Why drone development has a lot to offer oil and gas exploration

An expectant crowd gathered on 2-4 December 2019 in Toulouse, centre of European aerospace and home of the Concorde, for a first EAGE workshop dedicated to the use of unmanned aerial vehicles (UAVs) for applications in geoscience and earth observation studies. This is the report.

The workshop was well attended with participants from Russia, Europe, North America and the Middle East including experts in aeronautics, geology, geophysics, and mechanical engineering.

Bruno Pagliccia, senior innovative acquisitions geophysicist, Total, said: 'Artificial Intelligence and robotics are introducing a paradigm shift in the oil and gas industry. I'm glad EAGE has organized this first workshop on UAV technologies and applications as these will change our way of working for safer and more efficient operations. Enthusiasm and innovative

Happy crowd at the event

spirits were cornerstones of this workshop and will encourage the community to gather again for the next edition, so stay tuned, more is coming…'

In his keynote presentation exploring Total's extensive use of drones over the last decade, Pagliccia spoke about the METIS (Multiphysics Exploration Technology Integrated System) project, a revolutionary system for acquiring onshore seismic using a swarm of highly autonomous UAVs and wireless seismic receiver darts. The ambitious pilot project in Papua New Guinea was demonstrated to to have improved

efficiencies in cost and HSE while engaging local communities to improve social acceptance and support job creation.

A second pilot in Abu Dhabi is scheduled for 2020 in partnership with ADNOC. In addition to the better known METIS project, participants also learnt of Total's engagement in a series of successful piloted and automated drone operations featuring applications such as inspection of installations, corrosion detection, gas plume detection, search and rescue and crisis management. Pagliccia also pointed to the critical HSE considerations in qualifying drones for operation when faced with varying levels of operational complexity and diverse regulations.

The issue of safety in drone operations was further emphasized by subsequent talks including a presentation on the COMP4DRONES project, a European consortium to standardize drone components for professional use. The project is aimed at developing a set of pre-approved technological components to enable secure and autonomous drones for a broad range of complex civilian applications.

In contrast, the remaining sessions of the first day demonstrated the nature in which low-cost electronics have removed barriers to entry for airborne geological and geophysical investigations. Many of the UAVs utilized were developed in-house by relatively small organizations utilizing open-source components for carrying LiDAR, multispectral and magnetic sensors. Applications ranged from resource exploration (groundwater, hydrocarbons, copper, gold ore, silver and uranium), environmental monitoring, archaeology, locating abandoned O&G assets and unexploded ordnance. Many of the day's presentations pointed to the innovation coming out of the European Commission's Horizon2020 with many successful projects such as COMP4DRONES, NEXT, INFACT and Smart Exploration all developing advanced drone solutions.

The second day began with a focus on improving subsurface reservoir characterization methods using digital surface analogues derived from UAV acquired images. Studies in the Hikurangi Margin and Barents Sea demonstrated how relatively low-cost aerial acquisition techniques have the potential to reduce exploration risks in complex geological environments. While the photogrammetric modelling of outcrops is very well understood, increasing digitalization allows for new opportunities in automated and quantitative analysis for structural and stratigraphic interpretation and optimized integration of surface analogues into reservoir characterization studies. Many of the discussions centered on the ability to bring the field to the geologist and value of digital outcrops for increasing knowledge amongst geology students and multi-disciplinary teams.

The afternoon session focused on novel applications and began with a presentation from Oscar Gallego from Baker Hughes on the use of the Lumen Sky drones plat-

form for monitoring fugitive methane gas emissions. Other HSE focused applications included a tethered drone solution for obstacle detection during marine towed-streamer seismic acquisition and a thermal drone solution for search and rescue. A unique method for acquiring offshore ultra-long offset seismic surveys was also proposed. The very lengthy and engaging discussions reflected the excitement around the potential applications of UAV technology and increasing understanding of the value offered.

'UAVs are adding a new dimension to several exploration and production activities: data acquisition for geology and geophysics, surveillance and safety for drilling and production. However, new challenges must be addressed with the potential volume of data that UAVs (equipped with appropriate sensors) can collect. Practically, several issues must be cleared to stream the deployment of UAV: legislation, safety, etc.', Mokhles Mezghani, co-chair of the event, said.

Apart from the technical programme participants also enjoyed a networking reception and closing dinner. Perhaps the highlight of the workshop was the immersive technical tour which was hosted by Scalian and Altran at the Unmanned Systems Centre of Excellence at Scalian. Participants had a rare opportunity to test UAV equipment, enjoy simulations of UAV swarm flights and take part in detailed discussions with the robotics and software developers.

Women's group in the Netherlands gets year's activities off to an early start

The first event of the Women in Geoscience & Engineering group in the Netherlands in 2020 proved a valuable way of bringing like-minded members in the local community together for an informative debate and exchange of ideas.

Several factors went into the success of the event in Delft on 31 January 2020. In the first place, a renewed committee coordinating EAGE's largest community (over 1400 subscribers) is looking after future WGE activities with an international perspective. In addition, a team

got together in the Netherlands and joined forces with GAIA, the Network for Women in Earth Sciences, another strong presence for career development and gender balance in the country. This combined team intends to work together on an annual programme: keep an eye (and join!) the WGE group on LinkedIn to learn about upcoming meetings.

The year's activities kicked off with a get-together co-organized by Local Chapter Netherlands, supported by Delft Inversion, GAIA and EAGE, featuring an inspiring talk by Dr Aletta Filippidou

on the 'Four stages in a woman's career'. This was followed by a second meeting on 20 February with guest speaker and author Vréneli Stadelmaier who discussed what Albert Einstein, Meryl Streep and Michelle Obama all have in common, and how we can help women (and men too) around us to become more confident in their professional life.

You can connect and support the momentum by joining the WGE group via LinkedIn where we will keep you informed on all future initiatives.

EAGE Education Calendar

6 APR	EAGE EDUCATION TOUR 13 BY DR IAN JONES	MOSCOW, RUSSIA
10 APR	EAGE EDUCATION TOUR 13 BY DR IAN JONES	SAINT PETERSBURG, RUSSIA
21 APR	EAGE EDUCATION TOUR 13, BY IAN JONES (DATE TBC)	CAIRO, EGYPT
7 JUN	SHORT COURSE, BY JEAN JACQUES BITEAU	AMSTERDAM, THE NETHERLANDS
8 JUN	SHORT COURSE, BY MARTIN LANDRØ,	AMSTERDAM, THE NETHERLANDS
12 JUN	SHORT COURSE, BY EHSAN NAEINI	AMSTERDAM, THE NETHERLANDS

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