



# India's next phase of exploration needs a new seismic approach



Sam Moharir

As India accelerates domestic hydrocarbon exploration under HELP and OALP, land seismic acquisition is becoming a critical bottleneck, particularly in terms of cost, timelines, HSE exposure and surface impact. The article examines why traditional cabled seismic systems are increasingly misaligned with India's operating realities, and how cable-free nodal seismic offers a scalable, lower-impact alternative.

Drawing on experience from more than 250 onshore projects worldwide, including the world's largest 3D nodal seismic survey, the piece outlines how high-density nodal acquisition can improve subsurface imaging, reduce logistics complexity and support faster exploration across both mature and frontier Indian basins.

**H**aving enabled more than 250 onshore oil and gas exploration projects worldwide, the STRYDE nodal seismic acquisition system has already transformed hydrocarbon development in diverse operating environments.

Today, STRYDE's agile, cable-free technology is well positioned to support the next phase of India's oil and gas growth - delivering higher-quality subsurface imaging in less time, with fewer resources and at significantly lower cost.

## A Renewed Push for Domestic Exploration

India is entering a renewed phase of hydrocarbon exploration. Through the Hydrocarbon Exploration and Licensing Policy (HELP) and the Open Acreage Licensing Programme (OALP), the government continues to open new blocks and attract fresh investment, while national initiatives are directly funding seismic acquisition to accelerate discoveries and reduce import dependence.

Exploration activity is increasing across both mature basins and frontier areas, with national operators such as ONGC and Oil India intensifying onshore and offshore programmes. As the scale and pace of exploration grows, the efficiency and effectiveness of seismic acquisition will be critical to success.

## Moving Beyond the Limits of Traditional Cabled Seismic

Historically, land seismic acquisition in India has relied on large-scale cabled systems, requiring thousands of kilometres of cables, extensive line preparation and large field crews. While proven and familiar, these systems drive high operational costs, complex logistics and long

acquisition timelines.

This reliance is rooted as much in legacy investment as in technology. Decades of experience with cabled spreads have shaped tender specifications, workflows and training, reinforced by recent procurements of new-generation cable-based systems. For many operators, cables remain the perceived low-risk option for delivering predictable data quality.

However, as India's exploration ambitions scale under tighter timelines, stricter HSE expectations and increasing sensitivity to land access and environmental footprint, the limitations of cable-based acquisition are becoming harder to ignore, especially given the need to reduce costs to maintain or reduce exploration costs.

## India's Operating Reality Exposes Cable Constraints

India's most prospective basins - including Krishna-Godavari, Cambay, Rajasthan, Assam-Arakan Fold Belt and Cauvery - span highly varied and challenging surface environments. Surveys frequently cross farmland, forests, deserts, wetlands, foothills and densely populated areas.

Land access is often fragmented across many small landholders, permitting is time-critical, and the monsoon season compresses operational windows while stressing logistics. In these conditions, dense field cabling becomes vulnerable to damage, weather-related wear and tear, and repeated downtime - often becoming the dominant driver of cost and delay.

In addition, traditional cabled systems require large, heavy digitiser units powered by hundreds of batteries distributed across the spread. Any cable damage can result in significant lost production time, while system



Photo courtesy : Claudio Strobbia

Figure 1- Single sensor STRYDE node size compared to cabled geophones

weight and complexity limit receiver density, with station spacings often extending to 45 m or more.

**A Step-Change with Cable-Free Nodal Seismic**

Nodal seismic systems remove thousands of kilometres of vulnerable field cable and significantly reduce the daily labour associated with laying, monitoring, repairing and retrieving it. The result is a simpler, faster and safer field workflow with fewer vehicles, smaller crews and a much lower surface footprint - key advantages in cultivated and environmentally sensitive areas.

STRYDE's nodal system significantly reduces personnel requirements, simplifies logistics and minimises line preparation, representing a step-change in how land seismic surveys can be executed in India.

acquisition costs, a reduced HSE footprint - cutting field crews from around 600 to approximately 220 and vehicles from 160 to about 40 - and improved access across challenging sabkha and dune environments, all while maintaining high-quality seismic data."

Lightweight, easy-to-deploy nodes are proven to allow more equipment to be rolled out faster, enabling more efficient shooting strategies and accelerated project timelines. Where source productivity or terrain becomes the limiting factor, receiver density can be increased to reduce the number of source points required - giving survey designers greater flexibility to optimise geometry for both speed and imaging quality.

**Unlocking Value Across Mature and Frontier Basins**

This flexibility is particularly valuable in India's diverse exploration portfolio. In mature basins, high-density nodal geometries can sharpen imaging and reveal subtle stratigraphic traps overlooked by legacy data. In frontier acreage under OALP, improved velocity models and structural clarity early in the licence cycle help de-risk exploration and accelerate the path to drill-ready prospects.

In both scenarios, faster, less intrusive operations allow operators to maximise short weather windows and move more quickly from seismic acquisition to interpretation and



Figure 2 - 166,000 STRYDE nodes in Oman

drilling decisions.

STRYDE's nodal solution and integrated services enable seismic data to be acquired and delivered at a far faster rate than traditional cabled approaches. At scale, this translates into broader operational efficiencies, reduced environmental impact and improved capital efficiency across exploration programmes.

As India looks to strengthen energy security and accelerate domestic resource development, cable-free nodal seismic offers a clear path forward - unlocking larger, denser surveys, shortening turnaround times and

supporting a more efficient and sustainable future for the country's oil and gas industry. [dewjournal.com](https://dewjournal.com)

**about the author**

Sam Moharir has over 30 years of experience in the geophysical sector, specialising in the leadership and commercialisation of land seismic technologies and services. Sam brings deep insight into what it takes to deliver high-quality seismic data that enables better subsurface decision-making, helping drive the adoption of innovative, next-generation acquisition solutions across global markets.

## VIRIDIEN

# Viridien's major multi-client reimagining program in Malaysia

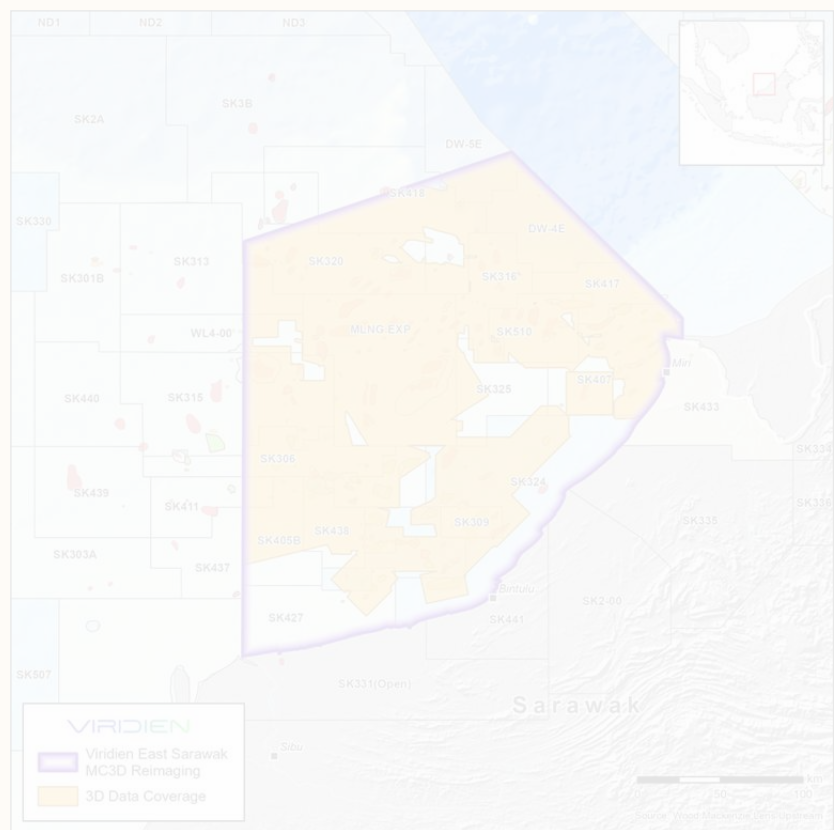
Viridien has announced on January 7, 2026 a new basin-scale reimagining program within the hydrocarbon-prolific Balingian-Luconia-Baram basins, in collaboration with PETRONAS, through Malaysia Petroleum Management.

Viridien will leverage its industry-leading imaging technologies to reimage 44,000 km<sup>2</sup> of legacy 3D seismic data, commencing in January 2026 with a basin-wide post-stack merge to deliver early data and key insights for further high-end reimagining. Prefunding is now open, allowing early participants to access initial results and benefit from enhanced imaging beneath complex carbonate sequences and resolve long-standing velocity and attenuation challenges to unlock underexplored plays.

Dechun Lin, Head of Earth Data, Viridien, said: "Supported by Viridien's extensive regional imaging experience and geological insights from our proprietary GeoVerse™ database, the project will deliver a clearer, more reliable subsurface picture, enabling higher-confidence interpretation and improved prospect identification."

Viridien is an advanced

technology, digital and Earth data company that pushes the boundaries of science for a more prosperous and sustainable future. With our ingenuity, drive and deep curiosity we discover new insights, innovations, and solutions that efficiently and responsibly resolve complex natural resource, digital, energy transition and infrastructure challenges. [dewjournal.com](https://dewjournal.com)



Map showing location of Viridien's Malaysia multi-client reimagining program (courtesy of Viridien Earth Data).