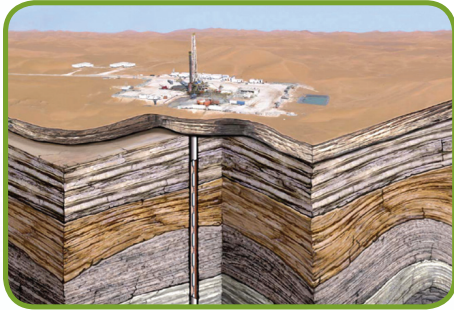




PANAMERICAN

Geophysical

Consider it **Done.**



WHO WE ARE

PanAmerican Geophysical, headquartered in Jersey, The Channel Islands, provides diversified seismic solutions to the oil and gas industry. These solutions include conventional and 3C onshore seismic acquisition services, shallow water or transitions zone acquisition services, microseismic monitoring utilizing surface and /or downhole monitoring sensors, VSP acquisition services, and Multi Client data acquisition. PanAmerican Geophysical applies experience and innovation coupled with leading edge technology. Delivering quality results through increased operational efficiency, PanAmerican Geophysical is able to significantly reduce costs, without compromising the safety of our personnel and the integrity of the environment.

With over 30 years of combined experience and locations in Argentina, Brasil, Canada, and the United States, PanAmerican is well equipped to offer customized seismic solutions for superior imaging throughout the Americas and for special key projects worldwide.



OUR ORGANIZATION

PanAmerican Geophysical is a union of strong national brands with fundamental market understanding and relationships in key markets. Our group companies are leading providers in their local market. Our company delivers critical mass which will maximize asset utilization, increase technical support, and allow us to invest in focused strategic expansion.

CUSTOMER FOCUSED

We strive to meet our clients' needs by conducting our operations safely and efficiently no matter the location. To achieve the best results, we partner with our clients utilizing our combined expertise. We are focused on local markets and remain committed to them throughout the market cycles.

VALUE DRIVEN

Solid values are the foundation of our company. The company culture we strive for, the way we operate and client relationships are driven by our values. These values determine our success and provide us with the commercial edge our customers expect. Values are the principles that guide our operations, strategies, policies, and our actions which in turn reinforce PanAmerican's long term relationships.

INGENUITY DELIVERED

We create and use technologies to provide the products, solutions and services our clients expect. We are an international market leader in the Americas offering extensive operational experience with detailed local knowledge in all active countries.

POWERED BY PEOPLE

Our success is driven by our people and their dedication, know-how and determination to deliver quality services and products. Delivering excellent results is impossible without a highly capable workforce. Our commitment to our customers and to be good neighbors in the communities in which we work is shared by all of our employees.

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OPEN & HONEST COMMUNICATION

We encourage open and honest communication within our workforce and with our clients. We listen carefully and value accurate and reliable communication from our workforce and our clients.

We expect the highest standards of ethical behavior and integrity throughout our organization.

EFFICIENT & RELIABLE OPERATIONS

We strive for optimal operational efficiency and reliability for all projects. Because the operating environment is constantly changing, the agility and flexibility of operations is crucial with each and every project we manage.

Our goal is to constantly improve operational efficiency, control costs and diversify management in order to always provide seamless and reliable operations.

DELIVERING SUPERIOR SERVICE

We deliver superior service through seamless project management. We are customer driven and are dedicated to meet each and every need.

Our highly skilled team provides the best levels of service, improving the customer experience at every point of contact. We build the foundation of meeting our customers' needs by honoring our commitments and the services we provide.

PEOPLE & RELATIONSHIPS

Our success is attributed to team effort and is driven by our people and their dedication, know-how and determination to deliver quality services and products. Delivering excellent results is impossible without a highly capable workforce.

Our commitment to our customers and to be good neighbors in the communities in which we work is shared by all of our employees.



WE TAKE PERSONAL RESPONSIBILITY FOR QHSE.

QHSE STATE-OF-MIND

We are determined to deliver quality services to our customers and are endlessly improving our quality for optimal solutions.

We focus strongly on employee health and are continuously improving the work environment in which our employees work. We also continuously strive for zero accidents to personnel, material and nonmaterial assets.

We conduct our operations through efficient use of materials and energy, with minimum waste and damage to all the environments in which we work and operate.



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LAND ACQUISITION

EXPERIENCED IN WHAT WE DO

With over 30 years of combined experience, PanAmerican Geophysical provides high quality onshore seismic acquisition services to the oil and gas industry.

Using leading edge technology and highly trained project managers and land crews, our team delivers land solutions ranging from 2D, 3D, and 4D data acquisition to 3C and wireless data acquisition services.

These assets enable us to work closely with our clients to design and conduct surveys that best meet their geophysical and budgetary objectives.

Our experienced international team provides efficient operations in all types of onshore environments such as desert, arctic, swamp, and marsh areas in both urban and rural settings as well as jungle and precipitous regions. PanAmerican can provide customized and comprehensive solutions in all onshore environments.

AIMED TO MEET ALL OF OUR CUSTOMERS' NEEDS

- Local knowledge in all active countries
- Multi-lingual operational and HSE management systems
- Large pool of resources allows us to offer the best technical solution for each survey
- Able to deliver critical technical and operational mass to all markets





POWERED TO PERFORM. QUALITY DELIVERED.

SOLUTIONS DRIVEN

PanAmerican Geophysical provides high-channel count operations for 2D & 3D land acquisitions. We utilize the latest technologies in single or three-component recording systems, 4D permanent sensors, and single sensors or geophone arrays.

Our environmentally tailored source technologies provide ease of access to difficult terrains while maintaining minimum impact to the environment.

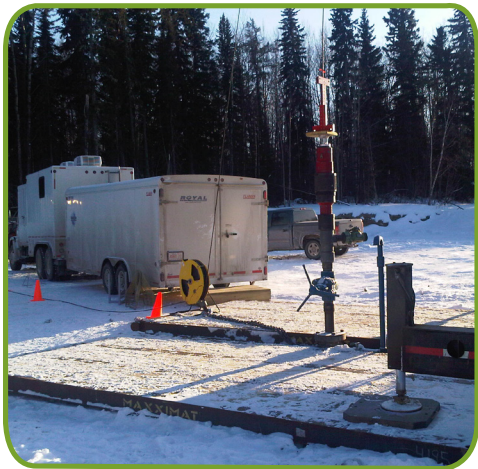
We provide wireless recording system solutions in order to address high demands for large channel count operations in difficult environments. We are able to access these areas by utilizing light weight state-of-the-art systems offered in digital or analog versions and in real-time or autonomous modes.

Our highly developed deployment capabilities are flexible, cost effective and have a proven track record for increased operational efficiency.



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DOWNHOLE ACQUISITION

HIGHLY SKILLED AND EXPERIENCED

PanAmerican Geophysical is competitively experienced in downhole seismic and surface acquisition, operating and maintaining systems to maximize data quality and operational efficiency. With state-of-the-art technology, highly qualified project managers and front end personnel, PanAmerican is able to deliver service at the prime contractor level.

We offer the latest solutions in fracture and passive monitoring VSP, 3D and 4D VSP's, using surface geophone arrays and/or through the use of downhole tools.

Our knowledgeable and highly skilled international teams specialize in providing our customers the best resolution by offering customized comprehensive microseismic solutions.

WE UNDERSTAND THE CHALLENGE AND GET THE JOB DONE.





SOLUTIONS DRIVEN

- Dense surface sampled field design allows a comprehensive suite of seismic processing tools to be applied to the data.
- Where possible, integrate downhole sensors with surface to reduce data uncertainties.
- Removal of non-unique events from the fracture event recording.
- Provide a numerical confidence factor on the likelihood of an event being in the mapped position.
- Time / Depth seismic reflector determination
- Sonic log and surface seismic calibration
- Drill bit look ahead
- Analysis of P and S waves
- Anisotropic velocity models – surface and downhole.

BENEFITS

- High Resolution
- Dense Spatial Sampling
- Increased confidence in location of subsurface events
- Multi Azimuthal Acquisition VSP
- Sound and Affordable Economics
- Maneuverability
- Improved HSE Performances
- Real-Time Analysis



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MICROSEISMIC ACQUISITION

INCREASING VALUE FOR OUR CUSTOMERS

Passive monitoring of microseismic events can create valuable information on changes taking place within a reservoir throughout its production lifecycle. Seismic monitoring can be particularly effective during hydraulic fracturing operations as it can deliver clear insights into the impact of the fracturing exercise and how much reservoir is being stimulated for production. Confirmation that fractures are staying within the desired formations can also be obtained.

PanAmerican Geophysical has entered into an agreement with NanoSeis LLC to commercialize the Narrow Beam Scan (NBS) micro-seismic technique. The technique is the result of extensive research and development by NanoSeis seeking to improve the detectability, spatial mapping, and understanding of the nature of microseismic events during the hydraulic fracturing process.





INDUSTRY SOLUTIONS. DELIVERING FLEXIBILITY AND EFFICIENCY.

The technique uses a small number of patches of densely spaced geophones strategically placed over the fracturing zone of interest. The patches allow un-aliased sampling of the 3D wave-fields that are generated by the fractures, which enables a full suite of advanced seismic processing methods to be used to suppress noise, detecting many more real events. False events caused by poor sampling and noise are eliminated. The patch geometries facilitate accurate event positioning and the multiplicity of patches can provide increased confidence on the accuracy of each fracture location.

The technique can be used in conjunction with a monitor well, or as a stand-alone service. The additional data from the monitor well allows detection limits to be extended to much smaller fractures, and can provide valuable information on the geometry of the fractures and whether they open or close as stresses change in the formation.

In a recent proof of concept survey conducted in a high noise area, NBS generated excellent agreement with events detected in a monitor well, and provided a significant increase in accuracy in the location of the events.

PanAmerican offers the NBS capability to its operating companies in Argentina, Brasil, and Canada, which will then serve as hubs to offer the services in neighboring countries.

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TRANSITION ZONE ACQUISITION

PanAmerican Geophysical provides a high level of expertise to fulfill any project from sea to coast in diverse environments.

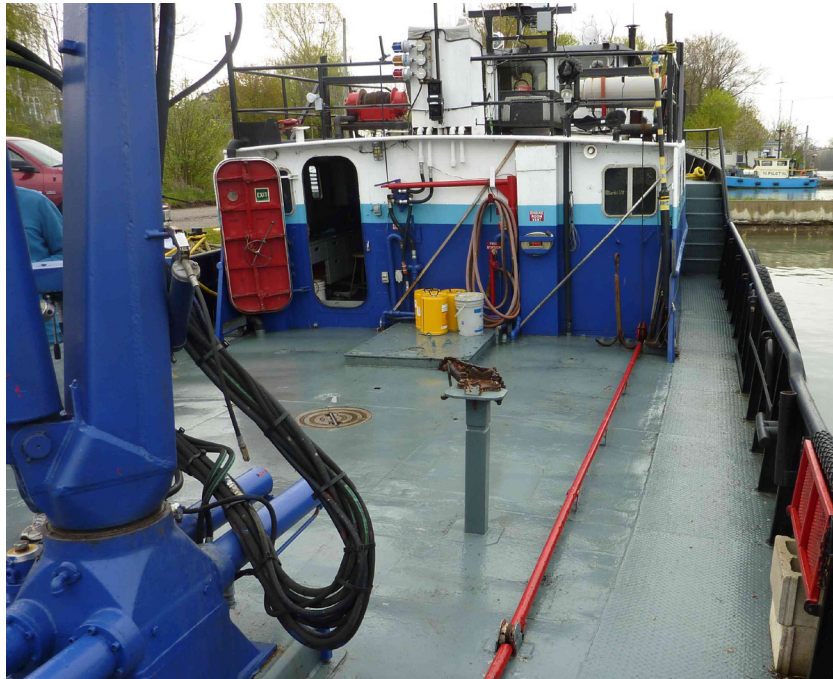
Our experienced team provides services in transitional, shallow water, coastal, swamp and marsh environments. PanAmerican ranks as a leader in TZ acquisition thanks to our highly trained senior managers and senior field crew whose international track record of successful projects is unmatched.

OUR APPROACH

PanAmerican's approach is to attach autonomous nodes to long ropes and to deploy and recover this system as if it were a cabled system.

This approach gives ultimate flexibility in terms of recording station interval and overall survey geometry.





KNOWLEDGE AND TECHNOLOGY FOCUSED.

SOLUTIONS DRIVEN

- Fragile and precious environments often occur in transition zone areas – our solution is designed to have the lightest impact.
- Each transition zone project presents its own unique issues – our solution is designed to adapt to all circumstances.
- Mobilization is often a significant cost – our solution is designed such that all elements fit into ISO shipping containers.
- Considering the surface infrastructure that exists in today's oilfields – our solution provides high quality resolution under this surface infrastructure.
- We ensure rapid deployment for more efficient operations.
- We offer innovative techniques and solutions for any project type.



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MULTI-CLIENT DATA LIBRARY

PanAmerican GeoExchange is a seismic data marketing firm established in Houston, Texas in 2011 by a management team with over 30 years' experience providing data rich multi-client reports and digital datasets. Building 3D seismic data programs that are designed, acquired, and imaged using the most advanced geophysical technology available from start-to-finish, we apply the best technologies to ensure value-added, fit-for-purpose results in the world's key locations. Quality and timely delivery are among the keys to our success in managing multi-client surveys.

By participating in multi-client surveys, exploration & production (E&P) companies get access to modern, high-quality geophysical data at a low cost stimulating exploration activity in both mature and new frontier exploration areas. The enhanced imaging and seismic attribute analysis from these programs provide E&P companies the ability to evaluate and address key challenges associated with acreage assessment uncertainty, drilling plans, and well performance. Data sets are designed and processed to deliver exceptional imaging and attribute information in both conventional and "resource play" exploration and production opportunities.

We offer onshore, full azimuth, extremely high density surveys with superior data quality and Azimuthal imaging in flexible, cost-effective packages. Non-exclusive data licenses are available for entire surveys or for specific areas of interest.

DESIGN

Each program is developed using a collaborative approach utilizing guidance from a team of expert regional geologists, input from the underwriting E&P companies, and expert advice from geo-consulting explorationists. This collaboration allows the PanAmerican GeoExchange team to acquire the data over areas of structural or stratigraphic interest, including structurally complex reservoirs that need high-quality, wide-azimuth imaging to fully understand their potential.

Working with difficult topography and environmental concerns can pose an obstacle in acquiring new data. We are accustomed to overcoming these obstacles by researching problems prior to field work to create and implement an achievable plan to acquire quality data.

Once the program's objectives have been set, our team manages the program with the utmost concern from initial technical planning through data acquisition to data processing and delivery. Cooperation with all ensures a thorough and timely execution of these activities.



PERMITTING

Permitting costs in some areas can comprise up to half the overall cost to acquire the data. By participating in a multi-client survey, these costs are dispersed, reducing an individual E&P company's financial share. We work with permitting companies who are skilled in negotiations to help further reduce these financial obligations.

Utilizing companies with experience in the geographical areas being surveyed is also key to keeping good relations within the community during the course of the survey. We cooperate with the authorities, government agencies, and environmental agencies as well as current and potential license holders, in order to find workable solutions that benefit all involved. We believe positive relations and cooperation is important not just during acquisition, but once exploration and production begins we work to pave the way for future endeavors.

PROCESSING

To further enhance and clarify the deep and ultra deep structures in our coverage area, we are applying Prestack Time Migration to the entire library. Our data is also used to build a comprehensive basin model to aid in determining hydrocarbon maturation, heat flow modeling, and structural/tectonic evolution. Gathers, velocities, and field tapes are available for all 3D data.

Particular attention is made to ensure our data ties available well information to provide the ideal framework. The resulting data provides E&P companies with new information, insights, and prospect generation opportunities for under-explored or unexplored, frontier basins at a vastly reduced price.

OPTIONS EXPLORED, SOLUTIONS FILLED.

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