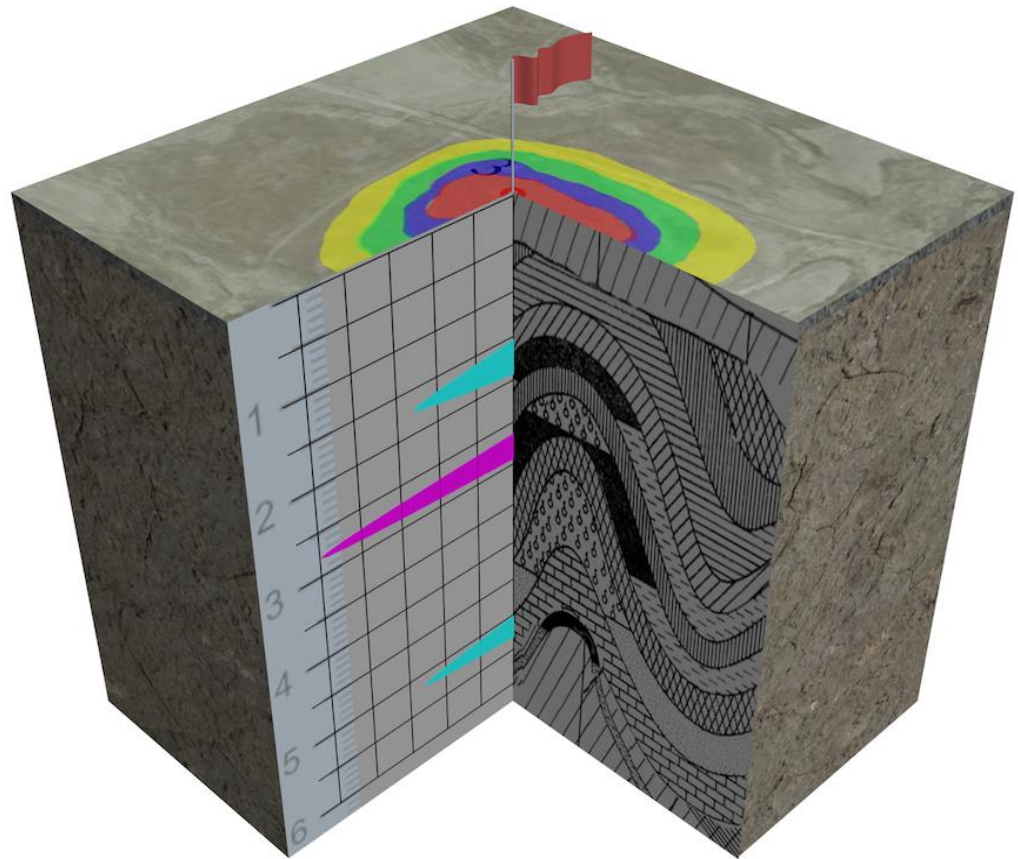
DIRECT DETECTION TECHNOLOGY SURVEY RESULTS

3D Block Diagram with DDT Stage Two Data Defining Hydrocarbon-Bearing Formations.



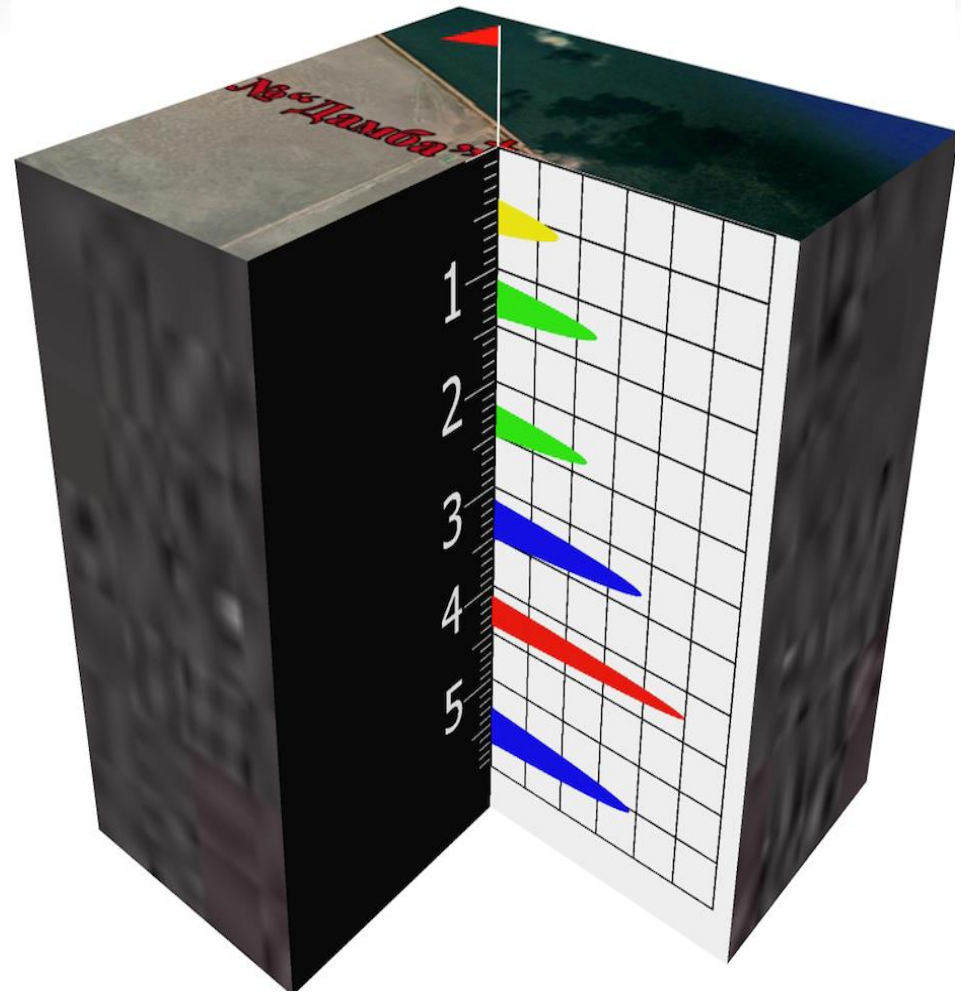
DIRECT DETECTION TECHNOLOGY SURVEY RESULTS

The DDT exploration data presented in this example is a very good example of the comparison between DDT Stage Two Survey results of defining hydrocarbon-bearing formations versus conventional hydrocarbon exploration data from hydrocarbon wells drilled and geophysical logging data presented by the Customer in the area.



DIRECT DETECTION TECHNOLOGY SURVEY RESULTS

The DDT exploration data presented in this example is a very good illustration of defining the multiple subsurface hydrocarbon-bearing formations prior to the drilling of wildcat wells in the area.

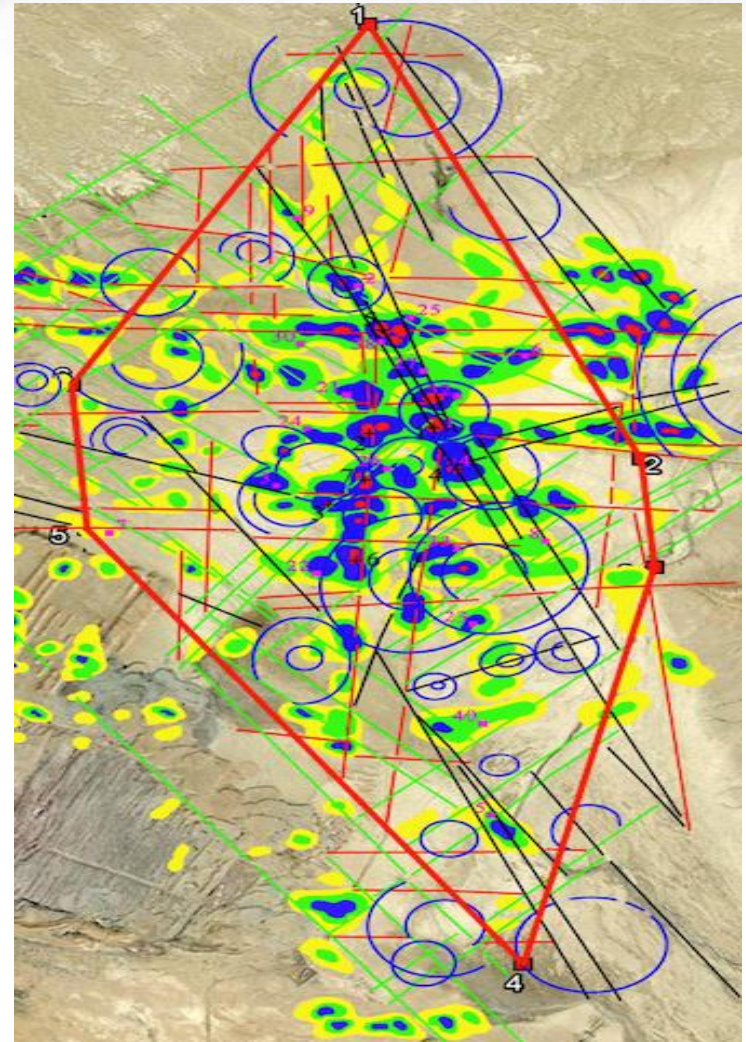


DIRECT DETECTION TECHNOLOGY SURVEY RESULTS

The combined result of topographic maps and 3D block diagrams provide the data necessary for OGD to precisely recommend drilling locations for productive wells accurate to about 95%, and definitely accurate in relative depth, size, and intensity of the hydrocarbon deposits.

With the increase in horizontal drilling and fracking, E&P companies have been trying to delineate sweet spots containing more significant and productive amounts of oil and gas.

Based on the OGD improved DDT Stage Two Surveys and better definition of areas of highest intrinsic radiation from hydrocarbon deposits, OGD can identify and correctly define these hydrocarbon sweet spots and accurately delineate their lateral extent.



FUTURE APPLICATION OF DIRECT DETECTION TECHNOLOGY

- With the increase in horizontal drilling and fracking, E&P companies are continually trying to locate the “sweet spots” containing more significant and productive amounts of oil & gas.
- With our improved DDT Stage Two Surveys and the better definition of areas of highest intrinsic self-radiation, OGD can identify and accurately define these hydrocarbon “sweet spots”.
- Based on our success ratios and the lower costs and shorter time parameters, OGD is interested in joint-demonstration trials with any potential E&P company.

**This Direct Detection Technology
Presentation
was Prepared and Submitted by**

Jim Combs, Ph.D.;
Jeffrey Drizin, Ph.D.; and
Oleg Yatsyuk, Ph.D.

Oil and Gas Discoverer, LLC

4331 South Mingo Road

Tulsa, OK 74146

URL: www.oilandgasdiscovererllc.com

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