Presentation Overview

- Nautronix Overview
- Nautronix Portfolio
- Brazilian Market Opportunities
  - NASNet® Overview
  - Project Savings
  - Project History
  - Nautronix Equipment
- Brazil - Challenges
- The Future
About Nautronix

• Nautronix is an international company specialising in through water communication and positioning technology for the global offshore Oil & Gas industry.

• A world-leader in the design and supply of advanced underwater acoustic systems encompassing our Acoustic Digital Spread Spectrum (ADS²) technology for world-leading subsea communications and positioning capability.

• Global Customer Services (ICS) team providing 24/7 support to customer installations.

• All equipment manufactured onsite with state of the art training and test facilities.
About Nautronix

- Headquartered in Aberdeen with offices in Houston, Macaé, Rio de Janeiro and Stavanger
- Sub-100 employees globally both onshore and offshore
- Since 2000, invested over $25 million in R & D with continued annual commitments
- Links to academic research institutes, supports development of cutting edge technologies
- Budget revenue for 2012/13 is £16.5million
Our portfolio includes:

• **NASNet®** (Nautronix Acoustic Subsea Network)
  - **NASNet® DPR** (Nautronix Acoustic Subsea Dynamic Positioning Reference)
  - **NASNet® FPR** (Nautronix Acoustic Subsea FPSO Acoustic Monitoring System)

• **NASCoM** (Nautronix Acoustic Subsea Command, Control & Monitoring systems)
  - **NASMUX™** (Nautronix Acoustic Subsea Multiplex)
  - **NASeBOP** (Nautronix Acoustic emergency Subsea Blow Out Preventer)
  - **NASBOP** (Nautronix Acoustic Subsea Blow Out Preventer)

• **NASDrill RS925 / NASDrill USBL** (Nautronix Acoustic Subsea Drilling)
NAUTRONIX MARINE TECHNOLOGY SOLUTIONS

NASNet®

• Game changing subsea positioning technology

• Unique and truly unlimited, multi-user acoustic positioning and navigation system for field-wide coverage applications

• "Underwater GPS system" delivering many of the benefits of GPS to the subsea environment

• Proven significant cost benefits to deepwater field developments

Click in box to view animation
Brazil Opportunities - why NASNet®?

• Cost savings
  – Multi Million R$ per year
  – Reduced installation and maintenance

• Improved safety
  – Reliable, accurate acoustic DP reference
  – No interference

• Operational efficiency
  – SIMOPS enabler – true multi-user
  – High quality, wide area subsea positioning
  – Complete operational flexibility
Field Coverage Example

99 LBL transponders

18 NASNet® Stations
Schedule Comparison with traditional LBL

<table>
<thead>
<tr>
<th>Activity</th>
<th>NASNet® (18)</th>
<th>LBL (99)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation &amp; Calibration</td>
<td>6 hours</td>
<td>3.5 hours</td>
</tr>
<tr>
<td>Recovery</td>
<td>4 hours</td>
<td>2.5 hours</td>
</tr>
<tr>
<td>Total for Project Example</td>
<td>180 hours OR 7½ days</td>
<td>594 hours OR 24¾ days</td>
</tr>
<tr>
<td>Time Saving</td>
<td>414 hours OR 17¼ days</td>
<td></td>
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</tbody>
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- **Additional time/cost benefits due to:**
  - Rig DP requirements – no additional arrays needed
  - Long deployment time (4 years) – less maintenance
  - Quality of positioning increases vessel productivity

- **Other Considerations:**
  - Cost of transponder frames
  - How often will transponders be changed for batteries? 6-12 months?
  - At least 10-12 vessel days per transponder (x99) change-out
NASNet® Summary

- **Seabed Array**
  - System Rental
  - Maintenance (batteries)

- **Vessel equipment options**
  - System Rental
  - System Purchase

- **Project Support Services**
  - Local Project Management
  - Locally held Spares
  - Inclusive 24/7 Support

- **Rental Durations**
  - 3, 6 or 10 year options (seabed)
  - Additional short-term options (vessel)
NASNet® Developments – NASNet® DPR

- NASNet® Dynamic Positioning Reference system
- Overcomes the threat of GPS scintillation
- Using NASNet® as a DP input for vessel positioning
- Uses same hardware as NASNet® for subsea use
- Dedicated software for DP operation
- An ideal complimentary input to DGPS
  - All the benefits of ADS² signalling
- Can be used with existing field array or dedicated local relative array
NASNet® Track Record 2005 to Date

- Delta-1 Cairn Energy
- Cascade & Chinook Petrobras America
- Bundle Tows Subsea 7
- STARTr UK Ministry of Defence
- Frade Acergy / Chevron
- AKPO Total
- Agbami Subsea 7 / Chevron
Vessel Positioning Systems

- **NASDrill RS925** - DP reference system for ultra deepwater drilling units
  - Combined LBL/SBL, accurate up to 1m @ 4000m water depth
  - Includes riser angle monitoring and ROV tracking
  - Fully Petrobras Compliant

- **NASDrill USBL** - riser angle monitoring and ROV tracking for drilling rigs and vessels
  - Fast position update – 1Hz in pinger mode, transponder mode as standard
  - High accuracy even in noisy environments
Vessel Positioning Systems Track Record

Since 2003 major projects have included:

NASDrill RS925:
- Rowan Companies – HHI 2559, 2560 & 2563
- Noble Drilling – HHI 2505, 2506, 2507 & 2508
- Odfjell Drilling – Deepsea Metro 1 & 2
- Transocean – Deepwater Champion
- ENSCO – ENSCO 850X fleet
- Diamond Ocean Clipper

NASDrill USBL:
- Songa Offshore – Songa Venus & Mercur
- COSL – NAN Hai 5
- Dolphin Drilling – Byford Dolphin & Bredford Dolphin
- Stena Drilling – Stena Clyde
NASeBOP

- Nautronix Acoustic Subsea emergency Blow Out Preventer
- The premier solution to acoustic control and monitoring of the BOP
- Multiple levels of redundancy for subsea BOP control and monitoring
- Winner of the Subsea 2012 Innovation and Technology Award
NASeBOP

- Provides a comprehensive fully redundant system by offering:
  - Primary control or secondary control in conjunction with the standard umbilical
  - Emergency control and monitoring via NASeBOP portable units
  - An emergency ‘red box’ response system
  - Meets safety requirements of Brazil and Norway
  - Fully compliant with API16D and 17E
- All components offer up to 16 x solenoid drivers/readbacks and 2 x 4-20mA interfaces, 6 interfaces configurable
- Depth Rating 4000m (6000 m optional)
- Through the use of acoustics, control and monitoring of the BOP is possible even after the EDS has taken place
Since 2003 major projects have included:

- Rowan Companies – HHI 2559, 2560, 2563
- Noble Drilling – HHI 2505, 2506, 2507 and 2508
- ENSCO – ENSCO 7500, 8504 and 8506
- Odfjell Drilling – Deepsea Metro I and II
- Diamond Offshore – Ocean Clipper
- Shell – Transocean Arctic I
- Murphy Oil – Azurite FDPSO
- Ophir Drilling – Deep Venture

Interfaced to various BOP manufacturers’ equipment
Support & Services

- Nautronix offer 24 / 7 / 365 Integrated customer service support

- Service to our customers is the mainstay of our operations; we provide this at every stage from project start up and installation, through to the after care of our products and projects through life of field support

- Full product training available at our state of the art training facilities in Aberdeen and in Houston

- Onsite customer training available globally if required

- Fully operational acoustic test and calibration facility
Nautronix Acoustic Subsea Multiplex Control

- **Phase 1** – Joint development project with Cameron Drilling Systems Division in Houston

- **What are the objectives?**
  - Acoustic primary control of subsea BOP
  - 128 functions and digital status signals
  - 60 analogue readings
  - Augment the traditional control umbilical
  - Retain the existing, proven, Cameron surface and subsea control units

- **Qualification**
  - Development will follow DNV-RP-A203, Qualification of New Technology
Nautronix in Brazil

• Actively supporting ongoing operations in Brazil:
  – Diamond Ocean Clipper
  – Odfjell Deepsea Metro II
  – Ensco 7500
  – Transocean Deepwater Discovery

• Set-up Brazilian entity – completed early 2011

• Local Business Development Manager recruited in 2011

• Completed Petrobras CRCC Registration

• Establish partnerships in Brazil to increase local support capability

• Develop Brazilian offshore support team

• Develop capability to build/assemble equipment in Brazil

• Opportunities for Brazilian academic research in future acoustic developments
Brazil Challenges

- Slow Progress since commitment to Brazil through investing in local entity
- Attendance at Brazil events - advised that we are doing the right things and talking to the right people, but just need to be patient
- Ongoing discussions over past 4 years to supply NASNet®
- Good feedback from Petrobras Geodesy Department, with significant savings identified, but unable to get to key decision makers
- Old specifications and resistance to change, despite key messages to bring new technology to Brazil
- Significant potential to supply our RS925 hydro acoustic positioning system, along with our BOP control system NASeBOP, for the new drillships program
NASNet® & NASCoM life of field scenario

• The vision for full integration of Nautronix’ NASNet® and NASCoM capabilities
• Positioning of all mobile assets in the field
• Communication between assets, mobile & fixed, across the field
  – Pre-production wells
  – Pipeline monitoring
  – Flowrates, pressures, temperatures
  – Subsea stored AUV / ROV. Mission upload / download and real-time positioning
  – Injection well control
  – Environmental data
  – Riser monitoring
  – etc.
Integrated Positioning and Communication
Thank you for your time