Sonardyne
SOUND IN DEPTH
SUBSEA TECHNOLOGY

Retrofitting a Subsea Pipeline Monitoring System to Provide Online, Near-realtime, Feedback, Replacing Periodic Vessel Based Data Collection

Stephen Auld, Global Business Manager
Sonardyne International Ltd.

Subsea Controls Down Under
23rd to 24th October 2018
Perth, Australia

POSITIONING
NAVIGATION
COMMUNICATION
MONITORING
IMAGING

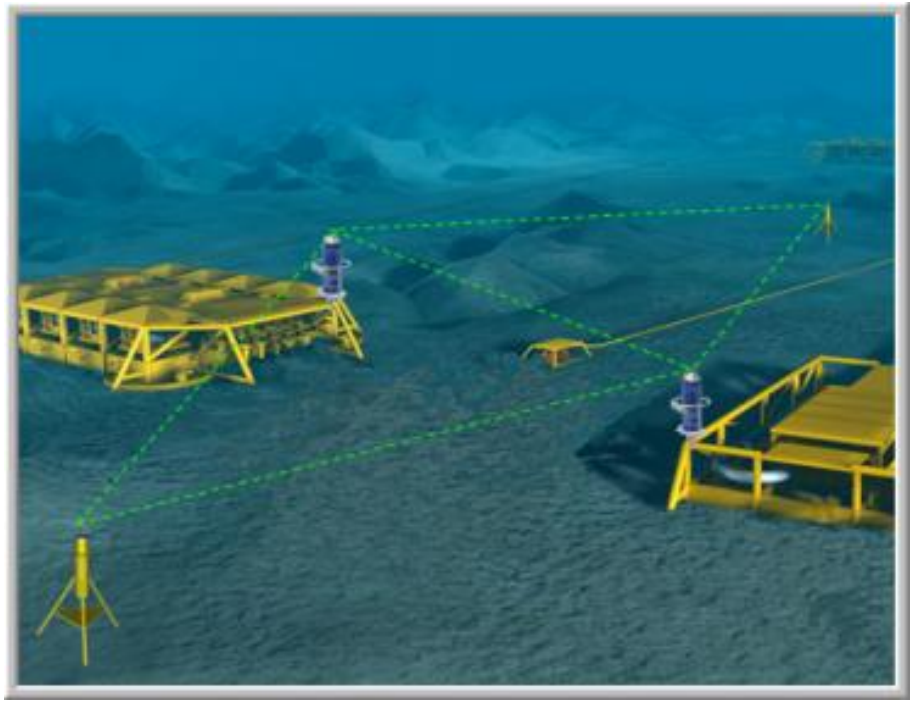
Order of Play

- Rewind to Subsea Controls Down Under, October 2016
- Nudge slightly forward to November 2016
- Move forward again to September 2017
- Fast forward to Subsea Controls Down Under, October 2018
- What does it all mean?

Rewind to October 2016

SMART Monitoring

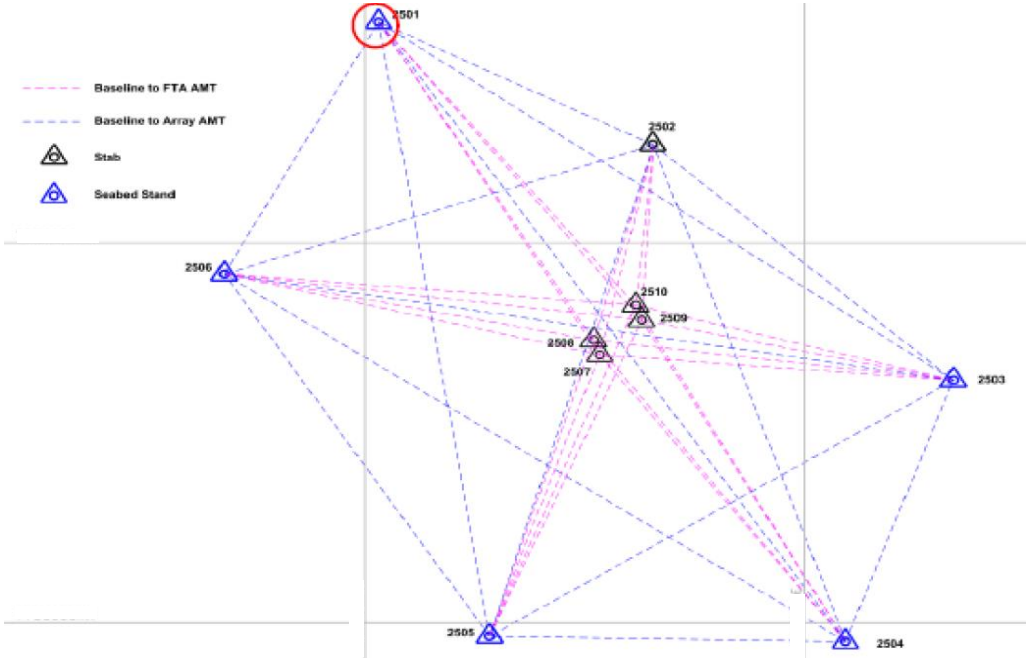
Rewind to October 2016



- E&P company wished to understand potential movement or ‘walking’ of two subsea flowline termination assemblies (FTAs)
- The FTAs were side-by-side and situated in around 850m of water depth
- A conventional Acoustic Monitoring Transponder (AMT) array consisting of 10x AMTs was deployed
- 6x AMTs placed in a ‘fixed’ location to provide reference frame
- 4x AMTs mounted on each of the two ‘walking’ FTAs (2x AMTS on each)
- As an aside, and to meet very tight client timelines, this array was constructed using refurbished Aluminium Bronze housings that had previously been deployed offshore Norway for over 5 years!

SMART Monitoring

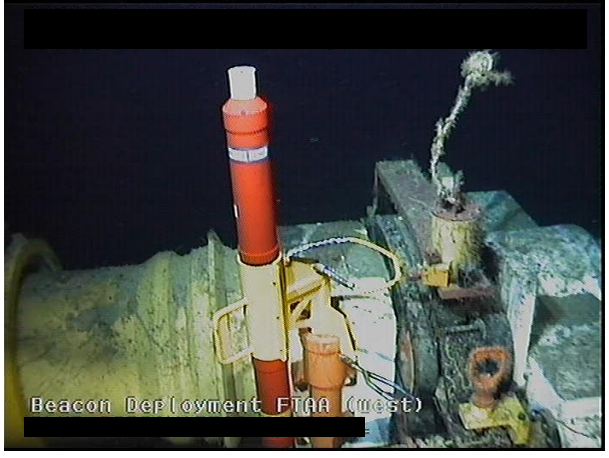
Between October 2016 to October 2017



- The resultant array network around the two FTAs is shown left

SMART Monitoring

Between October 2016 to October 2017



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- 5x AMTs were deployed on seabed frames, with the 6th on the nearby pigging manifold

SMART Monitoring

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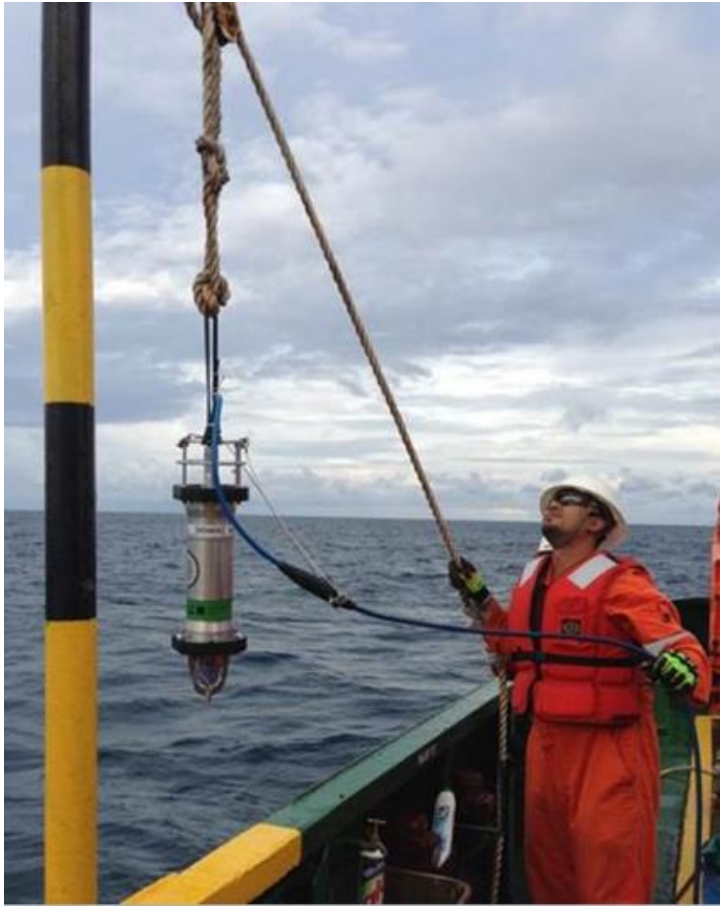

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- Following deployment of the AMT array data was harvesting using a vessel of opportunity with a conventional Dunker system

SMART Monitoring

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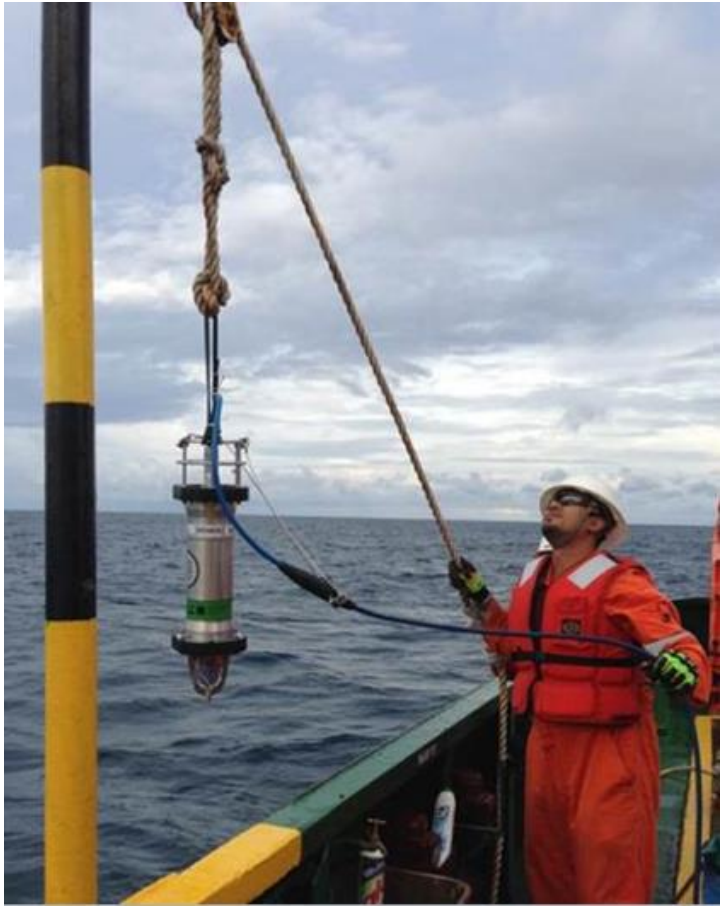
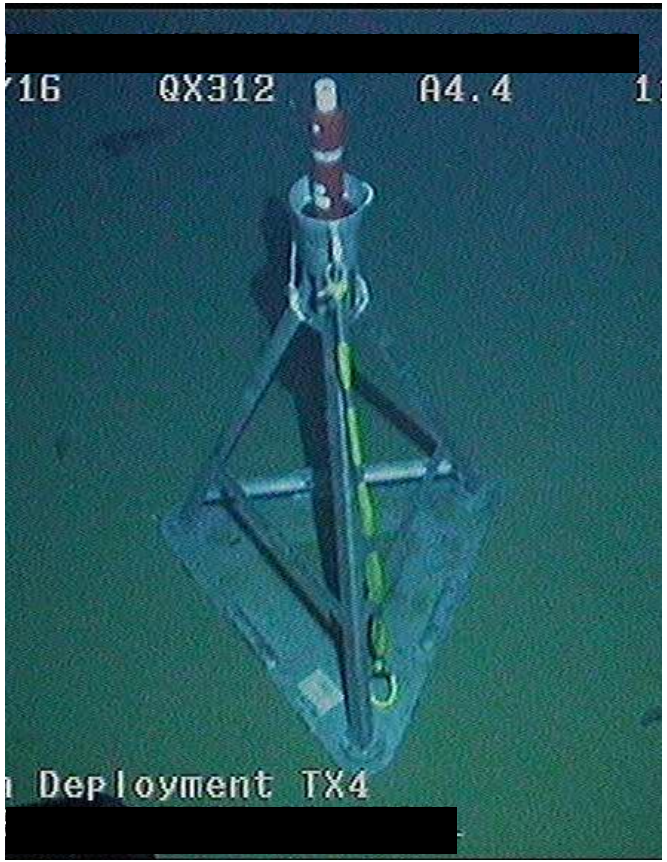


- The resultant array network around the two FTAs is shown left
- 5x AMTs were deployed on seabed frames, with the 6th on the pigging manifold
- Following deployment of the AMT array data was harvesting using a vessel of opportunity with a conventional Dunker system, with data processing on-board
- Client wished to increase data access rate and reduce through-life running costs, so looked at:
  a. Unmanned Surface Vehicles
  b. Iridium link via moored surface buoy
  c. Direct tie-in using subsea SMART technology to SCM



- To meet both criteria of on-demand data access and cost reductions, option c. was selected
- Subsea SMART (subsea monitoring, analysis and reporting technology) was programmed to act as replacement for the surface ship
- Internally it would process each FTA's positioning data, referenced it to a common point and save it in a set format
- Interrogation from the SMART to the AMTs was set for 60 min intervals
- Using a free port on the SCM, the shore-based operator could retrieve data on-demand

- Not everything went exactly to plan …

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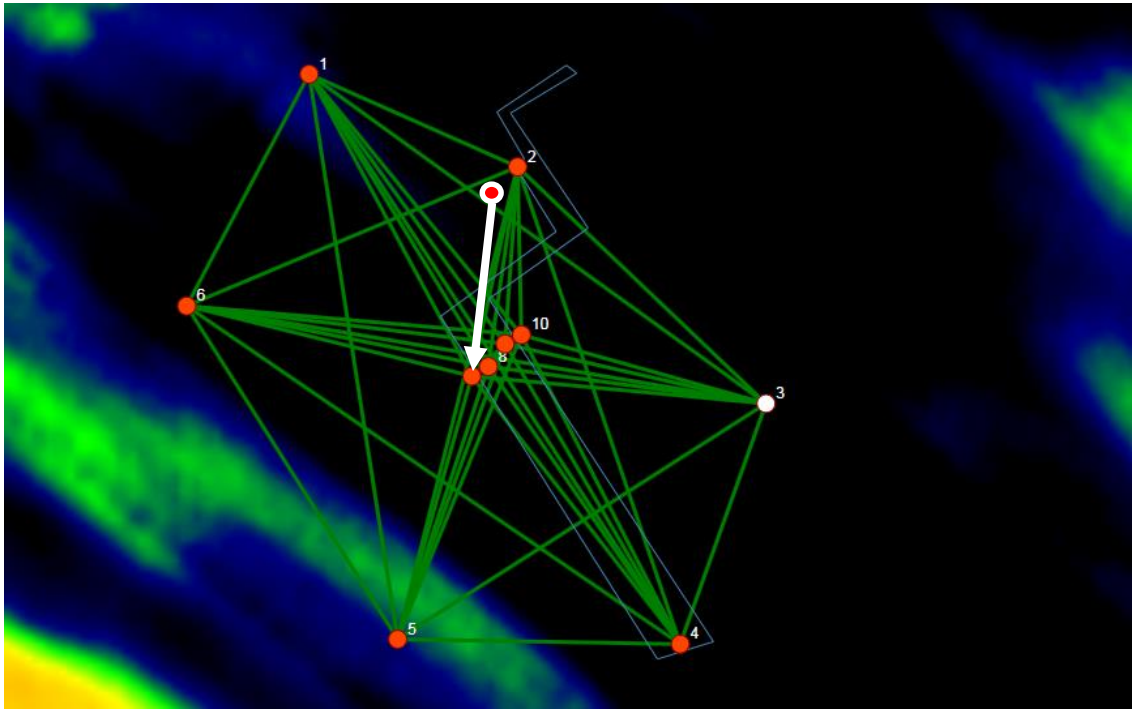
- The initial position of the SMART seabed frame found the two pigging manifold pipes obstructed a clear acoustic line-of-site view to the AMTs on the FTA
- Moving to a revised position, with flying leads running under the pipes, resulted in excellent acoustic communications path to all 4x AMTs on both FTAs

SMART Monitoring

New SMART On-Demand, Near Real-Time Data Access



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SMART Monitoring

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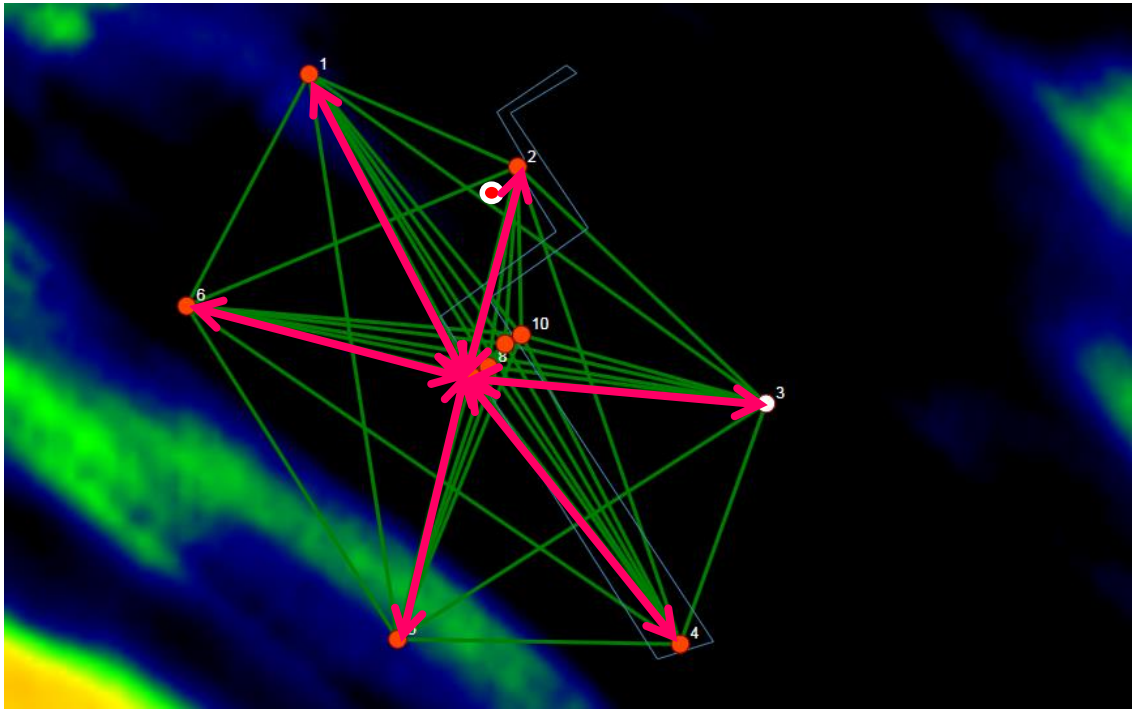

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- In turn each AMT on both FTAs collect range data from static seabed and pig manifold located AMTs

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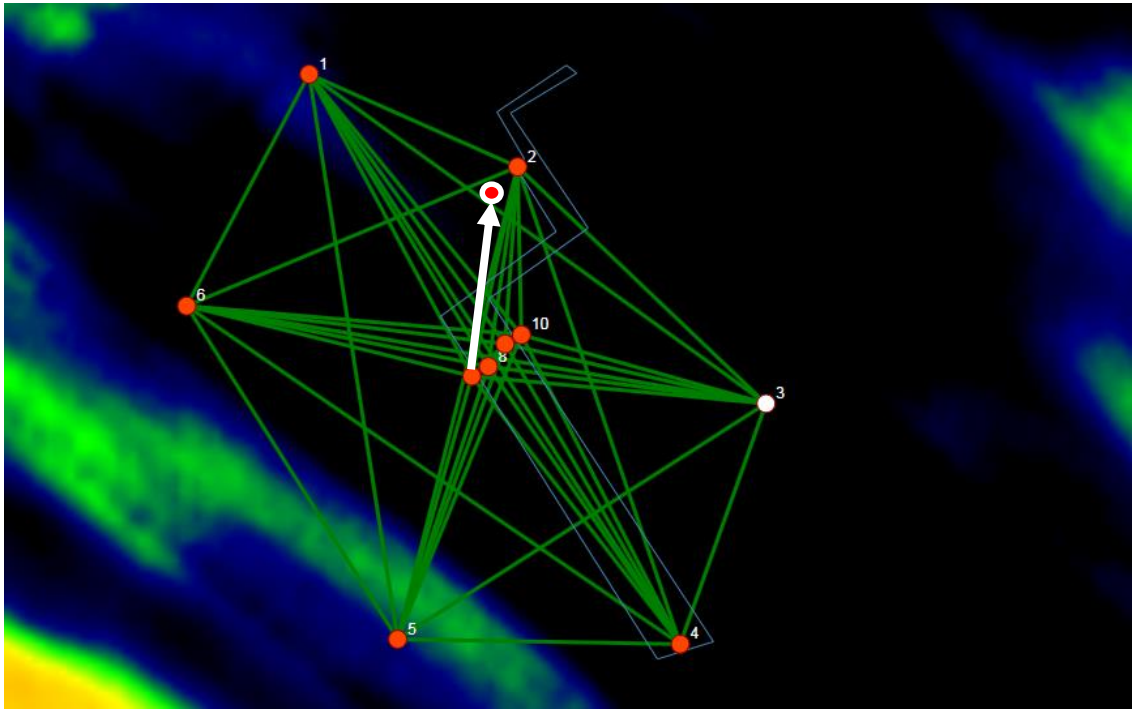

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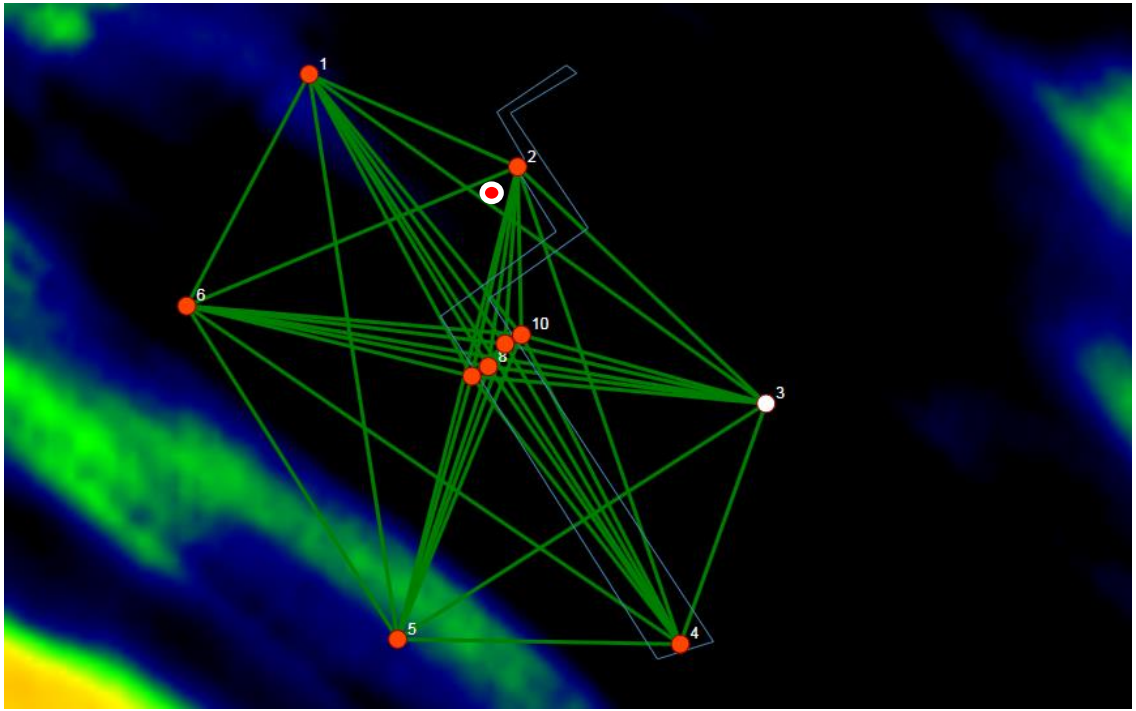

- Every 60 minutes SMART commences an interrogation
- In turn each AMT on both FTAs collect range data from static seabed and pig manifold located AMTs
- Data returned to the SMART
- Repeat for all AMTs on both FTAs
- Position calculations carried out in the SMART
- Data format conversion to match that expected at SCM

SMART Monitoring

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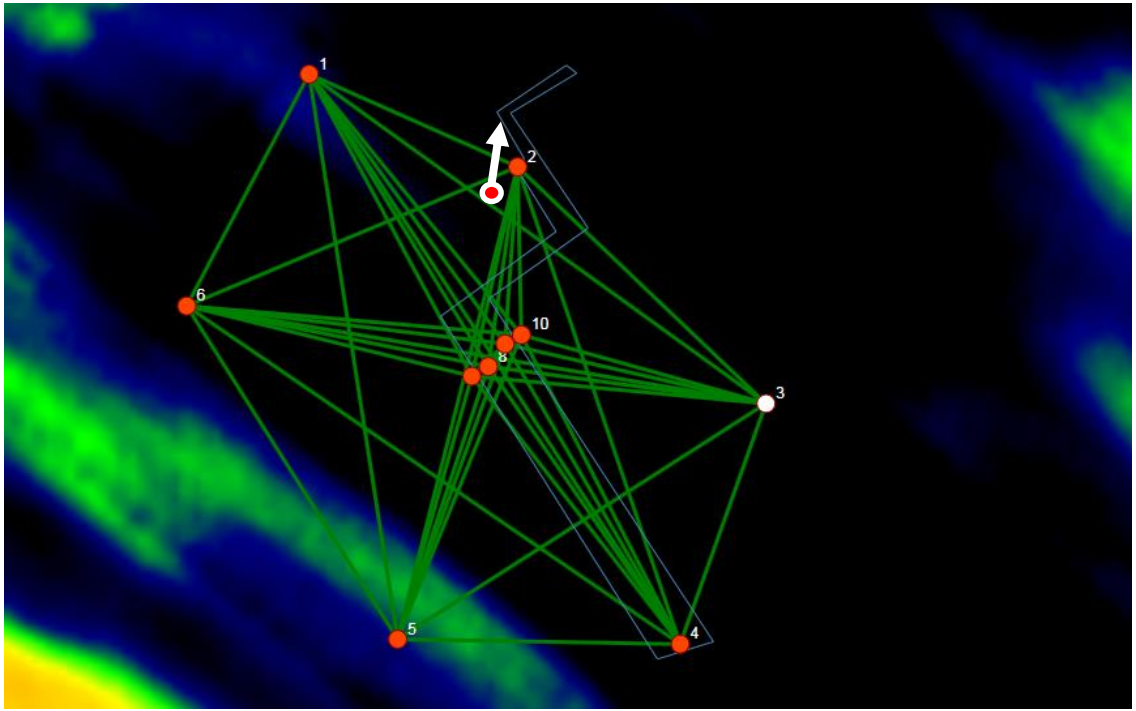

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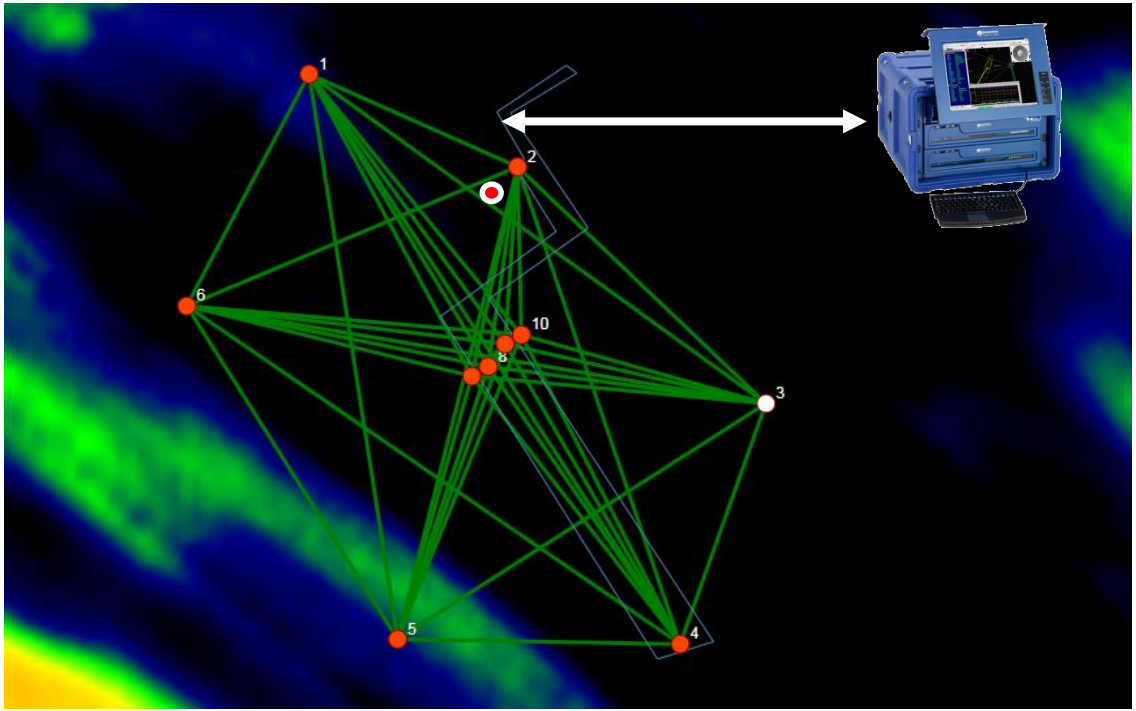

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- Data format conversion to match that expected at SCM
- Formatted data written to Modbus register
- Data on-demand recovered topside to provide movement trend

Subsea Controls Down Under 2018 – What Does it all Mean?

- Forum's such as SCDU can spark ideas that lead to innovative solutions
- Technically gifted teams from both on supplier and client sides, working together, can make things happen … and in this case *fast*
- Live field data can show asset 'walking' or movement trends PLUS it can improve modelling techniques, leading to safer and longer field life
- Low-powered sensors like SMART that process data subsea can provide timely summary results (not just raw data) with prolonged deployment life
- Cost savings for many types of monitoring applications can be achieved when you work smart

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Thank you.

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