Finding Petroleum

Spectrum - good reasons there may be oil in Lebanon

Cambridge Carbonates - more complex play types worth consideration

Maxar - using earth imaging satellites in exploration

CGG NPA - seeps and geological map making by satellite

Special report

Finding Petroleum Opportunities in The Middle East

June 25 2019, London

Event sponsored by:

MAXAR CGG Spectrum

This is a report from the Finding Petroleum Opportunities in The Middle East event, June 25 2019, London

Event website

www.findingpetroleum.com/event/5458d.aspx

Many of the videos and slides from the event can be downloaded from the event agenda page.

Report written by Karl Jeffery,
editor of Digital Energy Journal
jeffery@d-e-j.com
Tel 44 208 150 5292

Finding Petroleum
www.findingpetroleum.com
Future Energy Publishing,
39-41 North Road,
London, N7 9DP, UK
www.fuenp.com

Sales manager
Richard McIntyre
rmcintyre@d-e-j.com
Tel 44 208 150 5291

Conference producer David Bamford

Report author Karl Jeffery

Layout by Laura Jones, Very Vermilion Ltd

www.findingpetroleum.com/event/5458d.aspx

Finding Petroleum Opportunities in The Middle East

The Finding Petroleum in the Middle East forum in London on June 25 looked at exploration opportunities in Lebanon, new ways to find oil in stratigraphic and diagenetic traps, and using satellite imagery to find oil seeps and make better geological maps.

The Finding Petroleum forum on the Middle East in London on June 25th looked in detail at exploration opportunities in Lebanon, connected to an upcoming license round, from Neil Hodgson of seismic company Spectrum.

Jo Garland, consultant geologist with Cambridge Carbonates, talked about play types worth further consideration on the Arabian plate, including a number of types of stratigraphic traps, diagenetic traps, and areas where hydrocarbons may have been overlooked due to dry wells.

Alex Gow, senior sales engineer with satellite company Maxar Technologies, explained how satellite imagery and radar data is being used to monitor ground subsidence, which can be used to check the effectiveness of water and steam injection.

Mike King, oil and gas manager of NPA Satellite Mapping, explained how satellite imagery is being used to detect oil seeps and how this is used in oil and gas exploration. Also how satellite imagery is being used to make better geological maps.

Jo Garland, consultant geologist with Cambridge Carbonates

Spectrum – good reasons there may be oil in Lebanon

Following big gas discoveries in Israel, there is growing interest in exploration in Lebanon, and good reasons to believe there may be oil, said Neil Hodgson of seismic company Spectrum.

Following big gas discoveries in Israel over the past 10 years, there is growing interest in exploration in Lebanon to the North – and good reasons to believe they may be oil, said Neil Hodgson, EVP geosciences with seismic company Spectrum.

Neil Hodgson, EVP geosciences with seismic company Spectrum.

Offshore Lebanon has 80 per cent coverage with 3D seismic. But not a single well has yet been drilled. Total and ENI plan to drill in blocks 4 and 9 later this year or early next year, blocks won in the first license round. Bids for Lebanon's second license round need to be received by the end of January 2020.

Israel

The Mediterranean oil and gas story starts with the Tamar gas discovery offshore Israel, drilled in November 2008 in 1500m water, Mr Hodgson explained.

It was thought to be a 2 TCF prospect, but when it was finally drilled and data analysed, the estimated size increased to 10 TCF.

It was producing gas within 3 years with a subsea tieback, which was quite remarkable, considering that projects were typically taking 10-15 years to develop at the time, he said.

Noble Energy and Delek Drilling continued to make discoveries – Leviathan in 2011, which is twice as big as Tamar, then Tanin and Aphrodite (in Cypriot waters), all dry gas discoveries.

The chemical analysis suggests they are mainly biogenic gas discoveries, directly formed from rotting organic material, he said. Tanin is also known to have a thermogenic component. The Tanin well was subsequently sold to Energean oil and gas.

But the Karish discovery in 2013 offshore Israel, also sold to Energean Oil and Gas, is thought to be thermogenic, and would provide about 40m barrels of liquids as well as 2 TCF of gas. The more thermogenic wells are to the North.

Lebanon

Lebanon is north of Israel along the Mediterranean coast.

Data from Energean showed the Tamar field had fault lineaments going North West to Southeast orientation. The same lineaments can be seen to the north in Lebanon. "It is all part of the same system," he said.

People say Lebanon and the Northern Levant Basin have more structural intensity than the Southern Levant, but "it's actually the same deformations and same patterns," he said.

Looking at a seismic line running south to north, showing Karish reservoir, you can see the same "reservoir unit" also on the Lebanese side, but getting much thicker, about a kilometre thick in the North Levant basin, compared to a "couple of hundred" metres thick for Karish, he said.

Spectrum understands that Total is going to drill its first well on the same subsurface trend which Karish is on, he said. You can see the structure on Spectrum's 3D seismic.

Spectrum has looked at the section just below the reservoir unit in the Northern Levant basin, using its 2D and 3D data. It has seismic characteristics of a source rock. The same source rock has been found onshore on an outcrop in Lebanon, and seen to be oil rich, he said.

Spectrum did some analysis with researchers from Oxford University, and found a "big pronounced feature" in Lebanon's block 5, which it calls "Oceanus".

There is some deformation which can be seen in the Post Messinian salt above it, and some "little pipes" cutting through the salt, with flows continuing from 1.5m years ago to the present day. So it looks like overpressure in the reservoir has been bursting through the salt and cutting through sediment above.

The sediment has also been slowly slipping downwards over time, leading to another pipe being formed, with 21 pipes viewable altogether. It makes it possible to measure the rate that the sediment is slipping.

There have been 21 ice ages over that period, where the sea level dropped 20-30m, reducing the pressure on top of the system, which could be causing the slippage.

At the last burst through is a natural oil slick at the sea surface, which can be seen on satellite data. "The most important thing is you get this oil coming to the surface. We've got a working hydrocarbon system," he said.

What looks like a reservoir is early Miocene clastic sands. "It is the simplest hydrocarbon system in the world probably," he said.

"We can tie this to reservoirs discovered in Leviathan, Tanin, and Karish."

The sand thickness is 1km in Oceanus, compared to 250m for Tamar. "These structures should be stuffed full of oil," he said.

"When we map these structures, we find there's a whole series of cross cutting faults. Those are conflated with a series of folds running in this direction. When you have a fold and a fault you can have a good hydrocarbon trap. These are present all through the centre of the basin."

"If you make a discovery in that structure, there's nothing to stop that one from working, and that after that. You'll get a series of discoveries one after the other. The resource levels

turn out to be quite big. And instead of gas we think it's going to be oil."

One question is where the sands have come from. There was an open seaway between the Mediterranean and the Persian Gulf, so they could have come that way, or they could have come from the Nile.

"We believe, from our studies, we can map the sands coming from a proto-Nile source to South, transport North through Egypt, cleaned, winnowed, and dumped into the Med," he said.

The sands ended up in the Northern Levant basin because they were driven by currents, linked to the open seaway between the Med and the Persian Gulf.

These currents stopped in the mid-Miocene, when Syria and Turkey joined together and sealed the seaway. Then the Nile Delta starts to build in a standard way.

But it means the sands were left 250m thick on the Southern Levant basin, thickening to the North.

On Spectrum's 3D seismic you can see the thickening sands, the individual fan systems, one on top of the other. The oil would be generated below them.

Other areas where this play has worked is further offshore Gaza, with sands sitting underneath salt in simple structures.

Spectrum estimates there could be 5-8bn barrels of oil in one block. People say how can you make this estimation when no wells have been drilled. But it was the same situation in Israel, where no wells had been drilled by 2009, he said. Also the Zohr reservoir is very nearby.

"The Eastern Med has a track record of finding big reserves, good repeatability within play fairways when it's actually explored. When it is not explored it is more difficult to prove reserves are there."

Government terms

One audience member said that he had looked at offshore Lebanon while in employment with an oil company. The estimate of the amount of reserves was similar to Spectrum's, but due to the terms on offer by the Lebanese government, it did not look possible to make it break even. "Have they done anything to ameliorate the terms?"

Mr Hodgson replied, "No, the terms are the same as they were when you evaluated it before."

Cambridge Carbonates – more complex play types worth consideration

Now that the Middle East is a mature area, there are many, more complex, play types in the Middle East worthy of more consideration, says Cambridge Carbonates.

The Middle East has been explored for oil for over 100 years. This long history now means that many of the simple anticlinal structures have been tested, and we now need new exploration concepts to be contemplated, said Jo Garland, consultant geologist and director of Cambridge Carbonates.

"The stratigraphic and structural complexity of the Arabian plate provides us with a whole host of possible play concepts and opportunities," she said. Future potential could lie in stratigraphic traps, diagenetic traps, and missed pay.

Cambridge Carbonates has been working on the Arabian plate since the 1990's, including in Iraq, Syria, Iran, Kuwait and UAE.

Stratigraphic traps

Stratigraphic traps occur where variations in reservoir lithology (from porous to non-porous rocks) creates a natural trap for hydrocarbons.

The Middle East developed numerous intrashelf basins, formed in different intervals of geological time, giving potential for many stratigraphic trapping opportunities. However, exploring for stratigraphic traps in carbonates requires a good understanding of the palaeogeography and sequence stratigraphy, she said.

One stratigraphic trap style, which Dr Garland termed a "lowstand wedge play", occurs during periods of sea-level low. As sea level drops, the shallow water sediments (which generally for the reservoir) are deposited in the intrashelf basin margins are centres – these porous rocks are surrounded deeper water, non-porous mudstones. The lowstand wedges are typically separate reservoirs to the shelf facies, and might not be laterally connected.

"We know that these systems work. For example in western Oman and the UAE it has been well documented," she said. So perhaps it is time to test these concepts elsewhere in the Middle East. To do it would require a good understanding of basin and platform geometries. Good seismic helps, along with good palaeogeographic mapping of the shelf margins, she said. It can be recognised as a "wedge shaped geometry", against the former platform margin.

A second concept that could be further tested in the Middle East is isolated reefs, which can form stratigraphic traps. "Worldwide, this is an extremely common play. There are numerous examples from Southeast Asia and Western Canada for example," she said.

In some parts of the world, isolated reefs have proven to be a basis for stratigraphic traps – a tall, pinnacled mass of limestone, coral and other organisms surrounded by a tight basinal facies.

The reefs are sometimes seeded on salt structures. They are best developed during long periods when the sea level is slowly rising, because the pinnacle reef keeps growing to keep up with the sea level rise, she said.

They show as "mounded geometries" on the seismic. They can be laterally sealed by poorer reservoir quality basin sediments. You have the source, seal, reservoir and trap "all in one".

Diagenetic traps

Diagenetic traps in carbonates are formed when diagenetic processes (cementation/ dolomitisation) create lateral changes in porosity and permeability which can trap hydrocarbons.

One example is hydrothermal dolomites. These are formed when hot, magnesium rich fluids, move upwards through faults and fractures and dolomitise the host rock (replace calcium with magnesium), and create porosity to hold hydrocarbons by doing so. This has been seen on the Arabian plate, although the largest known examples are in North America, she said.

There have been dolomite bodies seen which are 6.5km wide, although 1km wide is more typical in North America. Lengthwise, they can continue for "many tens of kilometres".

In the Middle East, "The more we look for them, the more we see them," she said.

Examples can be seen in the Zagros Mountains or Iran and Iraq, where faults, and complex fracture network are associated with a hydrothermal dolomite body. The reservoir can have a "vuggy" nature, and can have good reservoir quality.

Missed pay

It is not uncommon that companies abandon a structure after drilling it and not finding oil – when they may have just drilled in the wrong place, she said.

Consider the Kirkuk field, with 38bn barrels oil in place, discovered in 1934, a very impressive anticlinal structure, a hundred km long and 4km wide. The main reservoirs are in the Oligocene (34-23 mya) and Eocene (56-34mya). The rock is fractured, with high matrix porosities.

There are three domes – the Baba, Khurmala and Avanah. The Khurmala Dome has relatively poor matrix properties (porosity / permeability) in these Cenozoic reservoirs compared to the other domes. But if the Khurmala dome had been drilled first, would the company have just abandoned the structure and never found Kirkuk?

Another example is the Ain Zalah field in Northern Iraq, a complex East-West structure with two pay intervals, which has been through two phases of structuration. The reservoir is intensely fractured, and all oil is held in the fractures.

Unusually, the productive part of the structure is not the crest due to complex phases of deformation. So drilling on the crest would not be productive, she said.

You can see that having a good understanding of the geological history, and the palaeogeography, is very important, she said.

UAE's bid round

Considering stratigraphic and diagenetic traps will be of great importance in future exploration, she said. The Abu Dhabi 2nd exploration bid round, which is due in November 2019, is a prime example.

"We know this is a prolific area, with oil producing from reservoirs in the Permian, Jurassic, and Cretaceous," she said. There are also several, world-class source rocks; however, many of the structural traps have been drilled. Therefore stratigraphic and diagenetic trapping will be key to unlocking future potential in the UAE, and a good regional palaeogeographic understanding of basins in a sequence stratigraphic framework will be needed to exploit this to its fullest.

Cambridge Carbonates produces detailed palaeogeographic maps of the region.

This talk contained a large amount of detail and imagery which has not been included in this written report, but is available free to view with an online video of the talk, see **www.findingpetroleum.com/event/5458d.aspx**

Using earth imaging satellites in exploration

Earth imaging satellites can be very useful in Middle East oil and exploration and production, particularly monitoring infrastructure, monitoring ground subsidence, and finding seeps. Alex Gow, senior sales engineer with Maxar Technologies, gave a review of what is available.

Satellite imagery is proving more and more useful in exploration and production, including for monitoring infrastructure, monitoring ground subsidence due to oil production, and finding seeps, explained Alex Gow, senior sales engineer with Maxar Technologies.

Alex Gow, senior sales engineer with Maxar Technologies.

Mr Gow showed how a series of images showing an oilfield facility in Oman being built. The images had resolution of 30cm on the ground per pixel. This is high enough resolution to show individual fan blades, streetlights and pipelines. You can use it to monitor your competitors, seeing if their process facilities are active, he said.

Mr Gow also showed an image of a tanker in the Gulf of Oman reported to be attacked by Iran in spring 2019, with the damage to the vessel clearly visible.

Maxar Technologies was formed from a merger in October 2017 of a number of companies, including SSL, a company which designs and builds satellites and space systems, DigitalGlobe, operator of very high resolution optical imaging satellites and provider of geospatial content, Radiant Solutions, an analytics company for geospatial data, and MDA, which focusses on surveillance and intelligence solutions, including with satellite radar.

Maxar owns the Worldview-3 satellite, launched in 2014, which offer pixels covering 31cm on the ground. WorldView-3 is an optical sensor, so relies on reflection of the sun's energy from the earth. The resolution has improved from 82 cm pixels in 1999. At this resolution, "we can pick out and count people in crowds," he said.

Maxar plans another constellation imagery satellites, WorldView Legion, to be launched in 2020-21. They will also have 30cm resolution, but will offer much more capability for gathering imagery, with 2.5 times more collection capacity, and three times more visits to the same points on the earth's surface, so more frequent images can be collected during the same day.

Maxar also has an archive of every single image captured since 1999, including optical and radar images, with a wide range of temporal (time), spectral (light bands) and spatial resolutions. Maxar's "EarthWatch" service gives us access to every image back to 2001, at 30 to 50cm pixels, with full multispectral bands.

Using the images you can see how assets have changed. This is useful if you are looking at territory and want to know what happened in the past, he said.

The imaging satellites fly in a low earth orbit, 620 km above the surface. They all fly a polar orbit, going around the globe every 90 minutes, going above both poles.

The quality of image acquisition depends on the weather, although this is less of a concern for the Middle East, where there are fewer clouds.

The image satellites are very "spectrally capable", capturing information outside the visible range. Infrared is very good for vegetation, while shortwave infrared can be useful for discerning different mineral types, so different lithologies. You can also discern construction materials, such as plastics or metal.

Radar satellite

There are also radar satellites which are unaffected by clouds. Maxar operates the Radarsat 2 satellite, which produces its own C-band microwave energy.
It can be used to detect ships on water, detect oil spills, and monitor small movements of the surface and pipelines.

Each location on the planet is normally revisited every 2-4 days, but the satellite does not fly over exactly the same route each time. If you want a revisit with the same route as the previous one, necessary if you want to look at land from the same angle, you have to wait 24 days for a revisit. This is necessary to monitor high resolution changes, for example subsidence in land due to oil and gas production.

The radar data has been used to analyse the volume of liquid stored in a tank from the height of the floating roof. This can be useful to commodity traders, he said.

Subsidence monitoring using interferometric SAR (InSAR) measures the phase shift in the reflected radar signal. It is possible to identify subsidence or uplift in the surface of as little as one millimetre, he said. This can be used to monitor injection processes, such as water flooding or steam injection, to see where the water or steam is going.

It can also be used to monitor slow subsidence due to oil production, which might damage wells.

It can provide information about structural integrity – changes in the subsurface can damage wells. You can also monitor how a new well is changing the drainage pattern of the whole reservoir.

Wide area InSAR uses natural reflectors to send the radar signal back to the satellite. The widest beam mode can capture a radar image of the whole of Vancouver Island, (460km long).

Narrower beam InSAR processing is improved by using man-made objects to reflect the radar energy, such as metal structures and buildings.

For very high accuracy InSAR analysis special corner reflectors placed on the ground can be used. This is used if you want to monitor for example small changes in the ground where the ground conditions can vary, for example shifting sand dunes or varying snow conditions.

CGG's NPA Satellite Mapping – seeps and geological map making

Now that the Middle East is a mature area, there are many, more complex, play types in the Middle East worthy of more consideration, says Cambridge Carbonates.

Seeps are one of the most interesting uses of satellite imagery in exploration, explained Mike King, Oil & Gas Manager at NPA

Mike King, Oil & Gas Manager at NPA

A seep could be described as the end point of a migration pathway. The oil moves slowly through the subsurface and comes out at the surface, onto land or onto the seabed. From there it moves up to the sea surface, since oil is lighter than water.

Onshore seeps have been seen in the Kurdistan region, sometimes as live flowing tar, he said. They are also seen on the surface as bitumen embedded in rock or alteration of host rock.

Satellite techniques which can be used to detect onshore seeps, include looking for different colouration rocks, or analysing infrared imagery to identify different clay minerals. The signature of a seep depends on the host rock. You can't usually use the same technique in different places, he said.

Offshore, a seep typically shows as oil droplets or a gas plume. There can be sea creatures, such as mussels and tubeworms, living off the oil on the seafloor.

You can have an oil "slick", a thin sheen of oil on the water which can be detected on radar indirectly because it prevents capillary waves forming on the sea. Capillary waves are often referred to as ripples, mainly caused from surface tension. They are 2-5cm high.

If you have very calm seas, you can see "natural film slicks" formed from algae, nothing to do with oil, he said.

The satellite data analysis involves looking to see where you have the same slick in the same place over time. You usually need minimum 10 images over time, 15 is better.

A seep can be hard to find in a satellite image and can be very small in an image which can cover an areas as big as 200km across.

Seeps can be also episodic, rather than continuous, with pressure slowly builds up in the subsurface and eventually pushing out a bubble of oil.

There are some hot spots for seeps in the Nile Delta and the Aegean Sea (Greece).

CGG classes seeps as first or second class, depending on whether there are lots of repeating slicks in the same place.

Also, a seep on the seabed doesn't necessary show up on the sea surface at the same place every time.

Seeps have been seen on waters offshore Lebanon. It would be interesting to see if they tie up with the seismic data showing where the reservoirs may be, as discussed by Neil Hodgson in the same conference, Mike said.

The Northern Red Sea is also very interesting, with slicks concentrated in the middle, where there are many rotated fault blocks. But there is also a lot of pollution in the Red Sea and easy to confuse it with seeps.

In the Persian Gulf, there was a belief for many years that there would not be any seeps due to the "seal being too good", and there are a lot of pollution seeps. But today, with additional data, it is possible to identify seepage hotspots," he said.

There is one seep in the region with so much oil coming from it, it looks like an oil spill, he said. "They are very tightly constrained repeating slicks."

If you want to analyse a seep in more detail, you can purchase higher resolution images, such as 31cm pixel images from Maxar. "Then you can then classify the different slick appearances," he said.

It is usually possible to differentiate fuel oil (leaking from shipwrecks, or leaky vessels) from oil seeps, because it has a different oil sheen, being usually of heavier oil.

Geological mapping from satellites

One use of satellite imagery is making geological maps.

People often assume that all parts of the world are well covered by geological maps. The truth is that nearly all parts of the world has some geological map, but the quality is very variable, Mike said.

Sometimes the maps don't match up across national borders, because the maps have been done by different groups and mapping agencies and sometimes the structural data is quite limited.

NPA has drawn a number of new geological maps from satellite data, where it has found many more faults, entirely new thrusts and corrected where lithologies on older maps do not tie up across map boundaries and country borders.

Not all terrain is ideal for satellite imagery – for example areas of the desert may be just covered in sand. However it is possible to improve the picture with some "basic contrast enhancement techniques", to picking out some water drainage systems for example.

The geological map making can make use of satellite generated digital elevation models (showing the height of terrain around the globe).

A few years ago, a new digital elevation model was released by RESTEC of Japan, "Advanced World 3D". There was a 5m resolution model available for purchase, and a 30m resolution model available free.

This model can be used to pick out bedding planes (separate layers of stratified rock). And if you can see the same plane in three points, dip and strike measurements can be extracted allowing you to construct cross sections through structures.

History of satellite imagery

Satellite imagery has been gathered since the 1960s. Mr King showed an image of the Fars region of Iran, taking from the Gemini 12 space flight (1966). You can "see anticlines and synclines in fantastic detail," he said.

The Landsat 1 images from 1972 had resolution of 80m, which is enough to see land structures, such as hills. It is roughly equivalent to using a 1:500,000 map, he said.

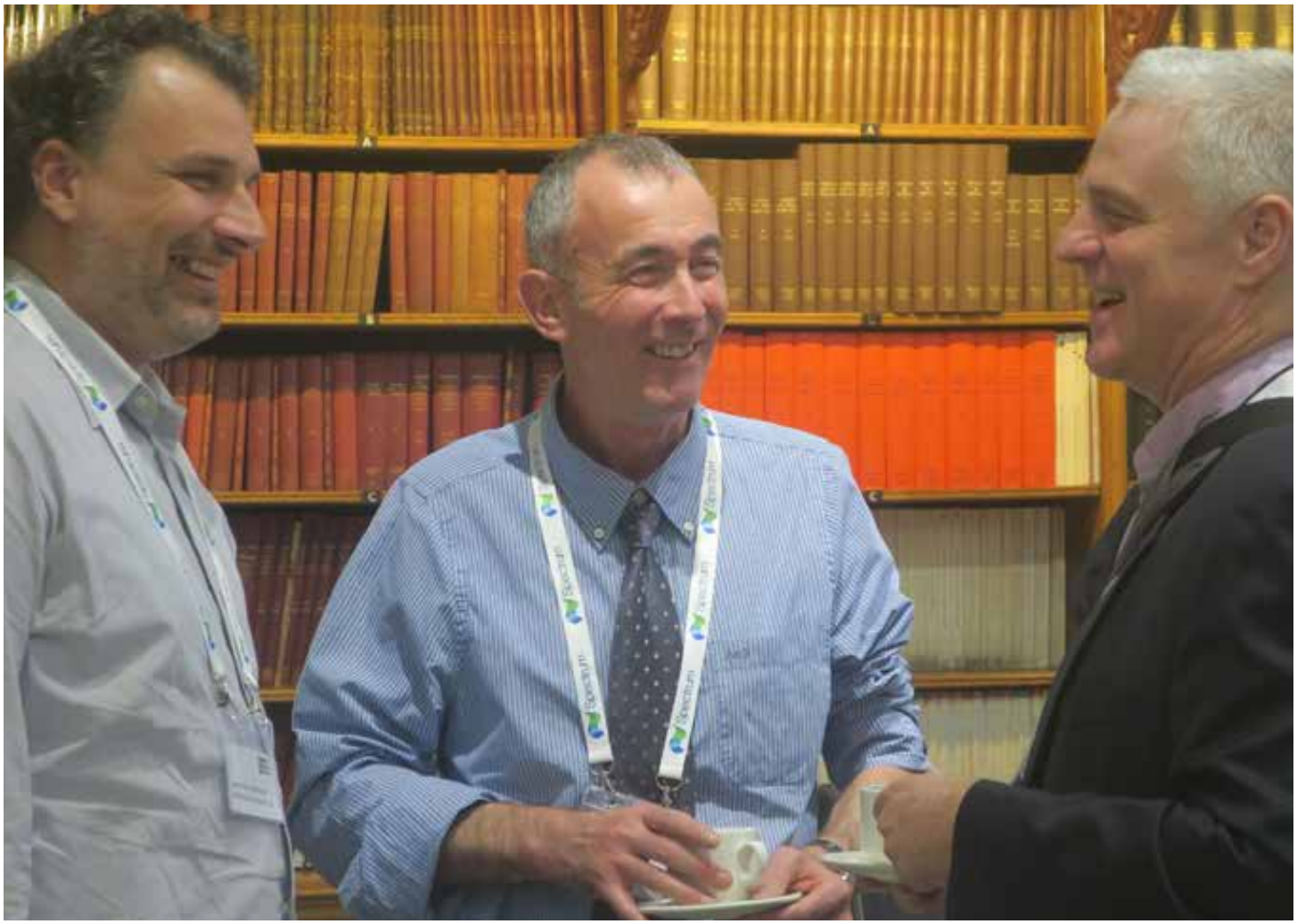
By the time the Landsat 4 satellites were launched in 1982, you could get 30m resolution images, and a number of infrared bands. This made it possible to differentiate rock types. The Data set "formed the backbone of geological mapping," he said.

Background to NPA

The company was originally called Nigel Press Associates. The company founder recognised the oil and gas commercial opportunities for satellite imagery as soon as the first LandSat satellite was launched by NASA in 1972. The company was sold to Fugro in 2008, which was in turn sold to CGG in 2012.

NPA is vendor independent – it does not own any satellites itself but offers best resolutions and systems for the task. It operates in the oil and gas, mineral exploration, infrastructure, defence and civil engineering sectors.

NPA provides a number of basin scale geological maps, some down to 1:5,000 scale, showing structures it has interpreted.



Finding Petroleum Opportunities in The Middle East Event, London, June 25 2019, Attendees

Mr Inaam Alkayat,
David Craik, Consultant, Atlaslocal
David Sendra, Associate Consultant, BlackRockQI
Lionel Therond, Director, Blue Oak Advisory
Oliver Roberts, Geoscientist, BP
Robyn Easton, Graduate geologist, BP
Robert FE Jones, Director, Caithness Petroleum
Pete Gutteridge, Lead geologist, Cambridge Carbonates
Joanna Garland, Director, Cambridge Carbonates Ltd
Andrew Webb, Manager, Petroleum Reservoir and Economics, CGG
Leila Evans, Offshore Image Interpreter, CGG - NPA Satellite Mapping
Jorge Gines, Senior structural geologist, CGG NPA Satellite Mapping
John Glass, MD, Cloverfield Consulting Ltd
Diwin Amarasinghe, Geophysical Specialist, Consultant
Bryan Man, Consultant
Peter Farrington, Geophysicist, Consultant Geophysicist
Andrew Freeman, Analyst, Control Risks Group
Ben Heather, conference producer, Digital Ship
Alex Gow, Manager – Sales Engineering, DigitalGlobe
Mark Lonergan, Senior Business Development Manager, EPI Group
Avinga Pallangyo, Conference Manager, Finding Petroleum
Karl Jeffery, Editor, Finding Petroleum
Mohammad Al-Gailani, , GeoDesign Ltd
Bryan Moseley, Geologist, Geologist
Jim House, Director, GeoSeis Ltd
Norman Hempstead, Director, Hempstead Geophysical Svcs
Kyle Hodge, Technical Research Analyst, IHS Markit
Irina Mosina, , Imperial College
Nick Steel, Consultant, Independent
Manouchehr Takin, , Independent consultant
Katsuhiko Ishikawa, Director, Ishikawa Advisory Office Inc.
Chris Gravestock, , Landmark Exploration Insights
Jon Wix, , Lloyds Register
Deborah Humphreville, Director energy, EMEAR, Maxar
Mike King, Oil & Gas Manager, NPA Satellite Mapping
Christopher Toland, Geoscientist, Oolithica Geoscience
alessandro lanfranchi, Oolithica Geoscience Ltd
Abi Mirkhani, COO, OPG Supply
Gerald Stein, Director, Pays International
Frederic Yeterian, Director, Philax International (UK) Ltd
John Clure, Managing Director, Phoenix Hydrocarbon Resources Ltd
Daniel Buckingham, INTERNATIONAL FINANCE BROKER., Pronto Business Funding
Josh King, Analyst, RAB Capital
Robert Snashall, Consultant, RGSConsult
Martin Smith, Business Development Manager - Operations, RPS Energy
Chris Hayes, Well Operations Director, RPS Energy
Aaron Lockwood, Software Sales Manager - EAME, Shearwater Geoservices
Tim Browne, , Spectrum
Neil Hodgson, EVP Mediterranean and Middle East Region, Spectrum Geo Ltd
Chris Holmes, BDM, Stratum Reservoir
Chris Anderson, Sales Director, TGS
Vladimir Ayeli, O&G Investment Analyst, VAnalytiQ
Reza Sedaghat, Director, Zagros Energy Ltd

What did you enjoy most about the event?

Discussion with delegates.

First presenter. *(Pronto Business Funding)*

Variety of interesting topics & opportunity to discuss during breaks and for networking in a convivial environment.

Discussions about the prospectivity offshore Lebanon - networking with other members of the industry.

Geoscience topics. *(BlackrockQI)*

Emerging business and technology trends.

Neil Hodgson's introduction and his summary on Lebanon and the Eastern Mediterranean.

Variety of good presentations.

Networking.

Varied & Interesting.

Diversity of talks - from climate change, through subsurface view of a licencing round, to geo-political/above-ground risk, in <2 hours. *Nick Steel (Consultant)*

Content of Presentations.

Great opportunity for networking and for catching up on recent developments in the Middle East. *Christopher Toland (Oolithica)*