

2017 Highlights

Offshore Marine Library

- Commenced 27,000 km² (1,166 OCS blocks) Fusion 3D M-WAZ reimagining program in collaboration with Schlumberger in Mississippi Canyon, Atwater Valley and Ewing bank areas of the U.S. Gulf of Mexico. The 3D M-WAZ data was previously acquired by TGS and Schlumberger between 2008 and 2012. Reimagining was more than 80% complete at the end of the year.
- Completed the acquisition of the 7,150 km² (306 OCS blocks) Revolution XII and XIII surveys in collaboration with Schlumberger in Green Canyon, Atwater Valley and Ewing Bank areas of the U.S. Gulf of Mexico. This survey, which utilizes Schlumberger's dual coil shooting acquisition technique will provide broadband, long-offset, full-azimuth data in an area that is expected to have high interest in upcoming licensing rounds.
- Completed acquisition of the 289,000 km² Otos multibeam and seep study including 350 cores and associated advanced geochemistry analysis, designed to mirror the successful Gigante multibeam and seep study in the Mexican Gulf of Mexico.
- Completed the 2017 seismic acquisition season Offshore Eastern Canada, in partnership with PGS. 22,000 km of new 2D data was added to the library, in addition to four 3D projects of approximately 18,000 km². This marks the seventh consecutive season working in partnership with PGS in Canada. Following the most active year ever in this region, the TGS/PGS JV library will exceed 175,000 km of 2D data and 29,250 km² of 3D data. In addition, TGS has 83,700 km of vintage 2D data.
- Began acquisition of the 40,000 km² AM17 Atlantic Margin 3D, project in the central-southern Norwegian Sea. This is the largest 3D survey carried out by any company in Northern Europe, covering largely open blocks in a relatively under-explored area with limited drilling to date. 7,500 km² of the committed area remains to be acquired in 2018.
- Completed acquisition of the 5,400 km² Crean 3D multi-client survey located in the South Porcupine Basin, between the Porcupine High and the Irish Mainland Platform. This survey adds to TGS's Atlantic Margin offering and builds on the exploration success on the Newfoundland Labrador conjugate margin coupled with historical exploration in Atlantic Ireland.
- Completed acquisition of the 5,490 km² Carlsen 3D multi-client survey in open acreage located in the Southwest Barents Sea between the Norwegian Tromsø and Sørvestnaget Basins, expanding TGS' already extensive data coverage in the Barents Sea.
- Completed acquisition of the >24,000 km long offset 2D North-West African Atlantic Margin (NWAAM 2017) seismic survey, a collaboration with PGS and GeoPartners. This broadband 2D survey infills, extends and complements the NWAAM 2012 2D survey which supported recent commercial discoveries in this region.
- Commenced acquisition of the 10,000 km Red Sea 2D long-offset broadband seismic survey, in collaboration with Schlumberger. This project is part of an agreement entered with South Valley Egyptian Petroleum Holding Company (GANOPE) in which Schlumberger and TGS have a minimum 15-year period of exclusive multi-client rights in a ~70,000 km² open area offshore Egypt.

Onshore Seismic Library

- Completed acquisition of the 1,050 km² West Kermit high-resolution 3D multi-client project in the Loving and Winkler counties, Texas, in the Delaware basin. This survey is TGS' first seismic project in the Permian Basin where TGS also has a comprehensive geological products database.
- Commenced acquisition of the 440 km² West Lindsey high-resolution 3D multi-client project in Reeves County, Texas to the southwest of West Kermit 3D. This is TGS' second Permian survey and is designed to image multiple zones from the Delaware sands through the prolific Wolfcamp, as well as deeper plays.
- Completed acquisition of the 200 km² Geary high-resolution 3D multi-client project in the Anadarko Basin, adding to TGS' dominant position in the SCOOP/STACK play which continues to see high level of client activity.
- Completed acquisition of the 107 km² Grayling high-resolution 3D multi-client project in West Central Alberta. This survey is adjacent to TGS' Kaybob and Bigstone surveys and further extends TGS' Duvernay library.
- Commenced acquisition of the 70 km² Dawson 3D high resolution multi-client project in North East British Columbia in the Montney Play, complementing TGS' existing footprint in this region.

Geological Data Library

- Continued expansion of the industry's largest library of digital well log data, including approximately 90,000 new digital Log ASCII Standard (LAS) wells, 7,000 new enhanced digital LAS+ well logs, 420,000 new Validated Well Headers as well as directional surveys, production data and multiple interpretive products.
- Obtained commercial authorization from the Mexican regulator Comisión Nacional de Hidrocarburos (CNH) to access its entire library of more than 30,000 wells in Mexico to process high-quality, high-value well data products. The first phase of processing is focused on all onshore and offshore exploration and appraisal wells, plus key development wells for bid rounds.
- Completed new multi-client interpretation studies in Norway, UK, Canada, Mexico, U.S. Gulf of Mexico and U.S. Onshore and continued with ongoing multi-client projects geared towards supplying customers with information on stratigraphy, structure, basin maturity and prospectivity.
- Completed joint venture agreement with BetaZi combining TGS' high quality well data with BetaZi's physics-based artificial intelligence and statistical methods to generate production forecasting and creating a series of pre-computed, comprehensive basin studies for the Permian and Anadarko basins.
- Completed development and implementation of a new map-based e-commerce website TGS R360, replacing LogLinePlus. R360 allows TGS customers access to our world-wide well data library 24/7.

Technology

- Completed one of the industry's largest orthorhombic depth imaging projects (9,000 km²) for the Declaration survey in the U.S. Gulf of Mexico. This Orthorhombic depth imaging approach is also being applied to the Fusion 3D M-WAZ reimagining program, and was successfully applied to a proprietary onshore project where results showed excellent correlation with gas production.
- Processed the industry's largest single 2D project, Gigante (186,000 km) in Mexican Gulf of Mexico. Delivered fast-track time and depth products ahead of 2017 licensing rounds.
- Applied latest onshore processing techniques, including 5D data regularization, land depth migration, and converted wave imaging on multiple TGS onshore multi-client projects. Processed TGS' largest proprietary onshore 3D in the Permian Basin to-date.
- Application of leading-edge 3D Least-Square Reverse Time Migration technology to many proprietary processing projects in the US Gulf of Mexico.
- Developed new deblending technology to separate seismic data acquired with Simultaneous Sources (SIMs) and continuous recording, to improve the efficiency of acquisition. This new technology has been successfully applied to more than 40,000 km² of 3D seismic data in TGS' multi-client 3D surveys.
- Applied two new high-end depth imaging technologies: Full Waveform Inversion (FWI) and Hessian-Based RTM Angle Gathers for improved accuracy of velocity models for depth imaging and enhanced Amplitude Versus Offset Analysis (AVO) for subsalt reservoirs.
- Acquired marine seismic data using the latest acquisition techniques including simultaneous sources, broadband, long offsets, coil-shooting and complemented by ancillary products such as multibeam and geochemical seafloor sampling. Acquired land compressive sensing test project.

