Cautionary Statement

• This presentation contains forward looking information

• Forward looking information is based on management assumptions and analyses

• Actual experience may differ, and those differences may be material

• Forward looking information is subject to significant uncertainties and risks as they relate to events and/or circumstances in the future

• This presentation must be read in conjunction with the press release for the second quarter and first half 2017 results and the disclosures therein
Strong MultiClient Sales
Further Cost Reductions Initiated

- MultiClient sales of USD 127.6 million
  - Late sales driven by a diverse customer base in several regions
  - MultiClient acquisition activity focused on the North Sea and the Eastern Mediterranean
  - MultiClient pre-funding level of 115%

- Improvement in marine contract pricing y-o-y

- EBITDA of USD 112.5 million

- Commenced large MultiClient campaigns offshore East Canada

- Further cost cuts of USD 50-60 million initiated

First half 2017 within scenarios envisaged during refinancing
Financial Summary

**Revenues**

<table>
<thead>
<tr>
<th>Quarter</th>
<th>USD million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1-15</td>
<td>251</td>
</tr>
<tr>
<td>Q2-15</td>
<td>256</td>
</tr>
<tr>
<td>Q3-15</td>
<td>226</td>
</tr>
<tr>
<td>Q4-15</td>
<td>229</td>
</tr>
<tr>
<td>Q1-16</td>
<td>203</td>
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<tr>
<td>Q2-16</td>
<td>183</td>
</tr>
<tr>
<td>Q3-16</td>
<td>224</td>
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<td>Q4-16</td>
<td>154</td>
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<tr>
<td>Q1-17</td>
<td>155</td>
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<tr>
<td>Q2-17</td>
<td>241</td>
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**EBITDA***

<table>
<thead>
<tr>
<th>Quarter</th>
<th>USD million</th>
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</thead>
<tbody>
<tr>
<td>Q1-15</td>
<td>128</td>
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<td>Q2-15</td>
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<td>Q3-15</td>
<td>115</td>
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<td>Q4-15</td>
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<td>Q1-16</td>
<td>80</td>
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<td>Q2-16</td>
<td>69</td>
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<td>Q3-16</td>
<td>63</td>
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<tr>
<td>Q4-16</td>
<td>30</td>
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<tr>
<td>Q1-17</td>
<td>113</td>
</tr>
<tr>
<td>Q2-17</td>
<td>113</td>
</tr>
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</table>

**EBIT**

<table>
<thead>
<tr>
<th>Quarter</th>
<th>USD million</th>
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</thead>
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<td>Q1-15</td>
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<tr>
<td>Q2-15</td>
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<td>Q3-15</td>
<td>9</td>
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<tr>
<td>Q4-15</td>
<td>-23</td>
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<tr>
<td>Q1-16</td>
<td>-30</td>
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<tr>
<td>Q2-16</td>
<td>-36</td>
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<tr>
<td>Q3-16</td>
<td>-5</td>
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<td>Q4-16</td>
<td>-66</td>
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<tr>
<td>Q1-17</td>
<td>-84</td>
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<tr>
<td>Q2-17</td>
<td>-9</td>
</tr>
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</table>

**Cash Flow from Operations**

<table>
<thead>
<tr>
<th>Quarter</th>
<th>USD million</th>
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<tbody>
<tr>
<td>Q1-15</td>
<td>212</td>
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<tr>
<td>Q2-15</td>
<td>83</td>
</tr>
<tr>
<td>Q3-15</td>
<td>71</td>
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<tr>
<td>Q4-15</td>
<td>121</td>
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<td>Q1-16</td>
<td>133</td>
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<tr>
<td>Q2-16</td>
<td>42</td>
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<tr>
<td>Q3-16</td>
<td>80</td>
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<tr>
<td>Q4-16</td>
<td>65</td>
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<tr>
<td>Q1-17</td>
<td>30</td>
</tr>
<tr>
<td>Q2-17</td>
<td>49</td>
</tr>
</tbody>
</table>

*EBITDA, when used by the Company, means EBIT excluding Other charges, impairment and loss/gain on sale of long-term assets and depreciation and amortization.

**Excluding impairments and Other charges.
Order Book

- Order book of USD 248 million by end Q2 2017
  - Of which USD 182 million relates to MultiClient
  - USD 96 million of new order book secured in Q2
  - USD 25 million of Q2/Q3 2018 work taken out of order book due to dry well causing project cancellation

- Vessel booking*
  - ~90% booked for Q3 2017
  - ~40% booked for Q4 2017
  - ~15% booked for Q1 2018
  - ~5% booked for Q2 2018

- Unsold Q4 2017 capacity planned to be filled as:
  - MultiClient ~2/3 (or ~3.5 vessels)
  - Contract ~1/3 (or ~1.5 vessels)

*As of July 17, 2017, based on 9 active vessels and excluding cold-stacked vessels.
Financials

Unaudited Second Quarter and First Half 2017 Results
Revenues increased compared to Q2 2016 due to higher MultiClient and contract revenues, somewhat offset by lower Imaging revenues.

Q2 impairment and other charges, net, of USD 6.5 million
Q2 2017 Operational Highlights

- Total MultiClient revenues of USD 127.6 million
  - Pre-funding revenues of USD 50.2 million
  - Pre-funding level of 115% on USD 43.8 million of MultiClient cash investment
  - Late sales revenues of USD 77.4 million

- Marine contract revenues of USD 95.9 million benefitting from improvement in marine contract pricing and strong operations
Late sales revenues were dominated by Europe and South America.

Pre-funding revenues were primarily from Europe and Middle East.

Pre-funding revenues to increase further in Q3 as more capacity is allocated to MultiClient.
MultiClient Vintage Distribution

- MultiClient net book value of USD 606.7 million as of June 30, 2017
  - Down from USD 647.7 million at year-end 2016
- Moderate net book value for surveys completed 2012-2015
- Q2 2017 amortization rate of 61%
- 2017 amortization expense expected to be in the range of USD 350-375 million
**EBITDA**, when used by the Company, means EBIT excluding Other charges, impairment and loss/gain on sale of long-term assets and depreciation and amortization. The accompanying unaudited financial information has been prepared under IFRS. This information should be read in conjunction with the unaudited second quarter and first half 2017 results released on July 27, 2017.

<table>
<thead>
<tr>
<th>Key Operational Numbers</th>
<th>2017</th>
<th>2016</th>
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<tbody>
<tr>
<td><strong>USD million</strong></td>
<td>Q2</td>
<td>Q1</td>
</tr>
<tr>
<td>Contract revenues</td>
<td>95.9</td>
<td>61.4</td>
</tr>
<tr>
<td>MultiClient Pre-funding</td>
<td>50.2</td>
<td>39.7</td>
</tr>
<tr>
<td>MultiClient Late sales</td>
<td>77.4</td>
<td>39.3</td>
</tr>
<tr>
<td>Imaging</td>
<td>14.9</td>
<td>13.8</td>
</tr>
<tr>
<td>Other</td>
<td>2.1</td>
<td>0.6</td>
</tr>
<tr>
<td><strong>Total Revenues</strong></td>
<td>240.5</td>
<td>154.8</td>
</tr>
<tr>
<td>Operating cost</td>
<td>(127.9)</td>
<td>(124.7)</td>
</tr>
<tr>
<td><strong>EBITDA</strong></td>
<td>112.5</td>
<td>30.1</td>
</tr>
<tr>
<td>MultiClient amortization and impairment</td>
<td>(80.5)</td>
<td>(70.6)</td>
</tr>
<tr>
<td>Depreciation and amortization of long-term assets (excl. MC library)</td>
<td>(42.9)</td>
<td>(44.5)</td>
</tr>
<tr>
<td>Impairment and loss on sale of long-term assets (excl. MC library)</td>
<td>(9.9)</td>
<td>0</td>
</tr>
<tr>
<td>Other charges, net</td>
<td>3.4</td>
<td>(8.8)</td>
</tr>
<tr>
<td><strong>EBIT</strong></td>
<td>(17.4)</td>
<td>(93.7)</td>
</tr>
<tr>
<td>CAPEX, whether paid or not</td>
<td>(12.9)</td>
<td>(101.6)</td>
</tr>
<tr>
<td>Cash investment in MultiClient</td>
<td>(43.8)</td>
<td>(33.6)</td>
</tr>
<tr>
<td><strong>Order book</strong></td>
<td>248</td>
<td>340</td>
</tr>
</tbody>
</table>
Vessel Utilization*
Seismic Streamer 3D Fleet Activity in Streamer Months

- 84% active vessel time in Q2 2017
  - Includes new build Ramform Hyperion and re-introduction of Ramform Vanguard after warm-stack

- ~50% of 2017 full year active vessel time planned for MultiClient acquisition

* The vessel allocation excludes cold-stacked vessels.
Gross cash costs are defined as the sum of reported net operating expenses (excluding depreciation, amortization, impairments and Other charges) and the cash operating costs capitalized as investments in the MultiClient library as well as capitalized development costs.

- Strong cost management
- Sequential cost increase primarily due to more capacity in operation

Full year gross cash cost expected to be below USD 700 million

*Gross cash costs are defined as the sum of reported net operating expenses (excluding depreciation, amortization, impairments and Other charges) and the cash operating costs capitalized as investments in the MultiClient library as well as capitalized development costs.
Cost Discipline Remains a Key Priority in 2017

• 2016 gross cash cost more than 40% lower than in 2014

• 2017 gross cash cost expected to be below USD 700 million – modest increase from structurally lower level in 2016 mainly attributable to:
  – More operated capacity with full year operation of Ramform Tethys and delivery of Ramform Hyperion
  – Some increase of fuel prices

• Tight cost control continues, with further USD 50-60 million of gross cash cost reductions initiated with effect from Q4 2017
  – Planning to cold-stack Ramform Vanguard after North Sea season

*Estimate based on 30 June 2017 USD exchange rates against currencies in PGS cost base.
Consolidated Statements of Cash Flows Summary

- **Cash flow from operating activities of USD 49.4 million in Q2 2017**
  - Y-o-Y increase due to higher earnings, partially offset by a significant increase in accounts receivables as a result of high revenues in the second half of the quarter which will benefit cash flow in Q3 2017

The accompanying unaudited financial information has been prepared under IFRS. This information should be read in conjunction with the unaudited second quarter and first half 2017 results released July 27, 2017.
### Balance Sheet Key Numbers

The accompanying unaudited financial information has been prepared under IFRS. This information should be read in conjunction with the unaudited second quarter and first half 2017 results released on July 27, 2017.

- **Liquidity reserve of USD 228.3 million**
  - Drawings on the Revolving credit facility increased by USD 60 million in Q2 for working capital fluctuations, the Company expects to reduce drawing in Q3

- **Total leverage ratio of 4.39:1 as of June 30, 2017, compared to 4.88:1 as of March 31, 2017**

- **Shareholders’ equity at 44% of total assets**

<table>
<thead>
<tr>
<th></th>
<th>June 30 2017</th>
<th>June 30 2016</th>
<th>December 31 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total assets</td>
<td>2,860.1</td>
<td>2,970.3</td>
<td>2,817.0</td>
</tr>
<tr>
<td>MultiClient Library</td>
<td>606.7</td>
<td>686.1</td>
<td>647.7</td>
</tr>
<tr>
<td>Shareholders' equity</td>
<td>1,250.9</td>
<td>1,350.3</td>
<td>1,359.4</td>
</tr>
<tr>
<td>Cash and cash equivalents (unrestricted)</td>
<td>53.3</td>
<td>49.7</td>
<td>61.7</td>
</tr>
<tr>
<td>Restricted cash</td>
<td>111.5</td>
<td>95.0</td>
<td>101.0</td>
</tr>
<tr>
<td>Liquidity reserve</td>
<td>228.3</td>
<td>429.7</td>
<td>271.7</td>
</tr>
<tr>
<td>Gross interest bearing debt</td>
<td>1,290.1</td>
<td>1,352.3</td>
<td>1,191.4</td>
</tr>
<tr>
<td>Net interest bearing debt</td>
<td>1,126.2</td>
<td>1,207.6</td>
<td>1,029.7</td>
</tr>
</tbody>
</table>

The accompanying unaudited financial information has been prepared under IFRS. This information should be read in conjunction with the unaudited second quarter and first half 2017 results released on July 27, 2017.
<table>
<thead>
<tr>
<th>Long-term Credit Lines and Interest Bearing Debt</th>
<th>Nominal Amount as of June 30, 2017</th>
<th>Total Credit Line</th>
<th>Financial Covenants</th>
</tr>
</thead>
<tbody>
<tr>
<td>USD 400.0 million Term Loan (“TLB”), Libor (minimum 0.75%) + 250 basis points, due 2021</td>
<td>USD 387.0 million</td>
<td></td>
<td>None, but incurrence test: total leverage ratio ≤ 3.00x*</td>
</tr>
<tr>
<td>Revolving credit facility (“RCF”), due 2020 Libor + margin of 325-625 bps (linked to TLR) + utilization fee</td>
<td>USD 225.0 million</td>
<td>USD 400.0** million</td>
<td>Maintenance covenant: total leverage ratio ≤ 5.50x, to Q2-2017, 5.25x Q3-17, 4.75x Q4-17, 4.25x Q1-18, thereafter reduced by 0.25x each quarter to 2.75x by Q3-19</td>
</tr>
<tr>
<td>Japanese ECF, 12 year with semi-annual instalments. 50% fixed/ 50% floating interest rate</td>
<td>USD 440.1 million</td>
<td></td>
<td>None, but incurrence test for loan 3&amp;4: Total leverage ratio ≤ 3.00x* and Interest coverage ratio ≥ 2.0x*</td>
</tr>
<tr>
<td>December 2020 Senior Notes, coupon of 7.375%</td>
<td>USD 212.0 million</td>
<td></td>
<td>None, but incurrence test: Interest coverage ratio ≥ 2.0x*</td>
</tr>
<tr>
<td>December 2018 Senior Notes, coupon of 7.375%</td>
<td>USD 26.0 million</td>
<td></td>
<td>None</td>
</tr>
</tbody>
</table>

*Carve out for drawings under ECF and RCF
**Reducing to USD 350 million in September 2018.
Operational Update and Market Comments
Unaudited Second Quarter and First Half 2017 Results
Streamer Operations July 2017

Ramform Sovereign (Malaysia)
Ramform Vanguard Sanco Swift (North Sea)
Sanco Swift (North Sea)
Ramform Atlas (Angola)
Ramform Titan
Atlantic Explorer (Canada)
Ramform Hyperion (Cyprus)
PGS Apollo (Taiwan)
Ramform Sovereign (Malaysia)
Marine Seismic Market

• Substantial improvement in oil companies’ cash flow
  – No negative change in client behavior despite oil price fluctuations during Q2
  – Pockets of opportunity for Q2/Q3 contract pricing owing to more 4D production seismic and capacity constraints in some regional markets

• Outlook
  – Currently low and competitive contract bidding activity for Q4
  – Improved bid pipeline for Q1/Q2 2018
Market Activity

- Encouraging leads development for 2018
- Seismic demand primarily driven by:
  - Positioning for strategically important license rounds
  - Seismic commitments in E&P licenses
  - Significant increase in production seismic, especially in North Sea, West Africa and Brazil
- Overall relative MultiClient activity expected to continue to increase

Source: PGS internal estimate as of end June 2017. Value of active tenders and sales leads are the sum of active tenders and sales leads with a probability weight and represents Marine 3D contract seismic only.
Seismic acquisition volume in 2017 expected to be in line with volume in 2016
- 2017 survey mix more focused on smaller and more capacity intensive 4D production monitoring surveys and more MultiClient 3D surveys
- Increased seasonal variations as geographical areas for winter activity have shrunk, while North Atlantic summer season activity is more resilient

2017 summer season capacity ~35-40% lower than 2013 peak
- Good supply/demand balance during summer season

Global streamer pool continues to shrink

Source of both graphs: PGS internal estimates.
Production Seismic is Growing Significantly
PGS has Premium Offering and Strong Market Share

- Oil companies invest more in producing fields and fields under development
- Number of production seismic (4D) projects will more than double in 2017 compared to 2016, and is expected to increase further in 2018
- 4D activity increasing in North Sea, West Africa and Brazil
- PGS will conduct more than 50% of global 4D surveys for 2017
  - PGS is well positioned in the 4D market
  - ~35% of 2017 contract revenues expected to come from 4D

Source: PGS internal estimates.
Strong MultiClient Sales from a Diverse Customer Base

- PGS sold MultiClient data to more than 70 different clients worldwide in Q2
  - Distributed over 90 projects

- PGS high quality GeoStreamer MultiClient data library attracts strong client interest, generating industry leading sales performance
Industry Leading MultiClient Performance

- Strategic priority since 2010 to increase weighting of the MultiClient business
  - Brings greater stability to overall Group performance in a highly cyclical market
  - MultiClient share of total market will continue to increase going forward

- Revenues currently dominated by MultiClient
  - 52% of revenues in 1H 2017, will increase significantly in 2H
  - Q2 2017 sales/investment of 2.9x
  - Most of EBITDA is generated by MultiClient activities
  - GeoStreamer, leading productivity and advanced, high quality imaging drives higher returns from library

- Retains flexibility to leverage a recovery in the marine contract market
  - Marine contract player with differentiating productivity and technology
2017 Guidance

• **Group gross cash cost below USD 700 million**
  – Of which ~USD 250 million to be capitalized as MultiClient cash investments

• **MultiClient cash investments of ~USD 250 million**
  – Pre-funding level ~100%
  – Active 3D vessel time planned for MultiClient of ~50%

• **Capital expenditures of ~USD 150 million**
  – Including new build capex of ~USD 89 million
In Conclusion:

Competitively Positioned to Navigate Current Market Environment

- Strong MultiClient sales
- Benefitting from improvement in marine contract pricing y-o-y
  - Well positioned in the 4D market
- Competitive contract bidding for Q4
- Improved bid pipeline for Q1/Q2 2018
- Further cash cost cuts of USD 50-60 million initiated
  - Planning to cold-stack *Ramform Vanguard* after North Sea season
Thank You – Questions?
## Appendix

### Main Yard Stays* Next Six Months

<table>
<thead>
<tr>
<th>Vessel</th>
<th>When</th>
<th>Expected Duration</th>
<th>Type of Yard Stay</th>
</tr>
</thead>
<tbody>
<tr>
<td>PGS Apollo</td>
<td>August 2017</td>
<td>7 days</td>
<td>Intermediate classing and major engine overhaul</td>
</tr>
<tr>
<td>Ramform Hyperion</td>
<td>August 2017</td>
<td>6 days</td>
<td>Guarantee work</td>
</tr>
</tbody>
</table>

*Yard stays are subject to changes.
Appendix: Fleet Structure Provides Flexibility Through the Cycle

<table>
<thead>
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<tbody>
<tr>
<td>The Ultra High-end Ramforms</td>
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<tr>
<td>Ramform Hyperion</td>
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<tr>
<td>Ramform Tethys</td>
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<td>Ramform Atlas</td>
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<td>Ramform Titan</td>
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<td>Ramform Sovereign</td>
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<tr>
<td>High-end Conventional on Charter</td>
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<tr>
<td>Sanco Swift - in operation</td>
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<tr>
<td>PGS Apollo - in operation</td>
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<td>Sanco Sword - cold stacked</td>
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<td>High-end Ramforms - Flexible Capacity</td>
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<tr>
<td>Ramform Vanguard - planned cold-stacked</td>
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<td>Ramform Valiant - cold stacked</td>
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<tr>
<td>Ramform Viking - cold stacked</td>
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<td>Ramform Challenger - cold stacked</td>
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<td>Ramform Explorer - cold stacked</td>
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</tbody>
</table>

*With possibility to buy back after year 5 and 8

- Combination of chartered high capacity conventional 3D vessels and temporarily cold-stacked first generation Ramform vessels:
  - Improves fleet flexibility
  - Chartered capacity with staggered expiry structure
  - Positions PGS well to take advantage of a market recovery
Appendix:
PGS Fleet Best Positioned on the Industry Cost Curve

- PGS retains lead on lowest cash cost per streamer
- Ramform vessels best positioned for both large, and streamer intensive (4D) surveys

Source: PGS internal estimates. The cash cost curve is based on typical number of streamer towed, and excludes GeoStreamer productivity effect. The graph shows all seismic vessels operating in the market. The Ramform Titan-class vessels are incorporated with 16 streamers, S-class with 14 streamers.
Appendix

RAMFORM Titan-Class

Lifespan
Setting the benchmark for this generation of seismic vessels and thereof.

Engineered for Geoscience

Stability
The Titan design ensures better performance and room for growth. The ultra-broad delta-shaped hull provides fantastic seakeeping capabilities and also means a smooth ride.

Endurance
120 days without re-fueling.
Dry docking interval 3-4 years.
Maintenance at sea a lesser operating costs.

Wire Pull @ 4.5 kts
This measures towing force through the water and is a more realistic representation of towing capability than bollard pull (100 tons).

Space = Flexibility
Three times larger than modern conventional vessels, the Titans offer a highly efficient work environment with ample space for equipment, maintenance and accommodation.

Fuel Capacity
Providing flexibility and endurance.

Power
Additional power enables more in-sea and on-deck equipment.

Redundancy
3 propellers, each with 2 motors – fully operational with 2 propellers.
2 engine rooms, each with 3 generators – fully operational with 1 engine room.

All Weather
Weathering the weather window and extending the seasons in northern and southern hemispheres without compromising HSEQ.

220 tests

Performance Results

Downtime

Cost/Streamer

All Survey Types

Records
Rapid Deployment
16 streamers (each 8 km) safely deployed in just 73 hours.

Large Spread
16.7% sq. km spread with 16 streamers (each 7.05 km) x 10.69 m separation (56 m at tail end).

Fast Acquisition
High-speed production (75 sq. km in a day (average for this survey - 159 sq. km/day).

HSEQ
Layout supports One Culture operations improving all aspects of HSEQ.

Health
Social space, gym, stability – rested crews perform better.

Safety
Stable platform minimizes risk of fatigue, trips and falls. Space to work, redundancy in power and propulsion, 2 more launched winches, deck automation.

Environment
Larger vessels and faster turnaround mean fewer days on each job and leaves a smaller environmental footprint. BIM OIL Design – max 50% content of <2.5%. Bisulphate reactor reduces NOx emissions by 60%.

Quality
Superior platform to deploy the best dual-sensor technology – rooms.

Future Proof

Titan-class vessels cover all the basics from highly efficient reconnaissance exploration surveys to the detailed resolution required for 4D production seismic.

Gamtform Titan – zero main time downtime and only 2.7% seismic downtime to date. Total sq.km acquired by Titan-class vessels is 80,790 sq. km.
Appendix

GeoStreamer® since 2007

More Measurements — Fewer Assumptions — Better Decisions

Dual Sensors
Complementary recordings facilitate deghosting by wavefield separation at all water depths.

Pressure + Velocity = Depth shift

Deeplow

Deep Tow
- Better signal, less noise
- More low and high frequencies
- Less weather dependent

Flexible Tow Depth
Dual-sensor recording enables us to re-define the pressure wavefield to any depth. Towing depth can be adjusted in response to shallow obstacles, currents, thermoclines or to optimize operational performance without any negative impact on data quality.

Superior shallow images using GeoStreamer-enabled Separated Wavefield Imaging: PGS SWE

Equivalent to...GeoStreamer

Reliable velocity models at depth using deghosted reflections: Tomography

De-risking with Precise Rock Properties
GeoStreamer prestack deghosting provides reliable attributes for better understanding of rock and fluid distribution. Improved attribute computations reduce uncertainty and enable more precise estimations of reserves.

Broader Bandwidth — Sharper Boundaries
Rich low frequency content reduces sidelobe artifacts, providing clearer reservoir details.

De-risking with Precise Rock Properties
GeoStreamer prestack deghosting provides reliable attributes for better understanding of rock and fluid distribution. Improved attribute computations reduce uncertainty and enable more precise estimations of reserves.

Monitoring Reservoir Changes
Wavefield reconstruction enables high resolution for both legacy surveys and future 4D monitoring independent of well state. This avoids more subtle production-related changes.

Proven in all Play types
- SBS-IALT Improved signal recovery and amplitude characterization
- SBS-BALT Cleaner sub-basalt imaging and intra-basalt layer definition
- CLEA New enhanced reservoir properties without the need for well control
- CARBONATE Detailed imaging of internal structures and better porosity prediction
- INERIS Resolved of complicated geometries and identification of true-geological importance boundaries

Experience that counts
450 000 KM² acquired worldwide
Extending Illumination and Angular Diversity

GeoStreamer data and SWIM imaging

Separated Wavefield Imaging (SWIM) is an innovative depth-imaging technology that uses both up- and down-going wavefields, recorded by GeoStreamer® dual hydrophones and motion sensors.

**SWIM + Survey Geometries**

**NARROW AZIMUTH TO WIDE TOW**
SWIM enables the design and use of cost-effective acquisition geometries such as super-wide tow. For narrow azimuth surveys in shallow water, SWIM yields better sampled data in the angle domain.

**WIDE AZIMUTH**
The extra sub-bottom illumination of sea-surface reflections combined with Wide Azimuth (WAZ) acquisition facilitates the imaging of salt domes and other density/piling stratigraphies.

**Further Uses**

**OCAM BOTTOM DATA**
SWIM has been successfully applied to seabed data such as ocama bottom node and cable recordings. SWIM can increase the shallow area coverage of seabed and the underlying sediments by up to 70%.

**IMPROVED MULTIPLE REMOVAL**
SWIM enables the generation of detailed shallow water topographic images that are a requirement for some data driven 3D SHM multiple removal methods.

**REDUCING DRILLING RISK**
Superior illumination of the overburden using SWIM provides high-resolution images suitable for shallow hazards, helping to identify drilling risks.

**Reduce Acquisition Footprint**

Taping the receiver spread into virtual sources and receiver array reduces source sampling in the cross-direction from the distance between all lines to that between streamers. Using SWIM in shallow water increases gaps in near-surface coverage, successfully reducing the acquisition footprint.

**Appendix**
Appendix

ACQUISITION SOLUTIONS

RAMFORM + GEOSTREAMER = EFFICIENCY + QUALITY

The unique combination of GeoStreamer™ technology and Ramform® vessels delivers a premium imaging product to locate and define your prospect.

Better Image Quality
Dual transducers combined with towing the streamers deep, 3D spread control, source steering, continuous recording and the ability to tow dense streamer spreads, all contribute to subsurface images of greater clarity, accuracy and reliability.

Reduced Survey Time
Faster turnaround time means less exposure to weather and faster access to data. We minimize the time it takes to complete a survey using 3D spread control, source steering, continuous recording, flexible tow depth and vast fleet integration.

Survey Versatility
Our fleet is capable of covering all the basics from highly efficient exploration surveys to detailed 4D production surveys.

Define Challenge and Select Technology
Tailored acquisition geometries make it easier to solve imaging challenges. Subsurface complexity and geophysical objectives determine the acquisition and imaging solutions to produce the best quality images in the most cost-effective way.

Coverage Options
From single sail line to the ultimate full azimuth coverage. Target illumination increases with each additional pair and direction.

Single Vessel Survey:
- Dual Source Narrow Azimuth (NIAZ)
- Triple Source Narrow Azimuth (NIAZ)
- Multi Azimuth (MAZ)
- EM and Seismic

Multi Vessel Survey:
- Wide Azimuth (WAZ/WAVS)
- Simultaneous Long Offset (SLO)
- Full Azimuth (FAZ)
Appendix

TOWED STREAMER EM

Reducing drilling risk

Sight & sound
Complementary data add new layers of comprehension like a 3D seismic but unlike adding more to EM, EM is more sensitive to changes in fluids.

Independent inversions
Seismic data can be inverted for velocity and for acoustic impedance, inversion of EM data provides another. Combining all these improves drilling success.

Drilling success with EM
Barents Sea

Resistivity
Hydrocarbon-saturated rocks are typically highly resistive. Geologists access local resistivity data from well logs.

EM response

EM source
EM is relatively long. EM source is below surface.

Towed streamer
250 m long line, up to 5 km east of the bore surface.

Towing speed
5-10 knots.

Operational 101
Towed streamer acquisition produces high-density 2D or 3D EM data fast. The operation is very similar to seismic, making it easy to install, operate, and even combine.

Fast
Acquisition speed up to 200 km per day. 1 km EM every / day.

Flexible
Multipurpose EM can be used to re-data prospects, resolve drilling hazards, or identify missed targets and production.

Global
Northern Europe is the region with greatest EM offshore potential.

Adding EM to seismic

How and when
Incorporating existing 3D seismic data, in-place 3D seismic and EM data. EM is typically used to locate good targets. EM response maps help locate 3D seismic anomalies and EM anomalies.

Quality
Towed streamer EM produces high-density data and can be acquired in a variety of settings.

HSEQ

Health
PGS' high standards apply.

Safety
Standard PGS towed streamer operations and equipment reduce risk and enable safety in the ocean.

Environment
Low environmental impact, fewer vessel days, lower emissions in both standalone and simultaneous acquisition modes.

Quality
Towed streamer EM produces high-density data and can be acquired in a variety of settings.