eBook

STRYDE

HOW MUCH DOES A STRYDE SURVEY COST?

A comparative analysis of a 10,000 + km^2 onshore desert vibroseis seismic survey to evaluate the impact of receiver equipment types (cabled, conventional node and STRYDE node) on survey design, CAPEX and OPEX.

CONTENTS

INTRODUCTION

In today's competitive energy landscape, optimizing seismic acquisition efficiency while controlling costs is critical, particularly in the challenging desert environments of the Middle East and North Africa region.

As companies strive to meet increasing demand for accurate subsurface data, leveraging the right technologies can dramatically impact project outcomes.

This eBook addresses a crucial need: the ability to reduce timelines and expenses without compromising data quality.

By comparing innovative solutions like STRYDE nodes to traditional cabled geophones and other nodal systems, we'll reveal how modern seismic techniques can optimize trace density, streamline operations, and ultimately deliver significant cost savings for onshore seismic projects.

We showcase detailed cost modelling and comparative analysis between STRYDE nodes, competing nodal technologies, and cabled geophones.

Insights presented by

Mehdi Tascher

A skilled professional with extensive experience in geophysics, seismic acquisition, and energy operations. He has a strong technical background in seismic data acquisition techniques, particularly in onshore environments.

Mehdi has worked in various capacities within the oil and gas industry, focusing on optimizing operational efficiency, reducing costs, and improving project timelines through innovative solutions. His expertise includes using cutting-edge seismic technology to improve data quality and acquisition in challenging environments like the deserts of the Middle East and North Africa (MENA). He is dedicated to driving innovation in the energy sector by leveraging new technologies to enhance seismic projects.

Claudio Cardama

A highly experienced geophysicist in the oil and gas industry, with a strong focus on seismic operations, field engineering, and project management.

Throughout his career, he has held leadership roles in overseeing seismic acquisition projects, working extensively in both onshore and offshore environments. Claudio is known for his ability to manage complex field operations, optimize workflows, and ensure safety and efficiency in high-stakes projects. His expertise spans geophysical technologies, operational logistics, and team leadership, making him a valuable asset in executing large-scale energy projects in diverse and challenging environments. He is passionate about integrating innovative solutions to improve operational outcomes in the energy sector.

Key factors constraining design and budget of an onshore seismic survey

PROJECT DESIGN

- 3D
- 2D
- Dense vs sparse Receiver Points (RPs)
- Dense vs sparse Source Points (SPs)
- Surface obstacle and no-permit zones
- Geological objective depth

EQUIPMENT

- Camp
- Surveying
- Source
- Vehicles
- Recording (total channels and maximum daily roll-rate)

SUPPLIES

- Fuel, Lubricants
- Spare parts
- Water, Food
- Accommodation and facilities
- PPE
- Other consumables

CREW HEADCOUNT

- Support
- Base Camp
- Surveying
- Recording
- Vibrator
- QC
- HSE

DURATION

- Acquisition method: Flip/Flop, DS3, DS4, Blended (ISS)
- 12 or 24 hour recording
- Total required channel count
- Layout capacity
- Pickup capacity
- Maximum daily channel roll-rate
- Technical downtime
- Other downtime e.g. weather-related

ENVIRONMENT

- Flat gravel plain
- Desert
- Rolling sand dune
- High dune
- Sabkha
- Farming
- Congested oil field
- Demining ERW
- Bulldozing line clearance
- Remoteness
- Social environment

"These environmental factors play a pivotal role in shaping your project's final cost and design options. It is essential to evaluate them thoroughly during the design phase, as they directly influence operational efficiency, logistical requirements, and overall project feasibility."

Mehdi Tascher

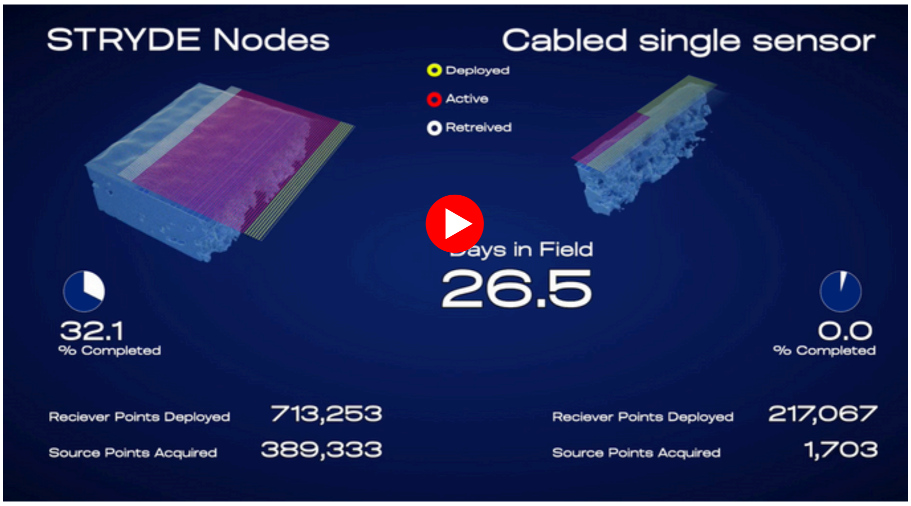
Recording equipment

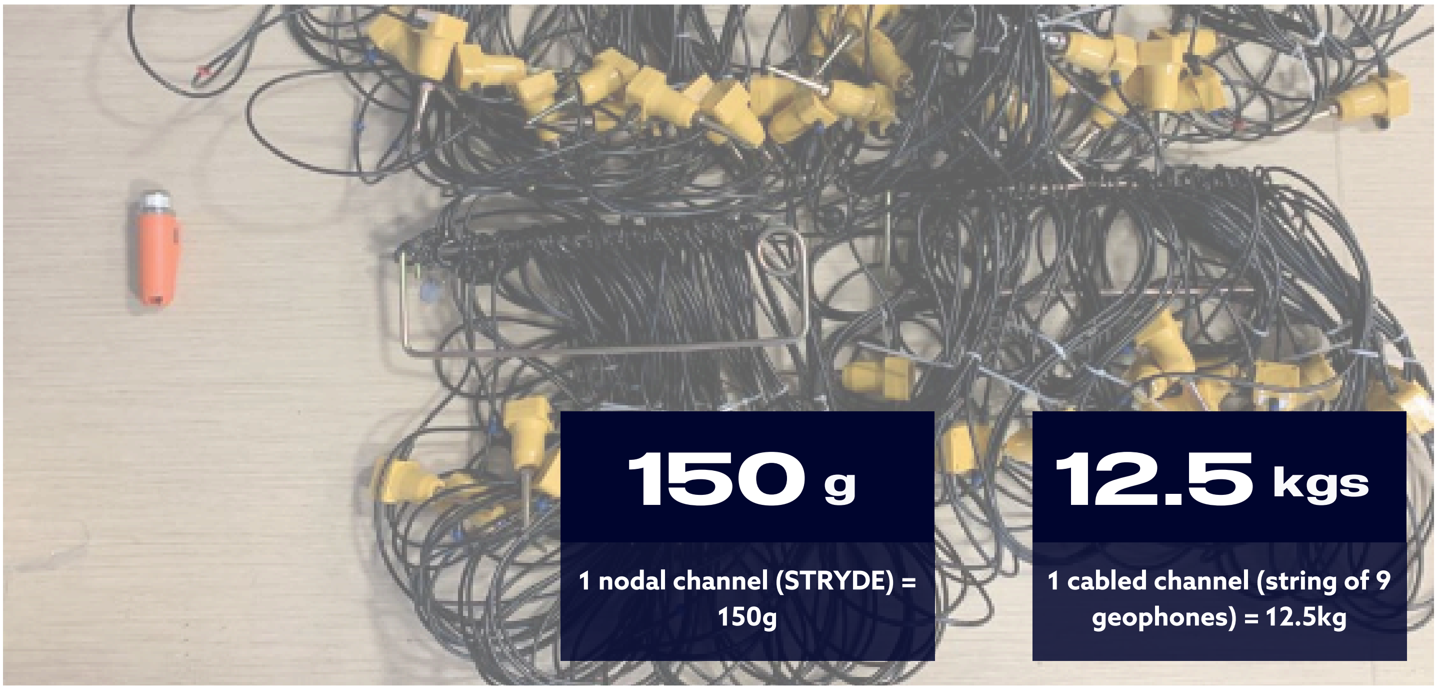
Cables vs nodes

Seismic survey efficiency differs dramatically depending on the type of seismic sensor used.

The video on the right compares the operational efficiency of STRYDE's seismic nodes compared to cabled acquisition for a 3D seismic survey in a desert environment.

Click on the image to watch the video.





"Carrying 100 STRYDE nodes is equivalent to transporting a single string of 9 geophones along with one cable. Unlike other cabled or nodal systems, STRYDE nodes can be fully buried, leaving the surface entirely unobstructed—ideal for seamless environmental and source operations, and providing best possible data quality.

"This dramatic reduction in weight and operational complexity unlocks significant efficiencies for seismic crews, streamlining workflows and enhancing overall productivity."

Mehdi Tascher

Recording equipment

STRYDE nodes vs other nodes

Image courtesy of Tim Dean.

The STRYDE node; the smallest and lightest seismic node on the market today - as of April 2025. (150g)

KEY FACTORS TO EVALUATE WHEN SELECTING NODES

- Weight, size, battery life, memory, ecosystem
- Surveying while deploying
- Buried node or surface node
- Ease of deploying/retrieving, planting and re-planting in the field
- Individual or bulk handling of nodes in camp
- Maintenance
- Operational costs (OPEX)
- Capital costs (CAPEX)
- Reliability

"The relative size of the STRYDE node is shown in the bottom right corner of the image above. Its exceptionally lightweight design significantly enhances ease of transport both into and within the field.

"In my view, one of the greatest advantages of this system is its unparalleled portability. This not only delivers financial and operational efficiency benefits for seismic data acquisition companies but also has a profound impact on the well-being of the field crew. The lightweight nature of the nodes means they are easier to handle and require less physical exertion during deployment and retrieval, significantly reducing fatigue and the risk of strain-related injuries.

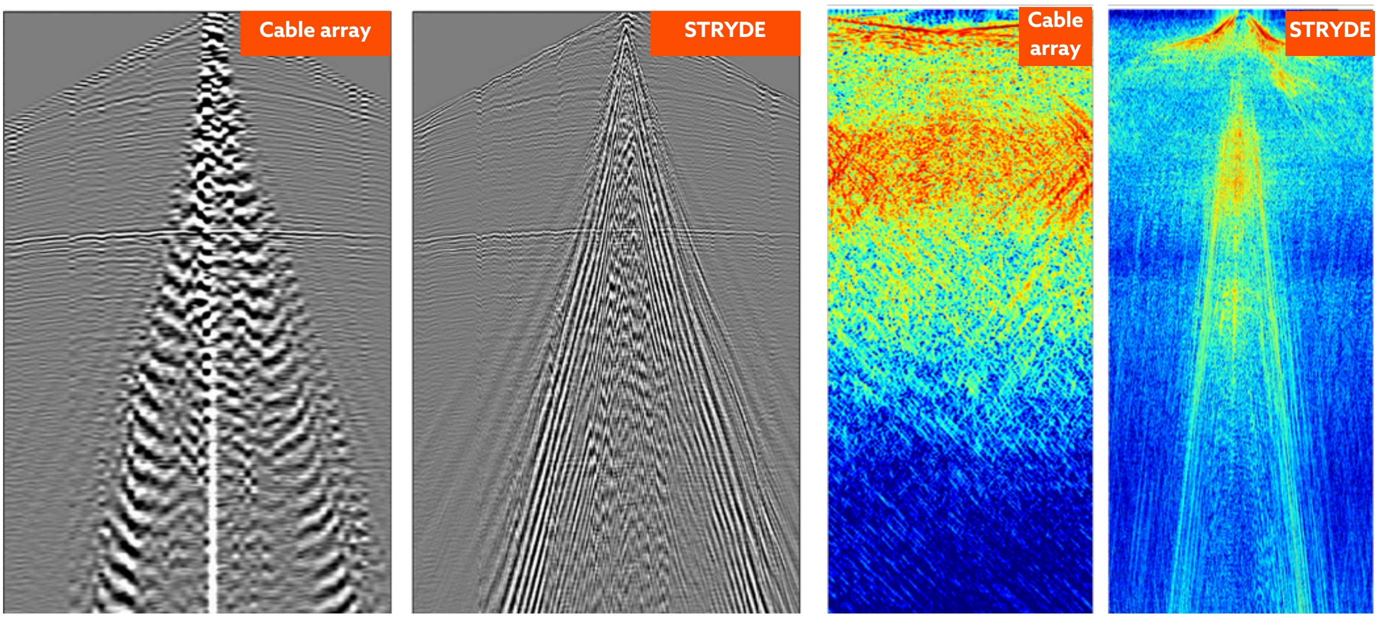
"Additionally, the reduced weight and compact design mean fewer resources are needed to transport the equipment, which often translates to less time spent in challenging environments. This limits the crew's exposure to extreme weather conditions, rough terrains, and other occupational hazards typically encountered in seismic operations."

Claudio Cardama

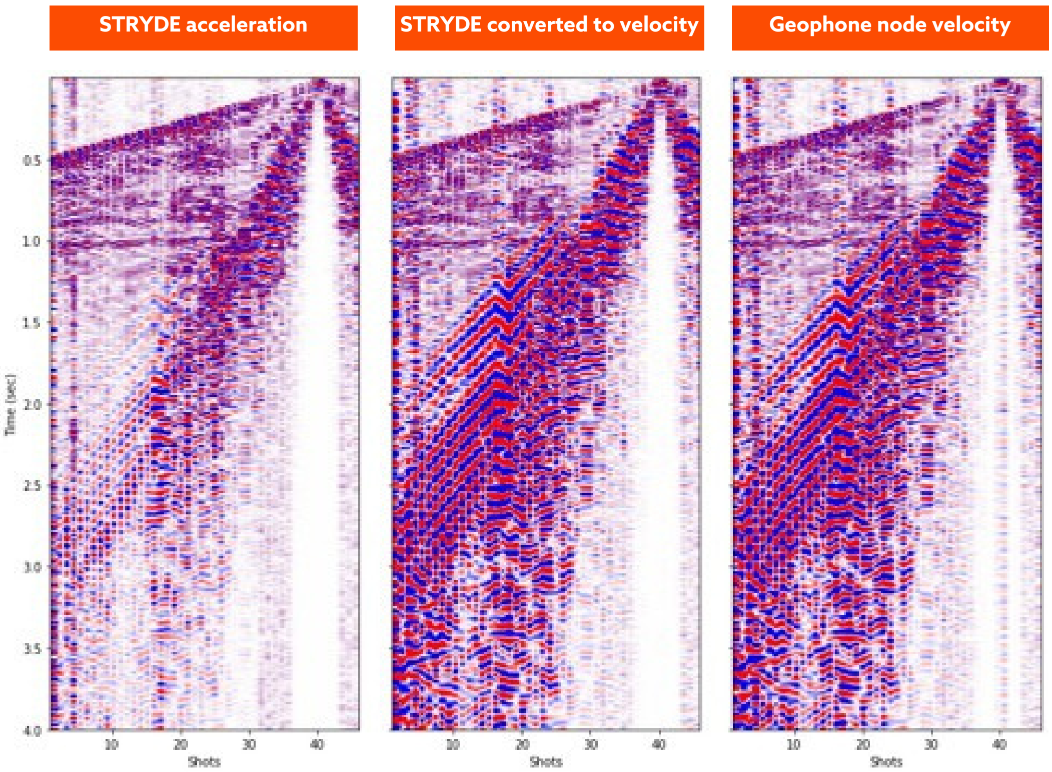
Seismic data comparisons

Data acquired with cables vs STRYDE nodes vs other nodes, offering clear evidence that STRYDE nodes deliver high-fidelity seismic data.

5x300m STRYDE nodes vs 50x300m 12-Geophone array cable system



A comparison of common shots, STRYDE vs a geophone node



CASE STUDY

Location:

MENA region

Terrain:

Onshore

Design:

3D

Size:

10,000 + km^2

Source type:

Vibroseis

Project design information

2 EQUIPMENT TYPES X 2 DESIGNS

- **1 X-node (generic) + string of 9 geophones per RP**
- **4 STRYDE nodes per RP)**

&

- **25m RI and 25mRLI**
- **@25mRI and 50mRLI**
- **All laid out in square array**

This case study is based in the MENA region, for a higher-density, multi-year seismic program.

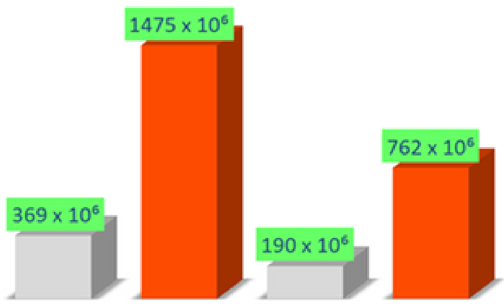
It compares two seismic survey configurations: X-node with a string of 9 geophones versus STRYDE 4- individual nodes in an array with two different trace densities. The analysis evaluates performance and efficiency under two receiver layouts:

- 25m Receiver Interval (RI) and 25m Receiver Line Interval (RLI)
- 25m Receiver Interval (RI) and 50m Receiver Line Interval (RLI)

In both scenarios, the source grid remains consistent at 25m x 25m, ensuring comparable survey conditions. A key distinction highlighted is that the X-node with a string of geophones requires connectors and surface equipment that are not buried, increasing complexity and logistical requirements.

SUMMARY TABLE CASE STUDY #2	OPTION 112	OPTION 412	OPTION 113	OPTION 413
LayOut Type	Generic NODE +9xGEOs	STRYDE 4 x Nodes	Generic NODE +9xGEOs	STRYDE 4 x Nodes
RI (m)	25	25	25	25
RLI (m)	25	25	50	50
SI (m)	25	25	25	25
SLI (m)	25	25	25	25
Surface Adquisition (Km2)	+10000	+10000	+10000	+10000
Receiver Density (Receivers / Km2)	1280 Recvs./Km2	1280 Recvs./Km2	800 Recvs./Km2	800 Recvs./Km2
Source Density (SPs / Km2)	1200 SPs/Km2	1200 SPs/Km2	1200 SPs/Km2	1200 SPs/Km2
Trace Density before DGF (x 10^6 traces/km2)	369×10^6	1475×10^6	190×10^6	762×10^6
Trace Density after DGF (x 10^6 traces/km2)	369×10^6	369×10^6	190×10^6	190×10^6
Qty of Receivers to Layout per Day	10124 Recvs./Day	53398 Recvs./Day	6327 Recvs./Day	33374 Recvs./Day
Days Receivers stays in the ground	24	16	24	16
Recording Duration (Total days)	1504	1143	1504	1143
Number of Vibrator's fleets (production)	16	16	16	16
TOTAL VP's	16,727,676 SPs	16,727,676 SPs	16,727,676 SPs	16,727,676 SPs
Recording Channel on Crew (Qty)	241,083 Rcvs	828,604 Rcvs	150,677 Rcvs	517,877 Rcvs

TRACE DENSITY BEFORE DGF (x 10^6 traces/km2)



OPTION 112	OPTION 412	OPTION 113	OPTION 413
X NODE +9GEOs	STRYDE 4N	X NODE +9GEOs	STRYDE 4N
369×10^6	1475×10^6	190×10^6	762×10^6

The importance of "discreet operations"

Stealth operations are critical in land seismic surveys, particularly in environments where minimizing visibility and disruption are essential. The ability to conduct seismic recording with minimal surface footprint enhances operational efficiency, reduces risk, and ensures high-quality data acquisition without external interference.

A key factor in achieving true stealth in seismic acquisition is the ability to fully bury the seismic sensor—a capability that STRYDE's nodal technology uniquely provides. Unlike traditional cabled systems or other nodal solutions, which require above-ground components or external connectors, STRYDE nodes are designed for complete burial, providing unparalleled advantages in seismic operations.

Why full burial matters

Zero surface obstruction for source operations
With no exposed cables or equipment, source teams operate without obstructions, allowing more flexible and dense positioning - optimizing survey efficiency and data quality.

Minimal environmental and wildlife disturbance
Exposed equipment can disrupt natural habitats and local activities. Fully buried nodes blend into the environment, minimizing impact on wildlife, livestock, and land use.

Eliminating noise and external interference
Above-ground equipment is vulnerable to noise from wind, vibration, temperature fluctuations, and human activity. Fully buried nodes prevent these issues, ensuring a clean seismic signal.

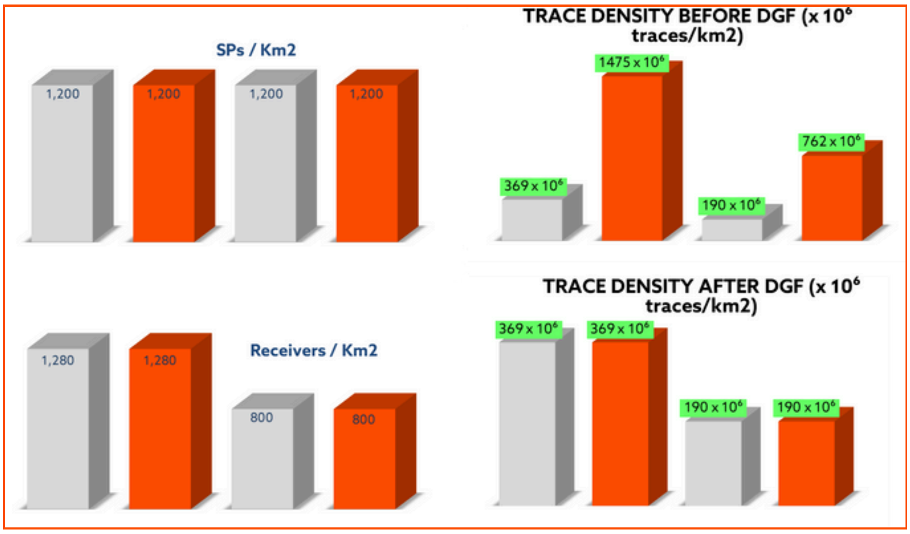
Production continuity – no delays or interruptions
Cabled systems and surface nodes require maintenance and repositioning, leading to downtime. Fully buried nodes stay in place for the survey's duration, reducing disruptions and enabling faster acquisition.

Reduced risk of theft
Fully buried nodes ensure the seismic recording system is invisible to third parties, reducing the risk of tampering, theft, or unwanted attention—crucial in high-security or environmentally sensitive areas.

"No other nodal or cabled system can offer true stealth. STRYDE's fully buryable node is the only system that enables a completely autonomous, hidden, and interference-free recording system - translating into higher efficiency, better data quality, and fewer operational risks."

Mehdi Tascher

Density: native and after DGF



OPTION 112	OPTION 412	OPTION 113	OPTION 413
XNODE +9GEOs	STRYDE 4N	XNODE +9GEOs	STRYDE 4N
369×10^6	1475×10^6	190×10^6	762×10^6

The STRYDE 4 node array at 12.5m x 12.5m grid enables the best possible imaging but generates too much data for current processing capacities, making it expensive and impractical in 2024.

To address this, STRYDE's infield data management solution (part of the its containerised receiver system), enables on-the-fly DGF, reducing data volume to match that of a node/string system while preserving the native high-density data for future processing.

How DGF Works:

Data collection:

- Individual nodes are deployed across the survey area, each operating independently to record seismic data.

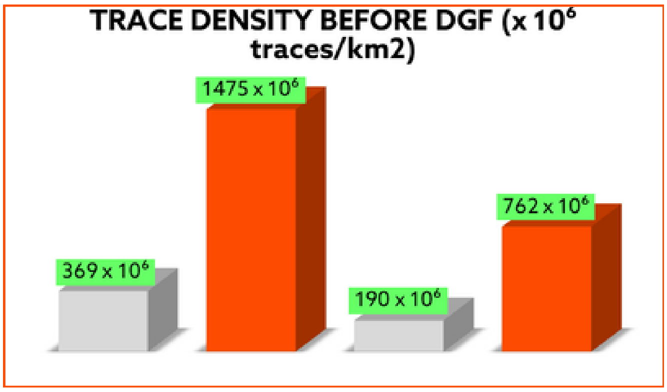
Digital combination:

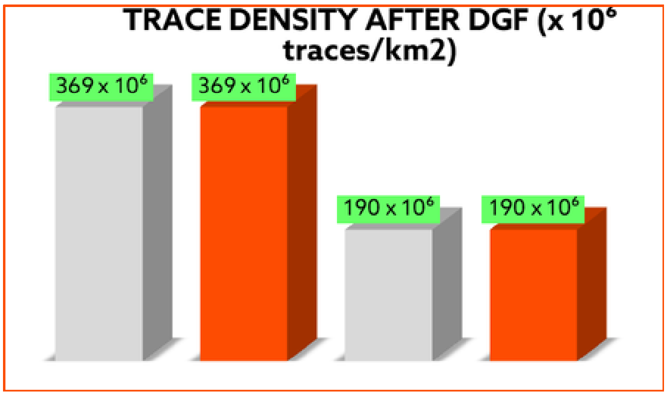
- After data is recorded, DGF algorithms process the signals from multiple nearby nodes (often deployed in close proximity) to combine their responses.
- This "virtual grouping" mimics the functionality of physical geophone arrays, enhancing the signal-to-noise ratio (SNR) of the seismic data.

Advantages of DGF:

- By averaging or digitally filtering the combined data, DGF suppresses random noise and amplifies coherent seismic signals, producing a clearer and more accurate image of the subsurface.
- This is achieved without the need for physical connectors, geophone strings, or additional field hardware.
- DGF allows for greater flexibility in node deployment since physical arrays aren't needed.
- It reduces the logistical challenges of deploying and maintaining cables or geophone strings, significantly improving survey efficiency and reducing costs.
- Faster deployment and retrieval due to the absence of cables or strings.
- Reduced labour and operational complexity.

DGF in the field





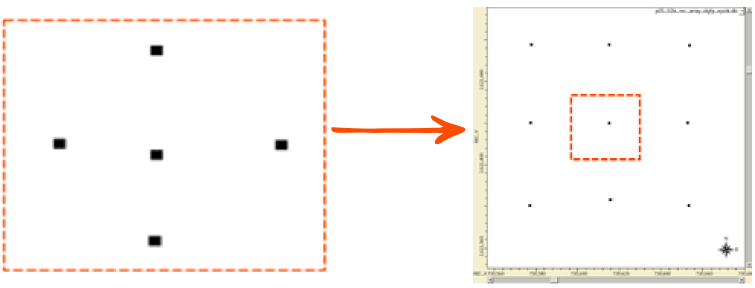
OPTION 112	OPTION 412	OPTION 113	OPTION 413
XNODE +9GEOs	STRYDE 4N	XNODE +9GEOs	STRYDE 4N
369×10^6	1475×10^6	190×10^6	762×10^6

The main challenge in the field is managing the large data volumes generated during high-density, large-scale seismic surveys, post-recording.

The solution is to implement DGF immediately after data harvesting.

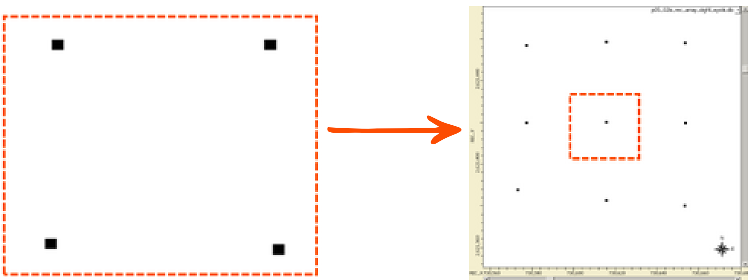
This approach reduces the data volume, ensuring it remains manageable for the processing center, both technically and within budget, preventing bottlenecks in data processing workflows and delays to accessing data.

DGF (+) on STRYDE node



- Receivers dropped before sum
- Single receiver created at centre of mass

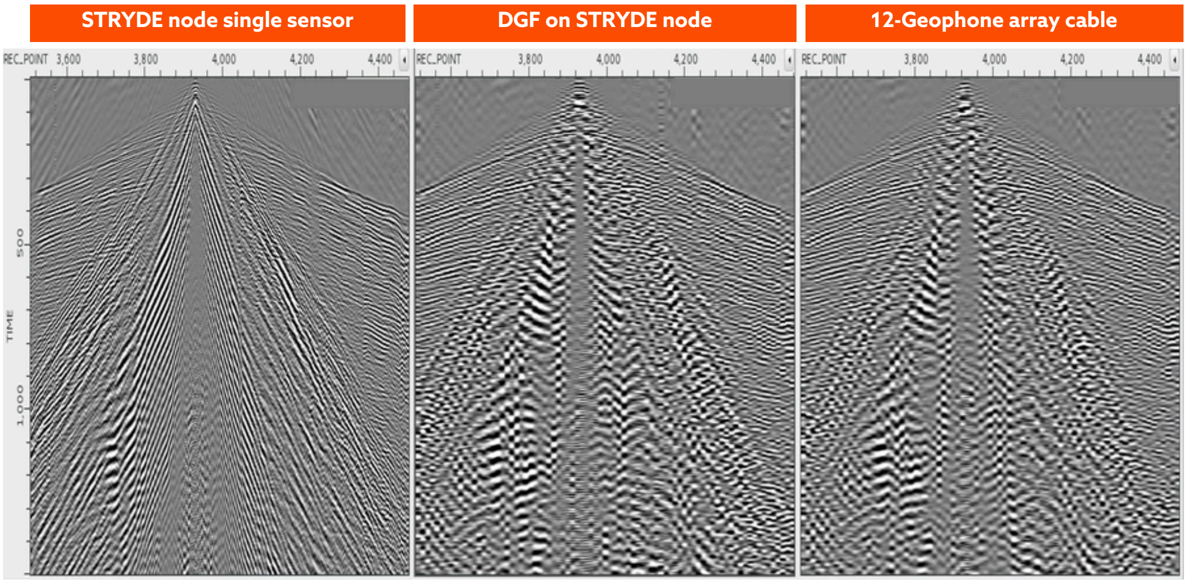
DGF (4) on STRYDE node



- Receivers dropped before sum
- Single receiver created at centre of mass

Data example

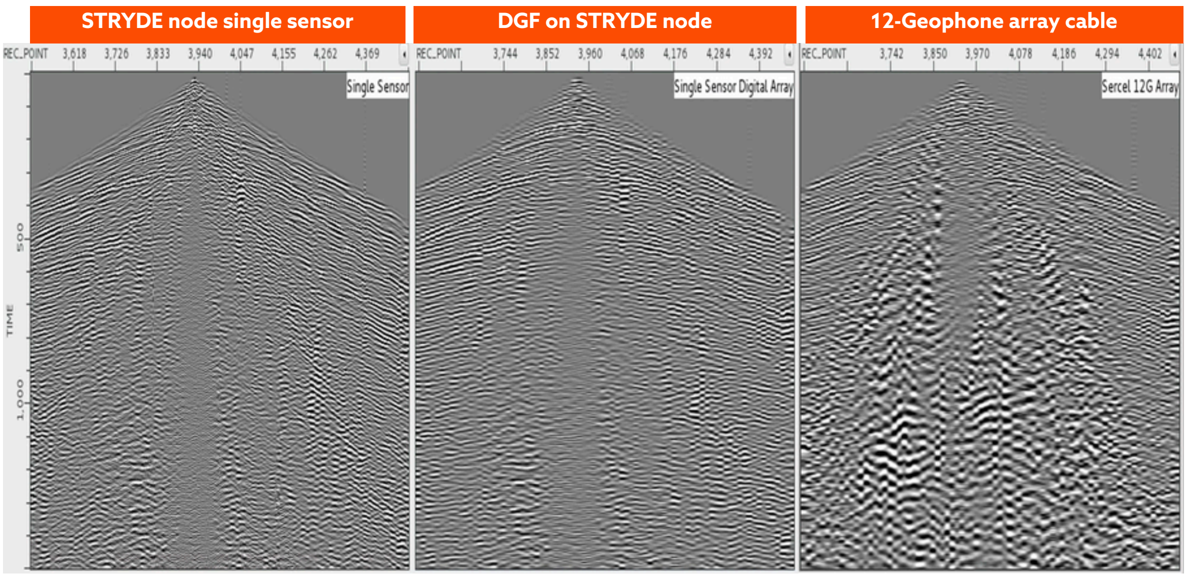
Single sensor vs Digital array forming vs Physical array **before** linear noise attenuation



Reference:

A comparative field trial of a new STRYDE node and cabled systems in a desert environment (Ourabah et al, 2019). https://doi.org/10.3997/2214-4609.201901136

Single sensor vs Digital array forming vs Physical array **after linear noise attenuation**



Reference:

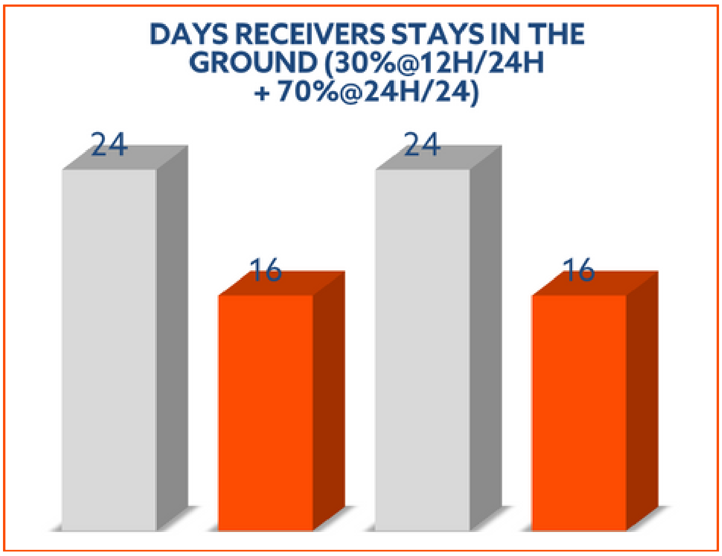
A comparative field trial of a new STRYDE node and cabled systems in a desert environment (Ourabah et al, 2019). https://doi.org/10.3997/2214-4609.201901136

This comparison confirms that applying DGF to STRYDE single sensor data produces a dataset that is equivalent in quality and structure to physically arrayed geophone data, both in terms of:

- Signal integrity
- Noise behavior
- Reflector continuity

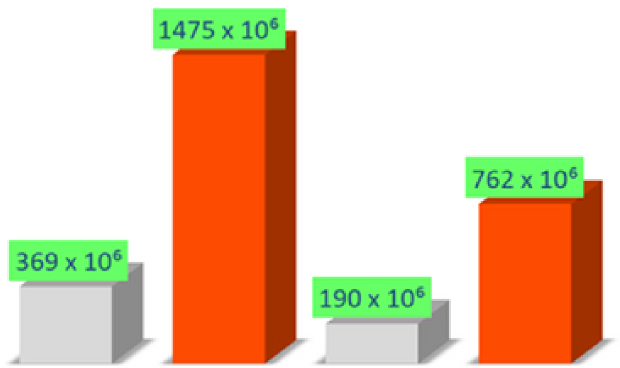
This demonstrates that STRYDE's DGF workflow can confidently replace physical array deployments, offering all the operational and logistical benefits of nodal acquisition without sacrificing data quality.

Recording duration



OPTION 112	OPTION 412	OPTION 113	OPTION 413
XNODE +9GEOs	STRYDE 4N	XNODE +9GEOs	STRYDE 4N
369 x 10^6	1475 x 10^6	190 x 10^6	762 x 10^6

TRACE DENSITY BEFORE DGF (x 10^6 traces/km2)



The graph highlights the number of days receivers stay in the ground during a seismic survey, which is a critical planning factor for node-based seismic programs.

Key considerations include:

Recording durations:

- 30% of the nodes operate for 12 hours per day, while 70% record continuously for 24 hours.
- The X node and geophone system remains on the surface, making the survey vulnerable to operational challenges during vibrator activities.

Operational complexity:

- Receivers are placed in a square grid pattern and are designed to record vibrations generated by the grid of vibrators shaking every 25 meters, both inline and crossline.
- However, because the X-node and geophone systems are located on the surface, they can interfere with vibrator operations, causing delays. This is particularly disruptive as vibrators must carefully manoeuvre around the visible nodes, increasing the time required to complete operations.

Impact on resources:

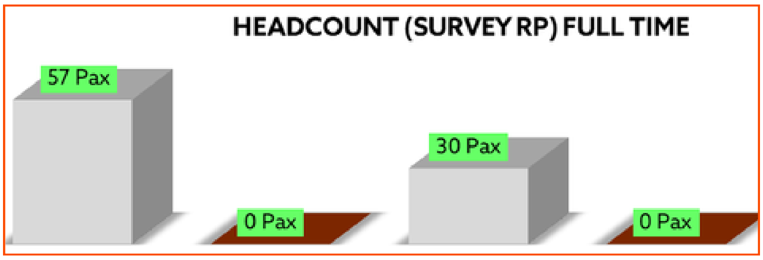
- The increased time needed for vibrator operations leads to higher project headcount and additional resource requirements, directly impacting the project timeline and budget.

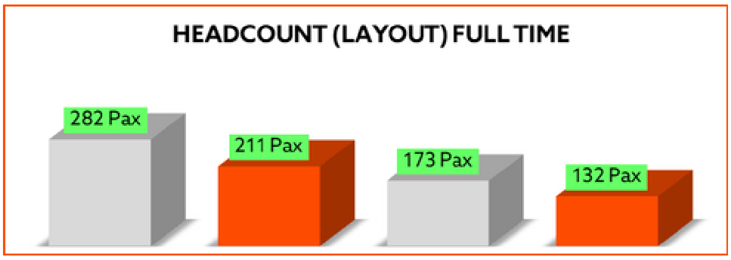
"Careful planning of node placement and recording durations is essential to minimize disruptions to vibrator operations.

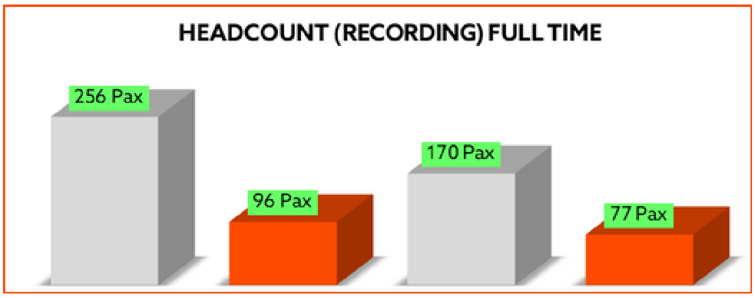
"STRYDE nodes' compact design and streamlined deployment process can significantly reduce these operational challenges, minimizing delays and resource demands, thereby ensuring cost-effective and efficient project execution."

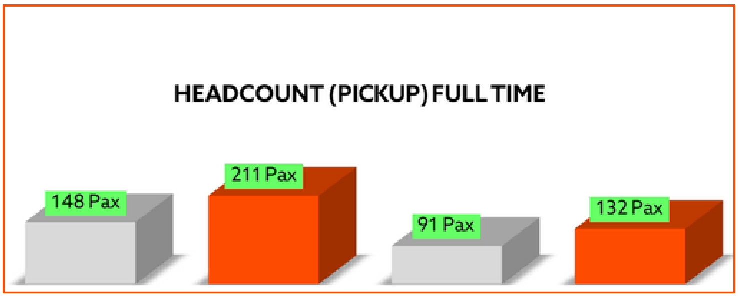
Mehdi Tascher

Project headcount optimization







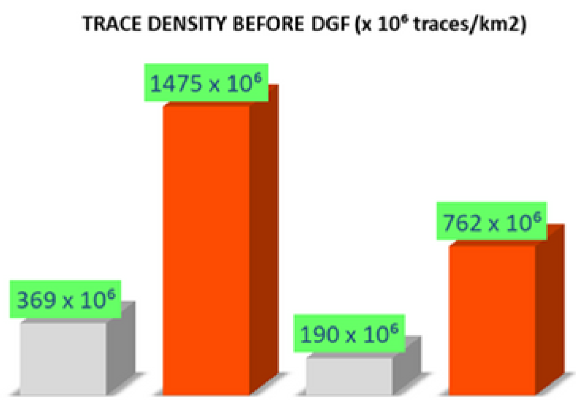


The graphs illustrate the significantly higher number of personnel required for the X-node-geophone system compared to the STRYDE node survey.

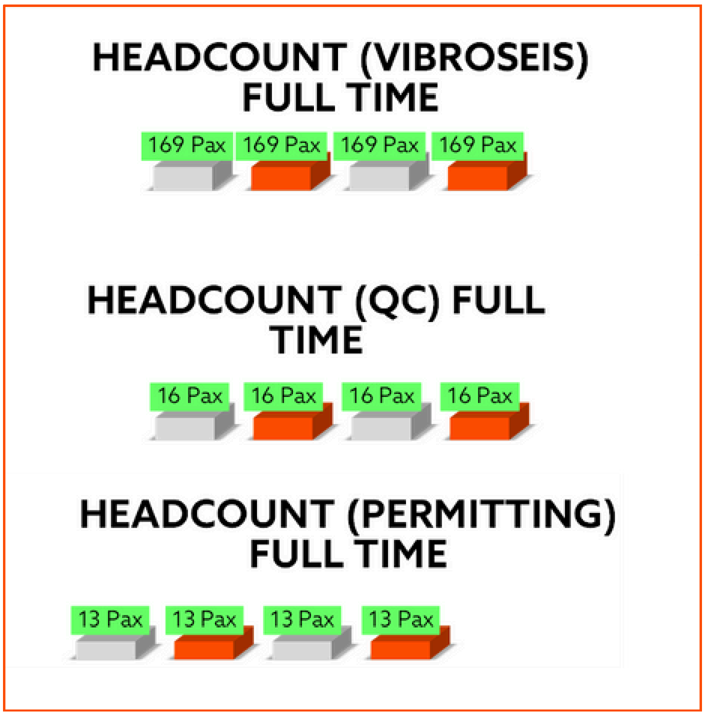
This disparity is primarily due to the need for pre-surveying, the complexity of layout and pickup operations, and the labour-intensive, manual tasks involved in managing the recording department for the X-node-geophone system.

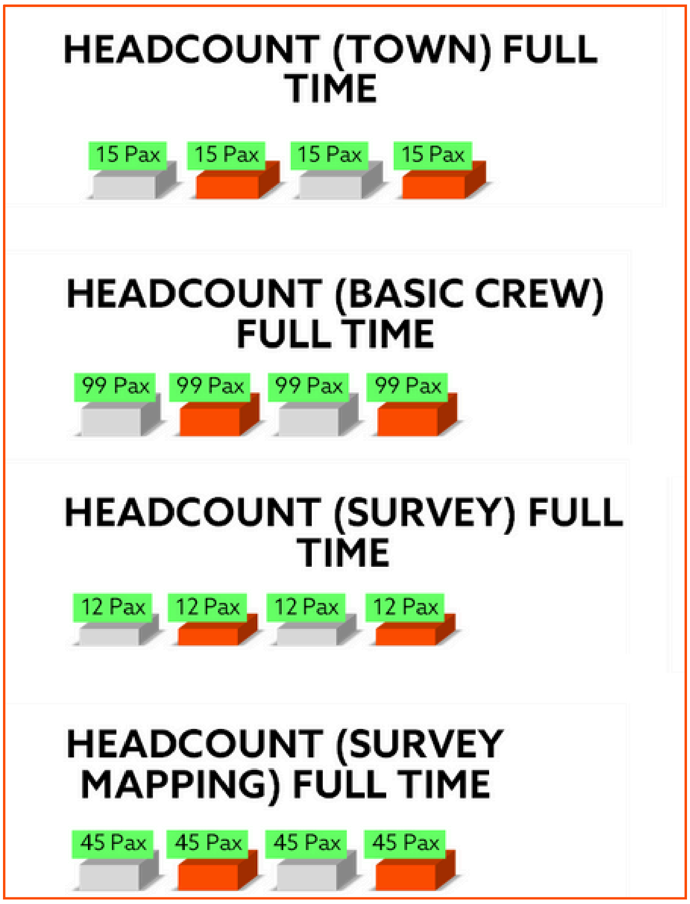
In contrast, STRYDE's agile, lightweight, and automated processes, allow for optimized headcount across all operations. This efficiency reduces logistical challenges, minimizes labour requirements, and enhances overall project productivity.

OPTION 112	OPTION 412	OPTION 113	OPTION 413
XNODE +9GEOs	STRYDE 4N	XNODE +9GEOs	STRYDE 4N
369 x 10^{6}	1475 x 10^{6}	190 x 10^{6}	762 x 10^{6}



Project headcount: all departments

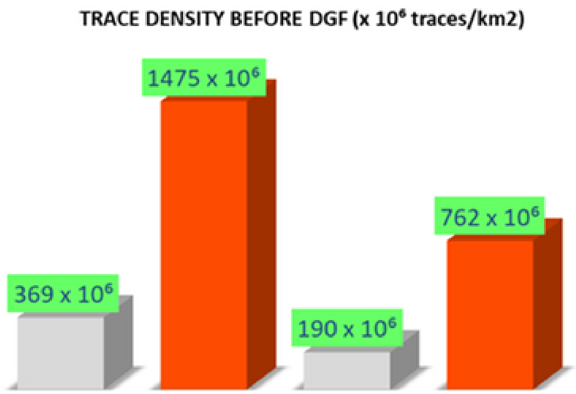




"These graphs illustrate that the number of personnel required per department remains consistent across different receiver types, regardless of the technology used.

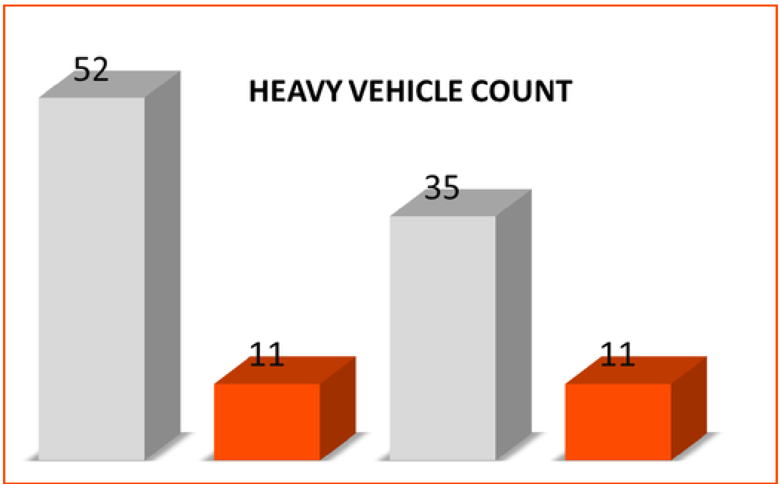
"Departments such as vibroseis operations, quality control (QC), and permitting show no significant variation in manpower needs, as their tasks are independent of the receiver system being deployed. "

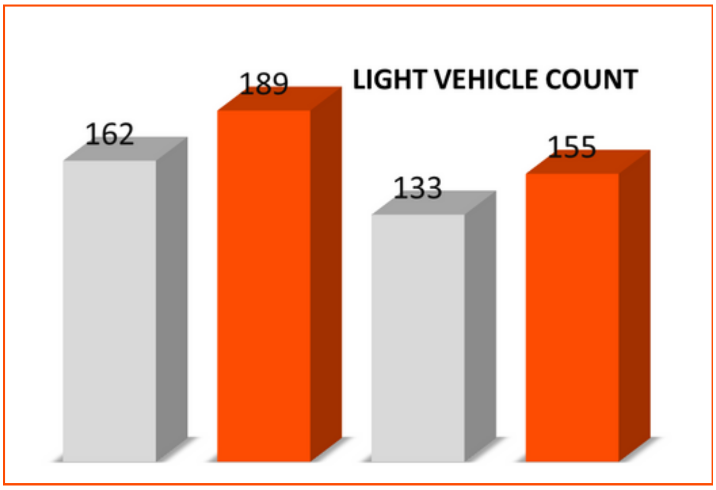
Mehdi Tascher



OPTION 112	OPTION 412	OPTION 113	OPTION 413
XNODE +9GEOs	STRYDE 4N	XNODE +9GEOs	STRYDE 4N
369×10^6	1475×10^6	190×10^6	762×10^6

Project vehicle count





The comparison of heavy and light vehicle counts demonstrates a significant difference in requirements when using STRYDE nodes versus the x-node-geophone system:

Heavy vehicle requirements:

- Less heavy vehicles are required for the STRYDE node deployment, in stark contrast to the other X- node-geophone system which relies on heavy vehicles to transport bulky equipment in and out of the field.
- This reduction reduces the logistical challenges and costs associated with heavy vehicle operation and maintenance, offering a major advantage in terms of efficiency and environmental impact on the STRYDE survey.

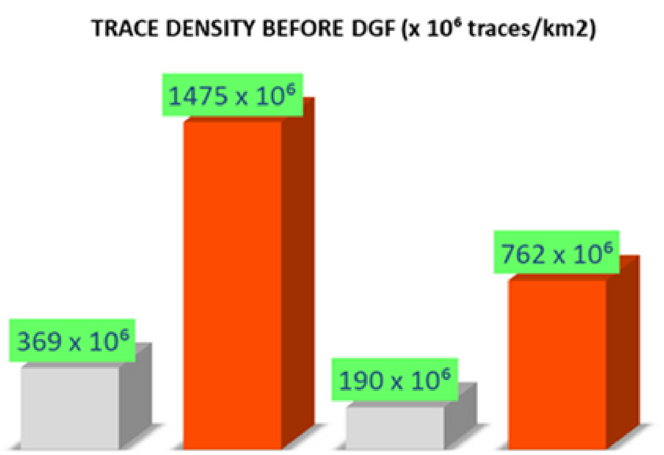
Light vehicle requirements:

- STRYDE node operations require slightly more light vehicles compared to other systems. This increase is attributed to the deployment of 4x more channels on the ground, enabling a much higher trace density. With STRYDE's compact and lightweight design, these additional light vehicles are sufficient to handle the logistics of deploying and retrieving nodes at this increased density.

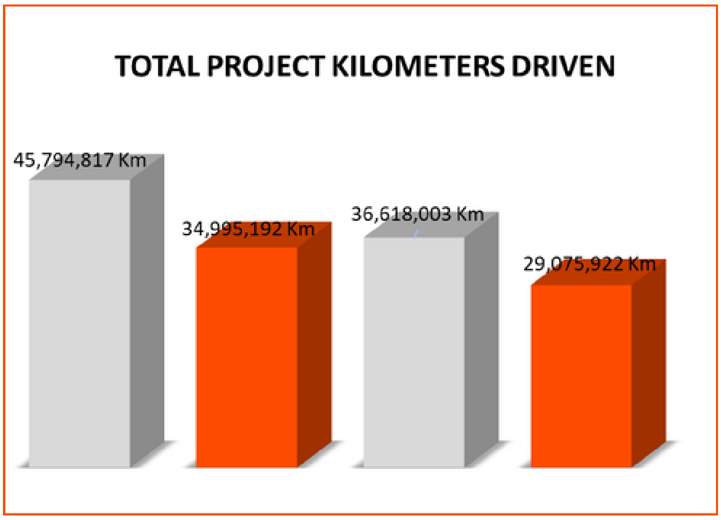
"The ability to achieve 4x higher trace density with minimal operational burden further underscores the efficiency and scalability of STRYDE system for modern seismic surveys."

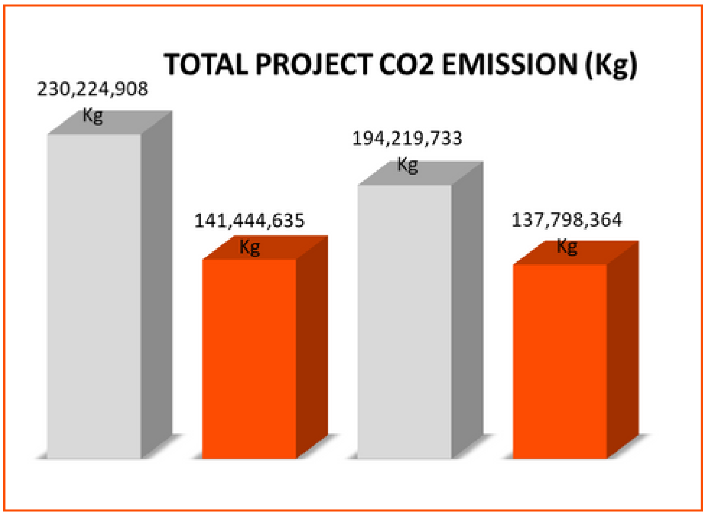
Claudio Cardama

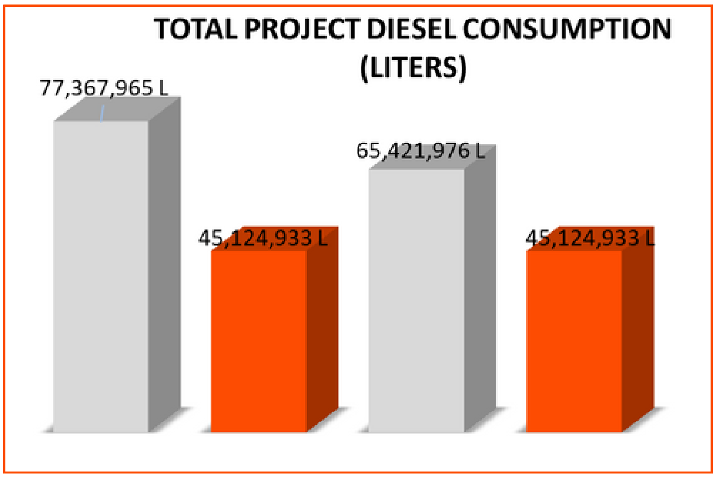
OPTION 112	OPTION 412	OPTION 113	OPTION 413
XNODE +9GEOs	STRYDE 4N	XNODE +9GEOs	STRYDE 4N
369×10^6	1475×10^6	190×10^6	762×10^6

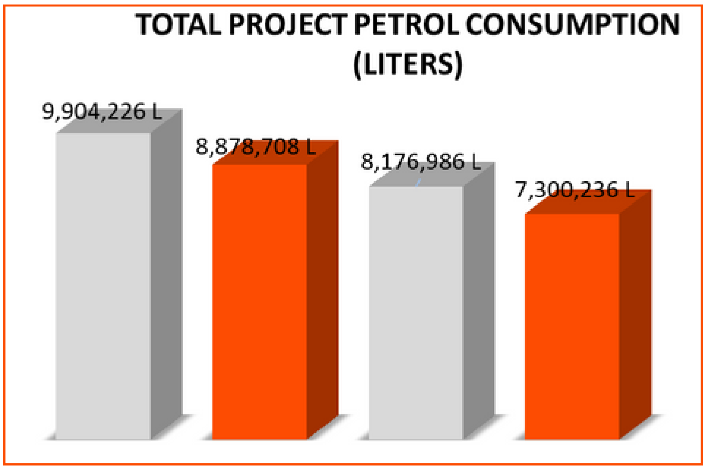


Project CSR comparison









The comparison highlights significant differences kilometres driven, total CO_2 emissions, and diesel and petrol consumption between surveys using the X-node-geophone system and STRYDE nodes:

Diesel consumption:

- STRYDE nodes result in a 30% to 40% decrease in diesel consumption compared to the survey using the X-node-geophone systems. This reduction is due to reduced volume and weight to transport and faster deployment and retrieval operations, which require fewer kilometres driven and reduce the reliance on heavy vehicles.

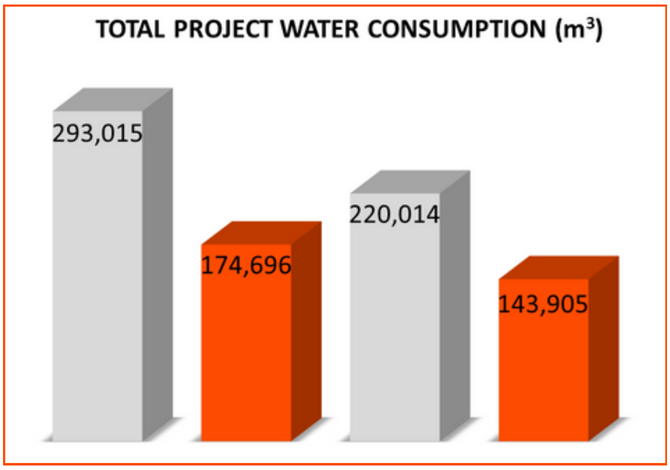
Petrol/gas consumption:

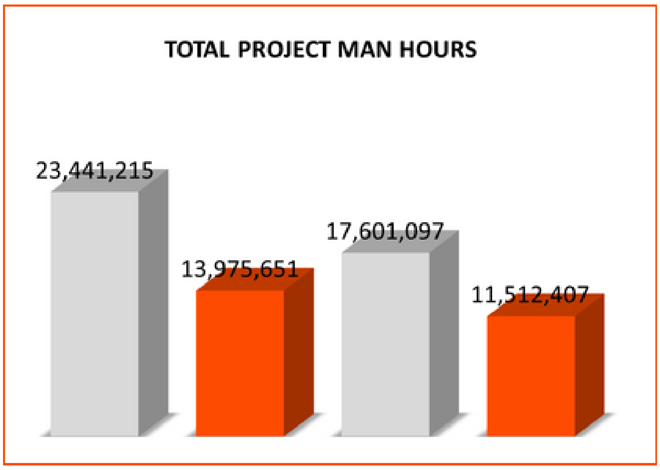
- Petrol consumption is also reduced by approximately 10% with STRYDE nodes. This decrease is attributed to streamlined operations requiring fewer vehicle trips and optimized logistics.

Operational risks:

- With the X-node-geophone systems, the greater number of kilometres driven not only increases fuel consumption but also raises the risks associated with extended travel, including accidents and wear on vehicles.

Project CSR comparison





4000

4,000 fewer water trucks ($30m^3$ each) with STRYDE

40%

40% less HSE risk exposure when STRYDE is used

The graphs illustrate the significant reduction in total project water consumption and man-hours when using STRYDE nodes compared to the x-node-geophone system. These reductions have a direct impact on operational efficiency, costs, risks, and overall project timelines.

Water consumption analysis:

- STRYDE nodes significantly reduce total water consumption requirements on a seismic survey, regardless of the density

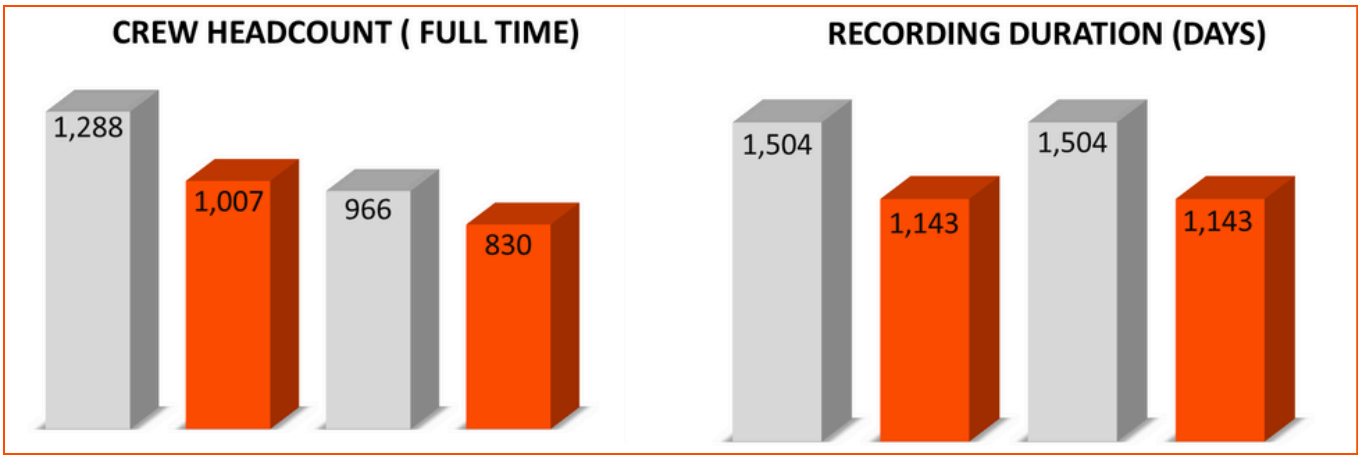
Impact of reduced water needs:

1. Fewer vehicle trips:
    - With less water required, the number of trips needed to transport water is drastically reduced, which cuts down on vehicle fuel consumption and maintenance costs.
    - Result in substantial cost savings in terms of fuel, driver wages, and vehicle wear and tear.
2. Reduced risk:
    - Minimizing trips in and out of camp lowers the exposure to road-related risks, including accidents, breakdowns, and delays. This also contributes to safer working conditions for the crew.
3. Saved time:
    - With fewer logistical movements, overall project timelines are shortened, allowing resources to be reallocated more efficiently.

Man-hour reduction analysis:

- STRYDE nodes also reduce total project man-hours by up to 40%, further decreasing HSE exposure and improving operational efficiency. Fewer workers in the field also mean less strain on water supplies, creating a positive feedback loop.

Comparison of headcount and recording duration



The graphs highlight the substantial advantages of STRYDE nodes in terms of crew headcount and recording duration when compared to the X-node-geophone systems.

Crew headcount:

- The crew headcount reduces, and even on the highest-density survey, the crew headcount is still well below the X-node-geophone system

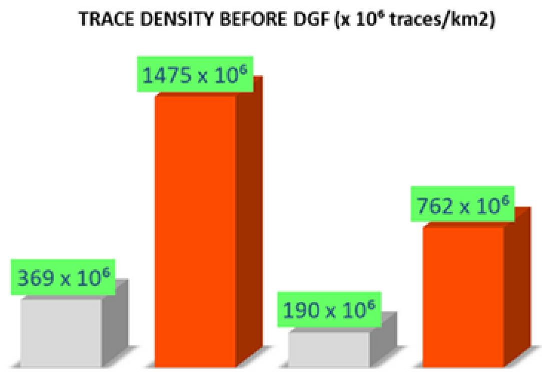
Recording duration (days):

- Recording duration also shows a significant improvement when using STRYDE
- This reduction is primarily due to the ability to bury the STRYDE node, which eliminates surface obstacles during operations. Unlike X-node-geophone systems, STRYDE allows for seamless "carpet shooting" with vibrators, removing the need for complex navigation around surface infrastructure.

Key impacts:

1. Operational efficiency - stealth mode effect:
    - The ability to conduct uninterrupted vibrator operations ("carpet shooting") improves survey efficiency and eliminates delays caused by surface obstacles.
2. Cost savings:
    - Fewer crew members and shorter project durations lead to reduced labour costs and overall project expenses.
3. HSE benefits:
    - A smaller crew size also minimizes health and safety risks, improving field safety and reducing exposure in challenging environments.

OPTION 112	OPTION 412	OPTION 113	OPTION 413
XNODE +9GEOs	STRYDE 4N	XNODE +9GEOs	STRYDE 4N
369×10^6	1475×10^6	190×10^6	762×10^6



Summary: X node/geophone vs. STRYDE node

OPTION #	RECEIVER EQUIPMENT	CSRL	CSSL	RLI	RI	SLI	SI	Number of sensors per RCVs STATION	Trace Density before DGF (x 10⁶ traces/km2)	Trace Density after DGF (x 10⁶ traces/km2)	Days Receivers stays in the ground	Daily Production (VP)	USD / Km (%)	Qty of Receivers to Layout / Day	Capex (%)	VIB FLEET IN PROD	Total Days of Recording	Total Channels (Qty REQUIRED FOR PROJECT)	TOTAL VP's INCLUDING WAS EFFECT (without zipper)	Qty Dozer	QTY LVL	QTY HVL	QTY PAX	TOTAL PROJECT COST (%)
OPTION 112	X NODE +9GEOs	0.80	0.75	25.0	25.0	25.0	25.0	1	369×10^6	369×10^6	24	12,655	100%	10,124	100%	16 F	1504	241,083	16,727,676	97	162	52	1288	100%
OPTION 412	STRYDE	0.80	0.75	25.0	25.0	25.0	25.0	4	1475×10^6	369×10^6	16	16,687	62%	53,398	81%	16 F	1143	828,604	16,727,676	65	189	11	1007	63%
OPTION 113	X NODE +9GEOs	1.00	0.75	50.0	25.0	25.0	25.0	1	190×10^6	190×10^6	24	12,655	100%	6,327	100%	16 F	1504	150,677	16,727,676	73	133	35	966	100%
OPTION 413	STRYDE	1.00	0.75	50.0	25.0	25.0	25.0	4	762×10^6	190×10^6	16	16,687	68%	33,374	82%	16 F	1143	517,877	16,727,676	65	155	11	830	69%

This table compares seismic survey configurations across four options, focusing on key parameters like receiver equipment, trace density, operational metrics, and total project costs.

1. **Receiver equipment and density:**
- Options 112 and 113 (X-node-geophone):
  - Resulting in lower trace densities (369×10^6 and 190×10^6 traces/km^2, respectively).
  - Require 24 days of receiver deployment per station, reflecting slower operations.
- Options 412 and 413 (STRYDE):
  - Use 4 sensors per station, significantly increasing trace density ($1{,}475 \times 10^6$ and 762×10^6 traces/km^2 before DGF).
  - Faster deployment, with receivers staying in the ground for only 16 days.

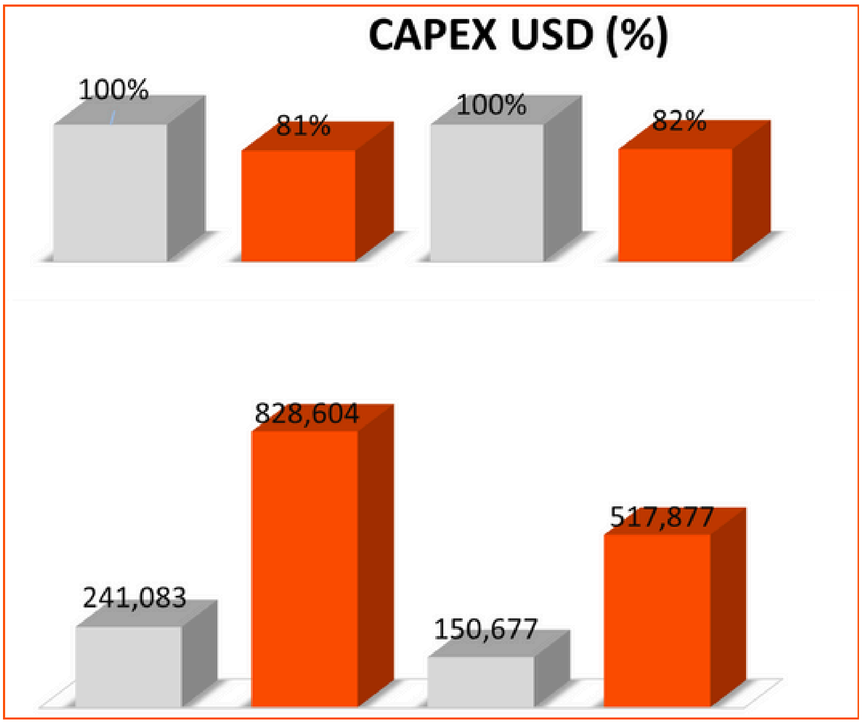
2. **Operations:**
- Capex and cost efficiency:
  - X-node-geophone options (112 and 113) represent the baseline at 100% cost.
  - STRYDE options (412 and 413) reduce opex costs to 62% and 68%, respectively, due to higher efficiency and fewer logistical challenges.
- Daily production:
  - STRYDE options achieve a higher daily production rate (16,687 VP/day) compared to X-node-geophone (12,655 VP/day), highlighting operational advantages.
- Total project duration:
  - X-node-geophone systems options increase the seismic survey duration (1,504 days).
  - STRYDE reduces the duration to 1,143 days, saving almost 1 year (361 days).

3. **Crew and fleet requirements:**
- Headcount:
  - STRYDE requires fewer personnel (1,007 and 830 vs. 1,288 and 966 for X-node-geophone), reflecting a 30% reduction in manpower.
- Vehicle usage:
  - STRYDE options use fewer heavy vehicles while maintaining similar light vehicle requirements, optimizing logistics.

Key takeaways:
- STRYDE offers superior cost efficiency, reducing total project costs by up to 38% compared to X-node-geophone systems.
- STRYDE systems are faster, require fewer personnel, and achieve significantly higher trace densities, making them the ideal choice for modern seismic surveys.

CAPEX (recording equipment)

The comparison highlights the significant cost efficiency of STRYDE nodes over X-nodes-geophone systems, even when STRYDE nodes are deployed at 4 times the density.



Key Observations:

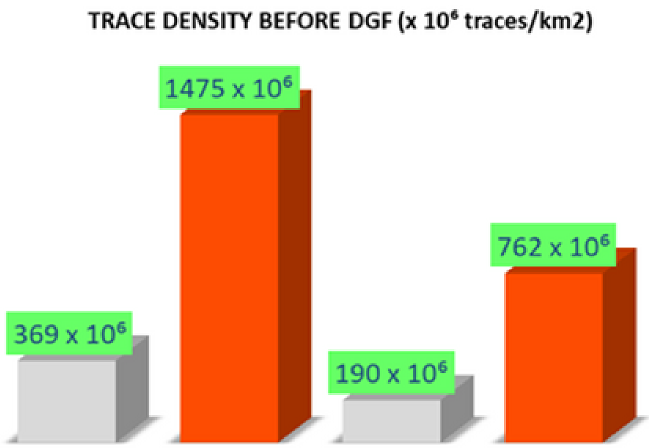
Lower CAPEX for STRYDE nodes:

- Despite deploying 4x more STRYDE nodes, the capital expenditure for STRYDE remains lower than that of the X-node-geophone system.
- This efficiency stems from STRYDE's lightweight, compact design, and simplified logistics.

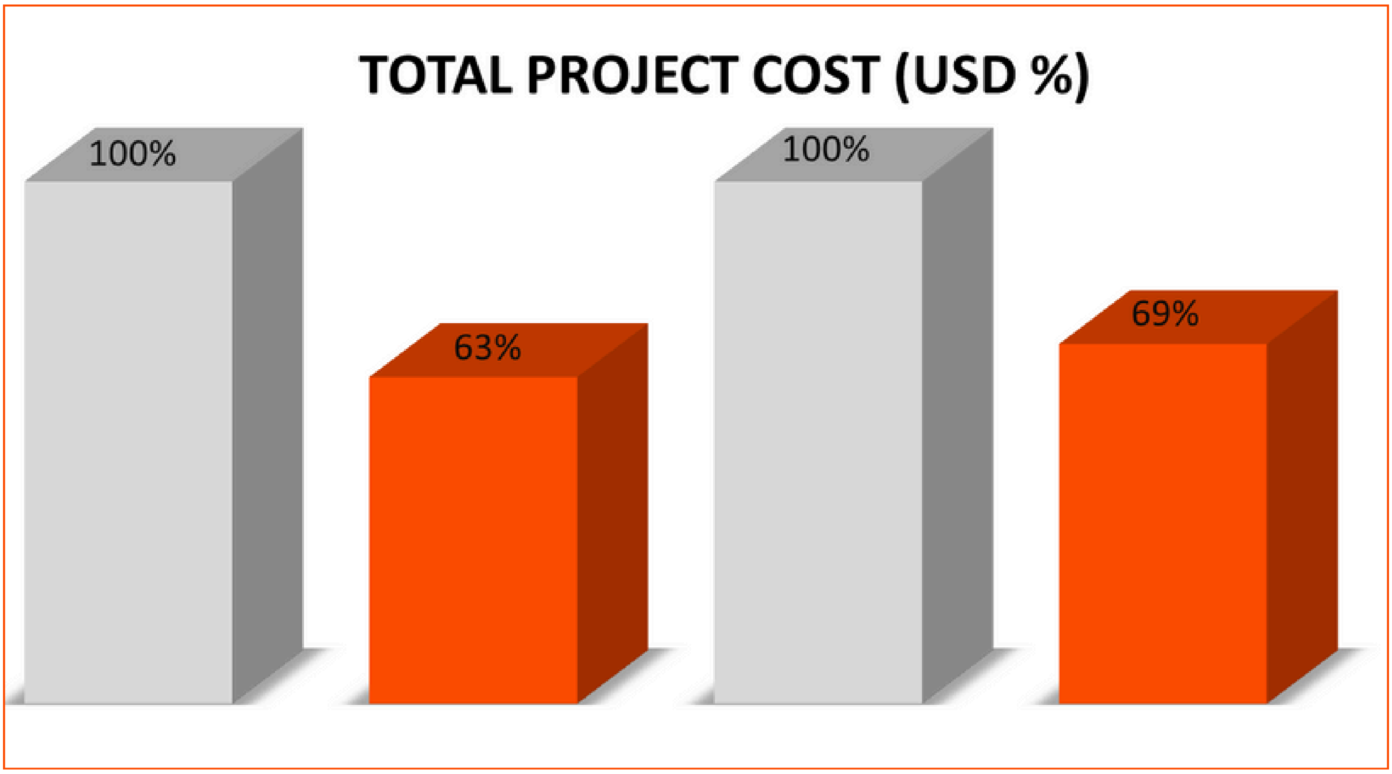
Maintenance costs:

- The X-node-geophone system incurs significant maintenance costs due to the complexity of managing and repairing cables and geophones in the field, particularly when deployed in a dense 25m x 25m source grid.
- STRYDE nodes, in contrast, are maintenance-free, reducing operational costs and downtime.

OPTION 112	OPTION 412	OPTION 113	OPTION 413
XNODE +9GEOs	STRYDE 4N	XNODE +9GEOs	STRYDE 4N
369×10^6	1475×10^6	190×10^6	762×10^6



Total project cost comparison



This graph compares the total project costs (in percentage terms) across different seismic survey configurations, demonstrating the cost-efficiency of STRYDE systems compared to traditional X-node-geophone systems, on two survey designs.

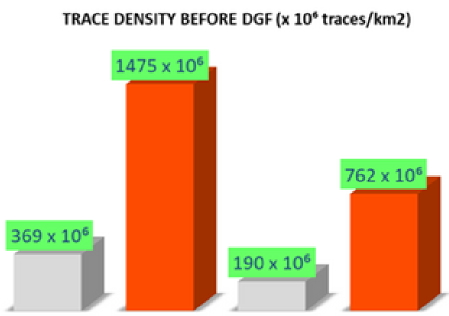
Densification vs cost:

- When transitioning from the X-node-geophone system to STRYDE, the total project cost is reduced to 63% of the baseline cost of the X-node-geophone system (100%).
- This significant cost reduction occurs despite achieving a huge increase in trace density, highlighting the efficiency of STRYDE's design and operations.

Key impacts:

- Cost efficiency - "stealth mode effect":
  - STRYDE achieves higher data quality (trace density) while maintaining a much lower total cost, making it the most cost-effective solution for seismic surveys.
- Scalability - "stealth mode effect":
  - STRYDE's ability to densify further with only a slight increase in cost showcases its flexibility and adaptability for projects demanding higher data precision.

OPTION 112	OPTION 412	OPTION 113	OPTION 413
XNODE +9GEOs	STRYDE 4N	XNODE +9GEOs	STRYDE 4N
369×10^6	1475×10^6	190×10^6	762×10^6



Summary

SUMMARY TABLE CASE STUDY #2	OPTION 112	OPTION 412	OPTION 113	OPTION 413
LayOut Type	Generic NODE +9xGEOs	STRYDE 4 x Nodes	Generic NODE +9xGEOs	STRYDE 4 x Nodes
RI (m)	25	25	25	25
RLI (m)	25	25	50	50
SI (m)	25	25	25	25
SLI (m)	25	25	25	25
Trace Density before DGF (x 10^6 traces/km2)	369×10^6	1475×10^6	190×10^6	762×10^6
Trace Density after DGF (x 10^6 traces/km2)	369×10^6	369×10^6	190×10^6	190×10^6
Recording Duration (Total days)	1504	1143	1504	1143
TOTAL VP's	16,727,676 SPs	16,727,676 SPs	16,727,676 SPs	16,727,676 SPs
Recording Channel on Crew (Qty)	241,083 Rcvs	828,604 Rcvs	150,677 Rcvs	517,877 Rcvs
Capex	100%	81%	100%	82%
Total Cost Project	100%	63%	100%	69%
Headcount	1288	1007	966	830
Project vehicle count (LVL)	162	189	133	155
Project vehicle count (HVL)	52	11	35	11
Manhours	23,441,215	13,975,651	17,601,097	11,512,407
Diesel Consumption	77,367,965 L	45,124,933 L	65,421,976 L	45,124,933 L
Petrol Consumption	9,904,226 L	8,878,708 L	8,176,986 L	7,300,236 L
Kilometers Driven during project Duration	45,794,817 Km	34,995,192 Km	36,618,003 Km	29,075,922 Km
CO2 emission	230,224,908 Kg	141,444,635 Kg	194,219,733 Kg	137,798,364 Kg
Water consumption (m^3)	293,015 m3	174,696 m3	220,014 m3	143,905 m3

The summary table compares the four seismic survey configurations and highlights key metrics such as trace density, recording duration, project costs, resource requirements, and environmental impact. The analysis emphasizes the critical role of data management and DGF in ensuring efficient post-recording workflows.

Key observations:

1. Trace density and DGF:
   - Option 412 (STRYDE 4x nodes) achieves the highest pre-DGF trace density (1,475 x 10^6 traces/km^2), significantly surpassing the X-node-geophone configurations (369 x 10^6 and 190 x 10^6 traces/km^2).
   - Post-DGF, trace density is optimized to 369 x 10^6 traces/km^2, aligning with data processing capacities and preventing bottlenecks at the camp stage.
   - The seamless integration of DGF is critical for managing large data volumes, ensuring smooth transitions to the processing stage without technical or budgetary challenges.
2. Recording duration and efficiency:
   - STRYDE configurations (Options 412 and 413) reduce recording duration by 25% (to 1,143 days compared to 1,504 days for X-node-geophone configurations), demonstrating enhanced efficiency in field operations.
3. Cost and Resource Optimization:
   - STRYDE significantly reduces total project costs (to 63% and 69%) compared to X-node-geophone options (100% baseline).
   - STRYDE also minimizes resource requirements, with lower headcounts (1,007 and 830) and fewer heavy vehicles (11 vs. 35 for the X-node-geophone system).

"With higher trace densities, data management in the camp becomes critical to ensure efficient post-recording workflows. DGF plays a vital role in reducing raw data volumes, enabling a smooth, cost-effective, and timely transfer to processing centers without overwhelming technical systems or budgets."

Mehdi Tascher

Summary cont.

Final thoughts

- Higher trace density can be managed effectively with DGF and the vast volume of raw data can be kept aside for future processing improvements.
- Automated operations and the ability to fully bury the node are crucial factors for unrivalled efficiency, good coupling and a hassle free survey.
- Trace density per km^2 is critical for improved image uplift, and high-trace density surveys are now feasible with the right technology.
- Focus less on expensive efforts (VPs) and more on the increase of RP density (stealth mode) for high-quality data.
- You can save money and shorten your project timeline using modern techniques and technologies.

Conclusion

For any project size, type and location, using STRYDE will:

- Enhance survey efficiency and productivity
- Reduce crew size
- Densify the receiver grid
- Reduce equipment weight and burden
- Reduce vehicles and logistics

Resulting in:

- **Lower cost seismic surveys**
- **Increased trace density at a lower cost per km^2, resulting in a better seismic image**
- **Enhanced processing outcomes as a result of increased acquisition density**
- **Reduced exposure to health and safety risks**
- **Accelerated field operations with a leaner team and no technical interruptions or downtime**
- **Reduced environmental impact and land disruption**

"The logic and principles outlined throughout this eBook apply to seismic surveys of any size, in any environment, and for any duration.

"The insights shared highlight how seismic operations and data quality have been revolutionized by the compact size, lightweight design, ability to be fully buried, and cost efficiency of STRYDE receivers. These advancements drive substantial benefits across all aspects of a survey.

"With significantly reduced OPEX and CAPEX, minimized HSE exposure, faster and more efficient field operations, and the ability to achieve higher trace density for superior seismic imaging—all at a fraction of the cost of traditional surveys—upgrading to STRYDE is a clear and transformative choice for modern seismic projects."

Mehdi Tascher

If you have any questions or would like to book a free technical workshop with STRYDE's land seismic experts, scan the QR code here: