geoconvention
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METIS: Flying Carpets

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Summary

Carpet receiver and / or source grids provide significant geophysical benefits compared to typical orthogonal 3D survey designs, but are rarely deployed due to the high acquisition cost that is typically associated with them. The use of fleets of swarming UAV's (drones) to drop the receivers enables rapid deployment of these designs, and provides additional benefits resulting from the reduced manpower and environmental impact.

METIS (Multiphysics Exploration Technology Integrated System) is an R&D initiative launched by TOTAL in 2015 with the goal of reducing exploration costs in challenging exploration environments, and employs a combination of Industry 4.0 fundamentals:

- Interconnection: a fully networked project area connecting the seismic spread, IoT sensors, and people
- Information Transparency: real time data acquisition and on-the-fly seismic qc and imaging
- Technical Assistance from AI / Robotics: safety clearance, and receiver retrieval
- Decentralized Decisions: UAVs communicate for route planning and collision avoidance, autonomous sources.

The METIS approach to seismic acquisition spans unobstructed terrains such as deserts and plains, where the seismic sensors can be recovered after use, through to acquisition in extremely challenging environments such as foothills and forests, where single use biodegradable sensors can be deployed.

The following topics will be presented:

- Geophysical benefits of carpets for noise attenuation
- Key innovations enabling aerial deployment of receivers and operational support
- Status and timeline of the METIS initiative, including recent pilot projects
- Upcoming innovations.