

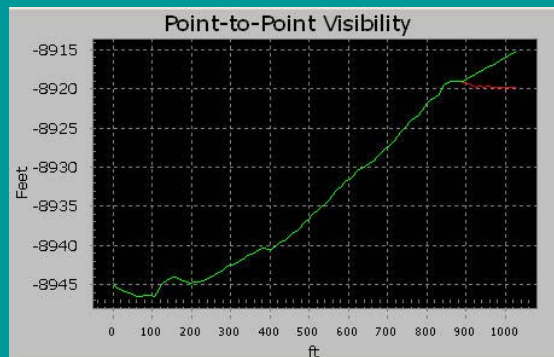


# Efficiency Improvements in Acoustic Metrology

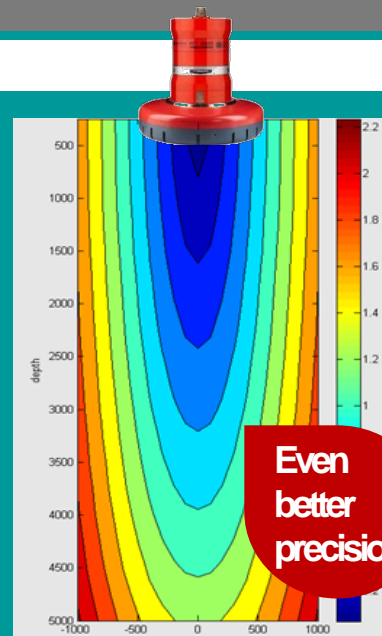


**Darren Murphy**

Senior Survey Engineer, Survey Support Group.

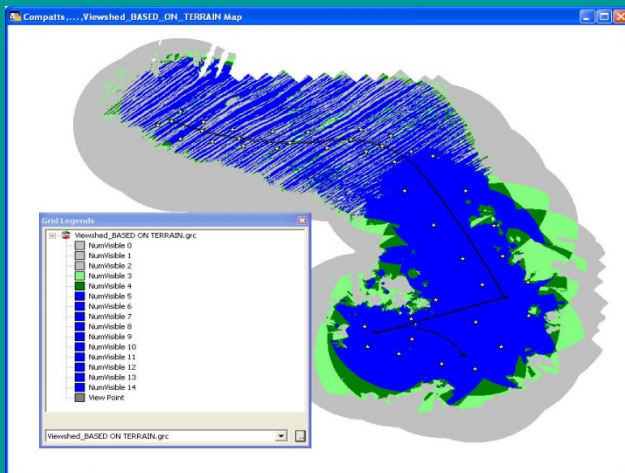


Product  
Advice

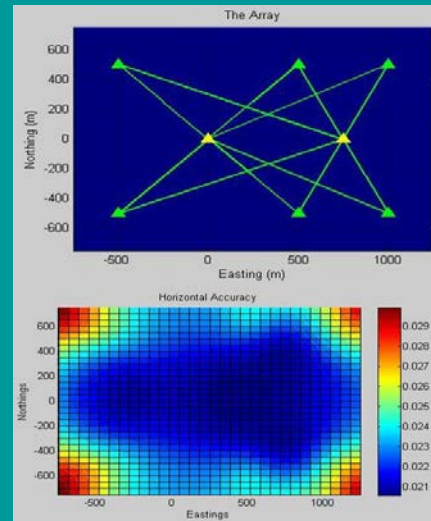


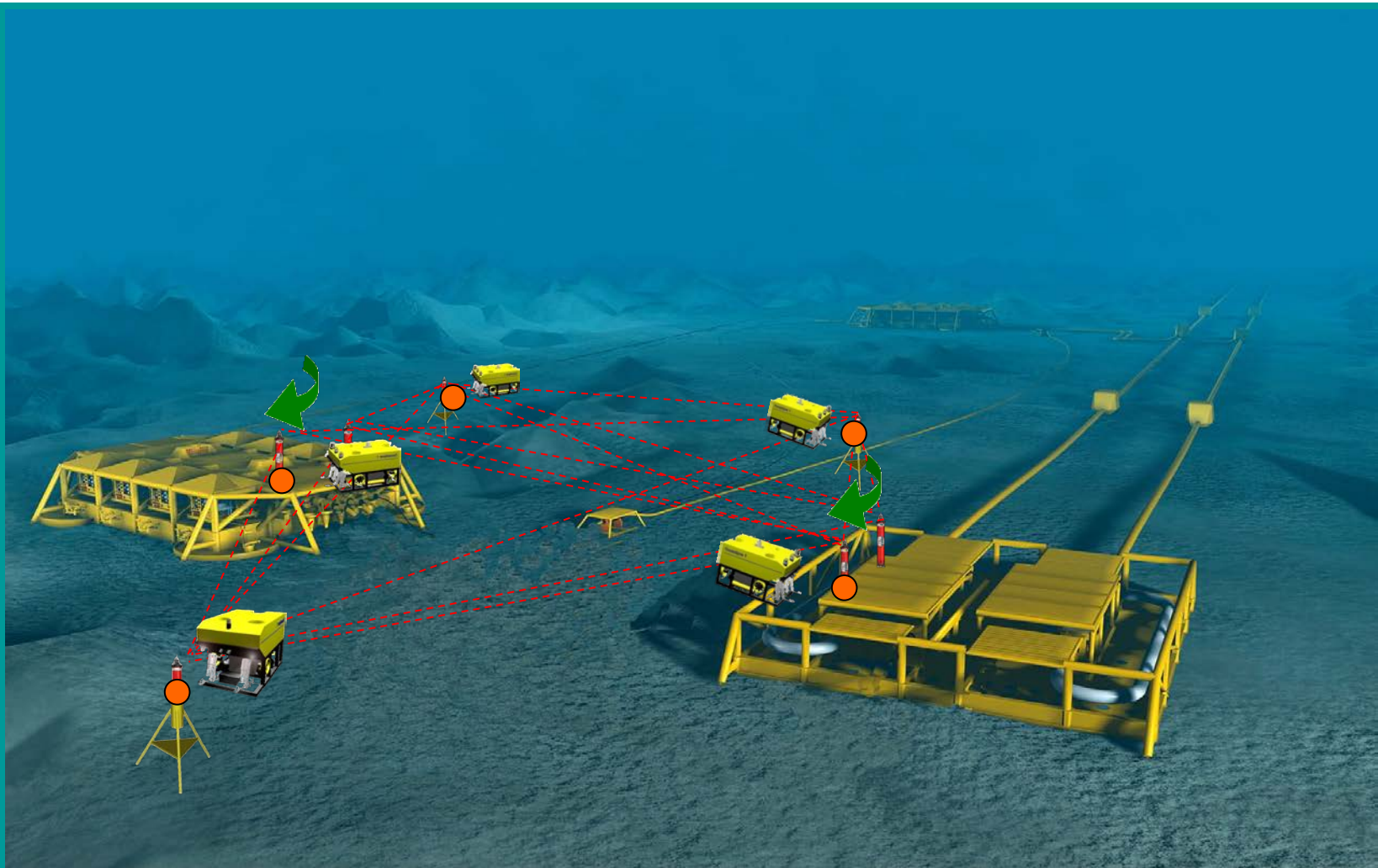
Project  
Support

Technical  
Workshops

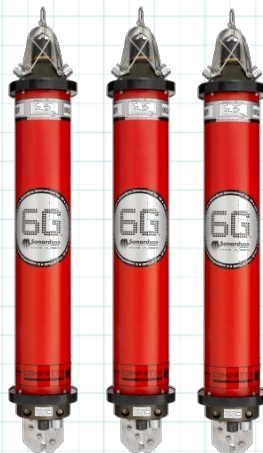
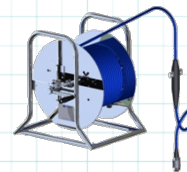


Internal  
Customer





“Standard  
Off-the-Shelf  
Equipment”



“Large  
Existing  
User Base”



- 
- The background image shows several acoustic metrology systems mounted on a ship's deck. Each system consists of a white tripod-like frame supporting a red and white cylindrical sensor unit. The units are labeled with numbers like '2104' and '220'. Purple and green straps are used to secure the equipment. The scene is set against a clear blue sky and the ocean.
- **Standard Equipment**
  - **Easy to Mobilise**
  - **Lots Available in Rental Pool**
  - **Many Experienced Operators**
  - **Highly Redundant Result gives Integrity**
  - **Low Planning Requirement**
  - **Long Track Record**
  - **Instant Result**
  - **Easily Interpreted Data**
  - **Email-able Data files**

## Typical Steps and Timings (800m WD - 5 Quadrants)

“Actual  
times from  
real  
campaign”

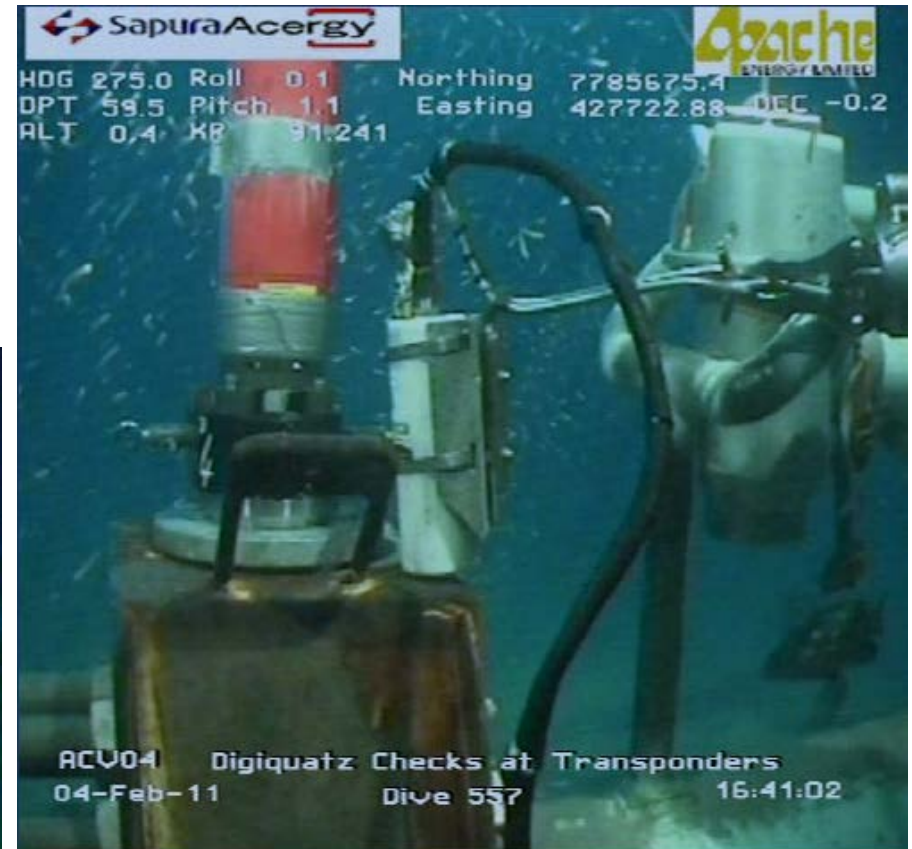
Activity	Time
Deploy Stand C6 to seabed and position	45
Deploy Stand C6 to seabed and position	45
Deploy Basket to Seabed with Hub C6s	15
Install Hub 1 Beacon	10
Install Hub 2 Beacon	10
Depth Loop (4 beacons)	20
Depth Loop (4 beacons)	20
Depth Loop (2 beacons)	10
Inclinations and Ranges (2 Beacons, 1 Quadrant)	30
Inclinations and Ranges (2 Beacons, 1 Quadrant)	30
Inclinations and Ranges (2 Beacons, 1 Quadrant)	30
Inclinations and Ranges (2 Beacons, 1 Quadrant)	30
Inclinations and Ranges (2 Beacons, 1 Quadrant)	30
Array Calibration	10
Recover Stand C6	15
Recover Stand C6	15
Recover Hub C6s and Basket	15

“Total  
time 6hrs  
20mins”

## Acoustic Metrology

### Metrology at Devil Creek, Australia

- 60m water depth
- Metrology completed in 30mins
- Robust acoustics around jacket
- Position accuracy 0.02m RMS





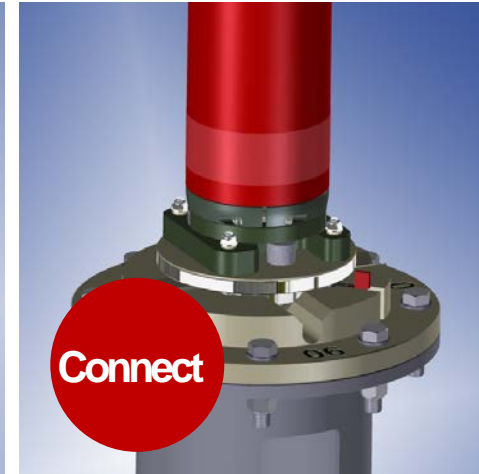
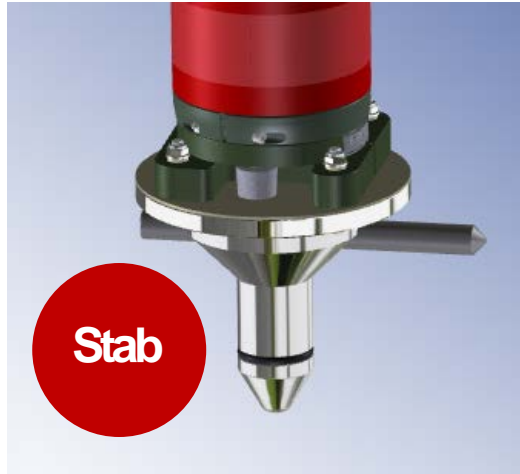


**GyroCompatt6 replaces gyro frames  
reducing complexity and increasing  
robustness**





- Stabs and receptacles are never manufactured to the same standard causing error budgeting problems
- How can Sonardyne help?



## Typical Steps and Timings (800m WD)

“Actual  
times from  
real  
campaign”

Activity	Time
Deploy Stand C6 to seabed and position	45
Deploy Stand C6 to seabed and position	45
Deploy Basket to Seabed with Hub C6s	15
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Install Hub 2 Beacon	10
Depth Loop (4 beacons)	20
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Depth Loop (2 beacons)	10
Inclinations and Ranges (2 Beacons, 1 Quadrant)	30
Inclinations and Ranges (2 Beacons, 1 Quadrant)	30
Inclinations and Ranges (2 Beacons, 1 Quadrant)	30
Inclinations and Ranges (2 Beacons, 1 Quadrant)	30
Inclinations and Ranges (2 Beacons, 1 Quadrant)	30
Array Calibration	10
Recover Stand C6	15
Recover Stand C6	15
Recover Hub C6s and Basket	15

“Total  
time 6hrs  
20mins”

## Typical Steps and Timings (800m WD)

“Actual  
times from  
real  
campaign”

Activity	Time
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Depth Loop (4 beacons)	20
Depth Loop (2 beacons)	10
Inclinations and Ranges (2 Beacons, 1 Quadrant)	30
Inclinations and Ranges (2 Beacons, 1 Quadrant)	
Inclinations and Ranges (2 Beacons, 1 Quadrant)	
Inclinations and Ranges (2 Beacons, 1 Quadrant)	
Inclinations and Ranges (2 Beacons, 1 Quadrant)	
Array Calibration	10
Recover Stand C6	15
Recover Stand C6	15
Recover Hub C6s and Basket	15

“Total  
time 4hrs  
20mins”



Fast, accurate subsea metrology

## Technip saves time in the West Delta Deep Marine

- GyroCompatts fitted with precise stab and receptacles
- This removed the requirement to rotate the GyroCompatts in the hubs
- Saved several hours per metrology
- Average error of 6mm

Engineer, fabricate and install approximately 60mm of umbilicals, 12km of flexible flowlines and three flexible jumpers

Connect the flowlines and umbilicals to the wellheads and subsea manifolds

Acoustic ranges could then be made whilst rotating the GyroCompatts and then using the attitude data recorded by the GyroCompatt, the projections of the hub position could be deduced. This meant we



A GyroCompatt is manoeuvred into position, the hub by an ROV.

By optimising its technique, Technip was able to complete each metrology operation in an average of 13 hours; one such operation was also conducted in under 9 hours. This resulted in the setup, measurements, drawings, jumper fabrication and installation for the entire





# Connect Metrology Workflow Tool/Calculator



**“Simplify Metrologies, allow better control and improve data collection efficiency”**

**“Office and Offshore versions  
allow multiple metrologies to  
be created and QC’d easily in a  
single job”**

**“Workflow and collection criteria can be defined in advance from the beach”**



**“Simple, intuitive GUI guides users through data collection, verification and processing”**

## Configuring a Transceiver

The screenshot displays the Connect Software interface with the Metrology tab selected. The Project Explorer on the left shows the hierarchy: Config > Geodesy > Horizontal CRS > Project Center > Configuration > Devices. The main window shows a table of 6G Transceivers with columns: Type, Name, I/O Config, Comms Status, I/O Status, and Recording. A single entry is listed: 6G Transceiver 6G Transceiver-1 COM41 38400 8-N-1. A 'Configure 6G Transceiver' dialog box is open, showing the 'Summary / Comms' tab. The dialog contains the following fields:

- Name: 6G Transceiver-1
- Type: 6G Transceiver
- Description: (empty)
- Frequency: MF OMNI
- Firmware: 6.01.00.03
- UID: 001239
- Wake Up Tone: W1
- Address: 1701
- HPR Channel: 45

The 'Get' button is highlighted. The 'Metrology Sensors' panel on the right shows the '6G Transceiver' tab with the following settings:

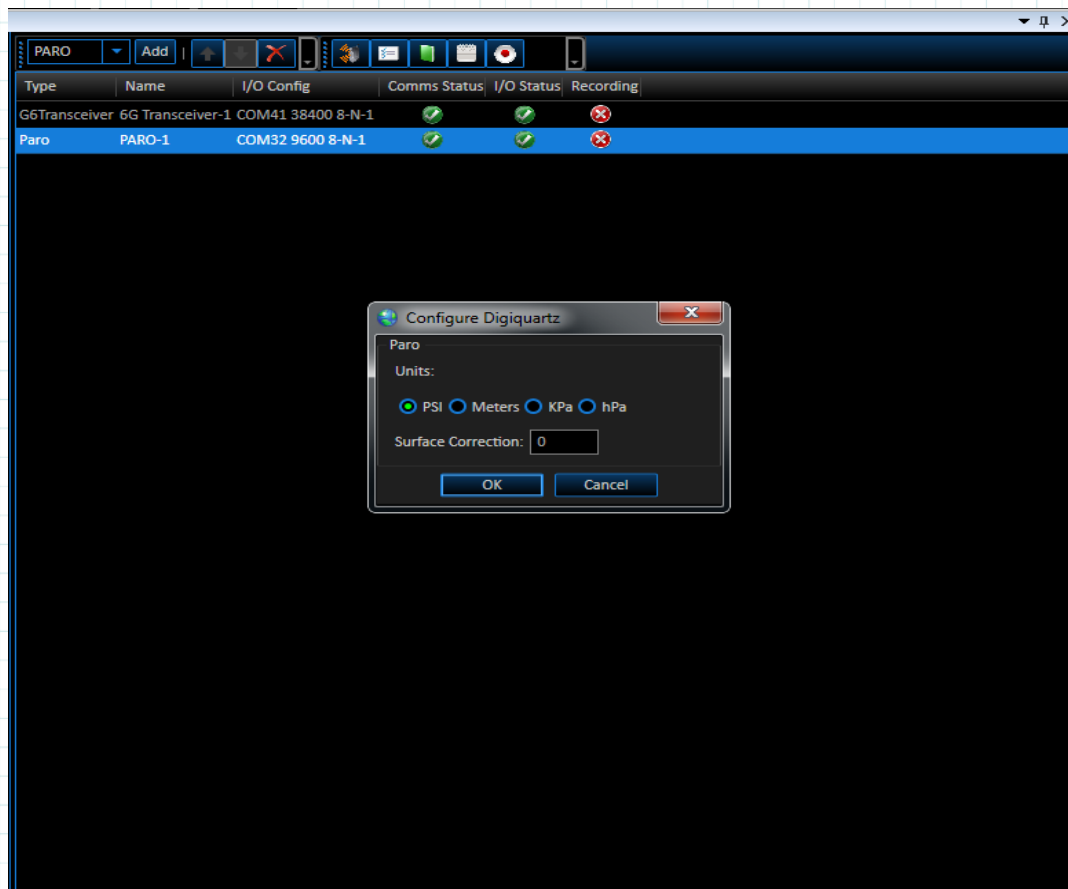
- Transceiver: 6G Transceiver-1
- CIS: MF CIS1600
- Request: Cancel

The 'Enter Request' section shows a list of timestamps and data:

Timestamp	Data
21/10/2013 08:46:31.9	>DIAG:1701,NONE
21/10/2013 08:46:31.9	DIAG:
21/10/2013 08:46:30.9	>CS:1701,TAT200,BLK100,RXW4800,TXW100,NPL187,TPL184,LG26,CIS0,AT8
21/10/2013 08:46:30.9	CS:
21/10/2013 08:46:29.9	>VS:1701,WKT1,HPR45,BT1,LI,VL15.1,IDC-12.5,CAP100.0/67,T9.0
21/10/2013 08:46:29.9	VS:
21/10/2013 08:46:28.9	>FS:1701,U001239,FV6.01.00.03,PV1.05,TDR,MF,OMNI;187;184;166,PR600
21/10/2013 08:46:28.9	FS:

The 'Port' section shows 'Port' with a green checkmark, 'Decode' with a green checkmark, and 'Map' with a green checkmark. The 'Map' section shows a coordinate system with values: 507,500.000 m and -318,450.000 m.

## Configuring a Depth Sensor



The screenshot shows the Connect Software interface. The main window displays a table of sensors, with 'PARO-1' selected. A 'Configure Digiquartz' dialog box is open, showing the 'Paro' section with 'Units' set to 'PSI' and 'Surface Correction' set to '0'.

Type	Name	I/O Config	Comms Status	I/O Status	Recording
G6Transceiver	6G Transceiver-1	COM41 38400 8-N-1	✓	✓	✗
Paro	PARO-1	COM32 9600 8-N-1	✓	✓	✗

Configure Digiquartz

Paro

Units:

☒ PSI ☐ Meters ☐ KPa ☐ hPa

Surface Correction: 0

OK Cancel



## Connect Software

### Adding Structures/Hubs/Receptacles with Offsets & C-Os

Add

Manifold

Tree

Selected Structure

Attributes

Name: Manifold

AutoCad File: ..\Autocad files\ManifoldMet ...

Layer: Outline

Notes:

Structure Location

Position: E 506,037.040 m  
N 504,355.730 m  
D 1,223.382 m

Heading: 238.14°

Pitch: 0.00°

Roll: 0.00°

Hubs

Add

Recep1

Hub1

Recep1

Survey Receptacle

Stbd: -0.260 m

Fwd: 3.196 m

Up: 0.244 m

Pitch C-O: 0.00°

Roll C-O: 0.00°

Hub Location

Position: E 506,034.463 m  
N 504,353.822 m

Depth: 1,223.138 m

Pitch: 0.00°

Roll: 0.00°

Heading: 238.14°

Heading C-O: 0.00°

Position Not Installed Install

Depth Not Installed Install

P/R Not Installed Install

Cancel

Apply

Metrology Sensors

6G Transceiver

Depth

Sound Velocity

Tides

Transceiver: 6G Transceiver-1 CIS: MF CIS1600

Request: Cancel

> Enter Request

Timestamp	Data
21/10/2013 09:31:33.7	>AKEY:1701,KEY_DECLINED
21/10/2013 09:31:33.7	AKEY:PK5CF650E35F5A965658741B95
21/10/2013 09:31:32.0	>ARND:1701,RN6AEB91DEF91F77E0
21/10/2013 09:31:32.0	ARND:IDK2

Port ☒ Decode ☒

Map

506,000.000 m

506,050.000 m

504,350.000 m

Manifold

Hub1

Tree



## Connect Software

### Add Tripods

Home View Setup Events Simulation Acoustics Metrology

ProjectExplorer

- Config
  - Geodesy
  - Project Center
  - Configuration
  - Devices
- Data
  - Metrology
    - Calculations
    - Beacons
    - Tripods**
    - Sound Velocity
    - Structures
    - Waypoints

Selected Tripod

Tripod W

Name: Tripod W

E 506,018.590 m  
N 504,349.060 m  
D 1,226.000 m

Cancel Apply

SetupEventsSimulationAcousticsMetrology

Compatt 6AddX

Name	Address	Type
2509	2509	Compatt 6
2510	2510	Compatt 6
2512	2512	Compatt 6
2513	2513	Compatt 6

Selected Beacon

Summary / CommsSensorsBattery

Name: 2513Type: Compatt 6

Description:

Frequency: MF OMNIFirmware: 6.01.00.03

UID: 001249Wake Up Tone: W1

Address: 2513Get

Communications

Transceiver: 6G Transceiver-1

Attempt 1 of 3  
Request configuration status

Cancel

CancelApply

Metrology Sensors

6G TransceiverDepthSound VelocityTides

Transceiver: 6G Transceiver-1CIS: MF CIS1600

Request: Cancel

> Enter Request

Timestamp	Data
21/10/2013 10:05:15.1	CS:2513;W1;TS1
21/10/2013 10:05:14.1	>VS:2513,WKT1,HPR45,BT1;U;VLT15.1;IDC-12.5,CAP100
21/10/2013 10:05:13.3	VS:2513;W1;W2;TS1
21/10/2013 10:05:12.3	>FS:2513,U001249,FV6.01.00.03,PV1.05,TDR;MF,OMNI
21/10/2013 10:05:11.6	FS:2513;W1;W2;TS1
21/10/2013 10:05:05.3	>CS:2512,TAT200,BLK100,RXW4800,TXW100,NPL187,TF
21/10/2013 10:05:04.6	CS:2512;W1;TS1
21/10/2013 10:05:03.6	>VS:2512,WKT1,HPR45,BT1;U;VLT15.1;IDC-12.5,CAP100
21/10/2013 10:05:02.9	VS:2512;W1;TS1
21/10/2013 10:05:01.8	>FS:2512,U001248,FV6.01.00.03,PV1.05,TDR;MF,OMNI
21/10/2013 10:05:01.2	FS:2512;W1;TS1
21/10/2013 10:04:50.7	>CS:2512,TAT200,BLK100,RXW4800,TXW100,NPL187,TF
21/10/2013 10:04:50.0	CS:2512;W1;TS1

Port Decode


Map

506,000.000 m506,05004,350.000 mTripod WManifold

## Define the Metrology

ProjectExplorer

- ▼ Config
  - Geodesy
  - Project Center
  - Configuration
  - Devices
- ▼ Data
  - ▼ Metrology
    - Calculations**
    - Beacons
    - Tripods
    - Sound Velocity
    - Structures
    - Waypoints

**Add** 

**Calculation Details**

Name:

Description:

Jumper Type: ☒ Vertical ☐ Horizontal

Jumper From:  ▼  
From Hub Ok

Jumper To:  ▼  
To Hub OK

Receptacles:  ▼

Tripods:   
 ▼

Calculation geometry setup is valid, Please select options below to save settings and plan data collection

**Cancel** **Apply** [Plan Selected Calculation](#)

## Configure the Data Collection Requirements

ProjectExplorer

- Config
  - Geodesy
  - Project Center
  - Configuration
  - Devices
- Data
  - Metrology
    - Calculations
    - Manifold - Hub
      - Plan Data Collection
        - Collection Settings**
        - Occupations
        - Acoustic Steps
        - Depth
        - Profile
      - Collect Data
      - View Data
      - Calculate Results
      - Report
    - Beacons
    - Tripods
    - Sound Velocity
    - Structures
    - Waypoints

**Quadrant Planning**

Ranges and Attitudes are observed with the compatts rotated in the hubs in different quadrants. Quadrant 1 represents Structure North, Quadrant 2 is Structure East, etc.

Number of Quadrants:

Collect Baselines at Quadrants:

**Observation Planning**

Number of Inclination measurements per set:

Number of Ranges per set:

**Sound Velocity Settings**

Global Sound Velocity:  Source:

Use Sound Velocity from Compatts if Available ☐ Yes ☒ No

**Logging Times**

Depth Sensor Logging Timeout: ☒ Enable

[Plan Metrology](#)



## Populate the Compatt Locations

Project Explorer

- Config
  - Geodesy
  - Project Center
  - Configuration
  - Devices
- Data
  - Metrology
    - Calculations
      - Manifold - Hub
        - Plan Data Collection
          - Collection Settings
          - Occupations**
          - Acoustic Steps
          - Depth
          - Profile
        - Collect Data
        - View Data
        - Calculate Results
        - Report
    - Beacons
    - Tripods
    - Sound Velocity
    - Structures
    - Waypoints

Compatt Occupation Planning

Specify the which COMPATTs will occupy which hubs, receptacles or tripods. In order to plan for a move of a different compatt to an element, select that element and click new occupation.

Element	Compatt	Status	Has Incl	Measure Incl	Has Gyro	Measure HPR	Has Depth	Has SV	Stab Base to Xducer	Receptacle to Stab Base	Orientation
Manifold Hub1	2513	Original	Yes	Yes	No	N/A	Yes	Yes	0.000 m	0.000 m	0.00°
Tree Hub1	2512	Original	Yes	Yes	No	N/A	Yes	Yes	0.000 m	0.000 m	0.00°
Tripod E		Original	No	N/A	No	N/A	No	No	0.000 m	N/A	N/A
Tripod W		Original	No	N/A	No	N/A	No	No	0.000 m	N/A	N/A

New Occupation Delete Occupation

Cancel Apply

Element: Tree Hub1

Compatt: 2512

Status: Original

Has Inclometer: ☒

Measure Inclinations: ☒

Has Gyro: ☐

Has Sound Velocity: ☐

Stab Base to Transducer: 0.000 m

Receptacle to Stab Base: 0.000 m

OK Cancel

Metrology Sensors

6G Transceiver Depth Sound Velocity Tides

Transceiver: 6G Transceiver-1 CIS: MF CIS1600

Request: Cancel

Enter Request

Timestamp Data

21/10/2013 10:05:15.8 >CS:2513,TAT200,BLK100,RXW4800,TXW100

21/10/2013 10:05:15.1 CS:2513;W1;TS1

21/10/2013 10:05:14.1 >VS:2513,WKT1,HPR45,BT1;U;VLT15.1;IDC-1

21/10/2013 10:05:13.3 VS:2513;W1;W2;TS1

21/10/2013 10:05:12.3 >FS:2513,U001249,FV6.01.00.03,PV1.05,TD

21/10/2013 10:05:11.6 FS:2513;W1;W2;TS1

21/10/2013 10:05:05.3 >CS:2512,TAT200,BLK100,RXW4800,TXW100

21/10/2013 10:05:04.6 CS:2512;W1;TS1

21/10/2013 10:05:03.6 >VS:2512,WKT1,HPR45,BT1;U;VLT15.1;IDC-1

21/10/2013 10:05:02.9 VS:2512;W1;TS1

21/10/2013 10:05:01.8 >FS:2512,U001248,FV6.01.00.03,PV1.05,TD

21/10/2013 10:05:01.2 FS:2512;W1;TS1

21/10/2013 10:04:50.7 >CS:2512,TAT200,BLK100,RXW4800,TXW100

Port Decode

Map

506,000.000 m

504,950.000 m

Tripod W

Manifold

The screenshot shows the 'Metrology Planning Steps' dialog box in the Connect Software. The left pane, 'ProjectExplorer', shows a tree view with 'Acoustic Steps' selected under 'Manifold - Hub'. The right pane contains a list of steps to be generated, a 'Generate Steps' button, and 'Cancel' and 'Apply' buttons at the bottom. A text box in the right pane instructs the user to click 'Generate Steps' to create a measurement plan based on the selected options.

ProjectExplorer

- Config
  - Geodesy
  - Project Center
  - Configuration
  - Devices
- Data
  - Metrology
    - Calculations
      - Manifold - Hub
        - Plan Data Collection
          - Collection Settings
          - Occupations
          - Acoustic Steps**
          - Depth
          - Profile
        - Collect Data
        - View Data
        - Calculate Results
        - Report
  - Beacons
  - Tripods
  - Sound Velocity
  - Structures
  - Waypoints

Metrology Planning Steps

Click Generate Steps to create a measurement plan based on the options selected above.

- Set Up Compatts
- Measure Acoustic Links
- Inclination Compatt 2513 at Manifold Hub1
- Inclination Compatt 2512 at Tree Hub1
- SV Sound Velocity
- Baselines Measure Baselines at Quadrant 1

Generate Steps

Cancel Apply

[Plan Depth Loop](#) [Collect Acoustic Data](#)

## Plan Depth Loops and Clearance Profiles

Home View Setup Events Simulation Acoustics Metrology

ProjectExplorer

- Config
  - Geodesy
  - Project Center
  - Configuration
  - Devices
- Data
  - Metrology
    - Calculations
      - Manifold - Hub
        - Plan Data Collection
          - Collection Settings
          - Occupations
          - Acoustic Steps
          - Depth**
          - Profile
        - Collect Data
        - View Data
        - Calculate Results
        - Report
  - Beacons
  - Tripods
  - Sound Velocity
  - Structures
  - Waypoints

Depth Loop Details

Name: Loop 1

Occupations

Starting Element: Manifold Hub1

Selected Elements: Tripod E, Tree Hub1, Tripod W

Closing Element: Manifold Hub1

Available Elements

Cancel Apply Plan Seabed Profiles Collect Depth Loops

ProjectExplorer

- Config
  - Geodesy
  - Project Center
  - Configuration
  - Devices
- Data
  - Metrology
    - Calculations
      - Manifold - Hub
        - Plan Data Collection
          - Collection Setup
          - Occupations
          - Acoustic Steps
          - Depth
          - Profile
        - Collect Data
          - Acoustic
          - Depth
          - Profile
        - View Data
        - Calculate Results
        - Report
  - Beacons
  - Tripods
  - Sound Velocity
  - Structures
  - Waypoints

Steps

Measure Acoustic Links

Process Acoustic Steps

Step Queue

- Rotate Compatt 2513 to Quadrant 1
- Measure Inclination 2513 at Quadrant 1
- Rotate Compatt 2513 to Quadrant 2
- Measure Inclination 2513 at Quadrant 2
- Rotate Compatt 2513 to Quadrant 3
- Measure Inclination 2513 at Quadrant 3
- Rotate Compatt 2513 to Quadrant 4
- Measure Inclination 2513 at Quadrant 4
- Rotate Compatt 2513 to Quadrant 5
- Measure Inclination 2513 at Quadrant 5

Occupations

Element	Compatt	Quadrant	Orientation	Valid
Manifold Hub1	2513	1	238.14°	✓
Tree Hub1	2512	0	0.00°	✓
Tripod E	2509	0	N/A	✓
Tripod W	2510	0	N/A	✓

Command Console

Confirm Rotate Compatt

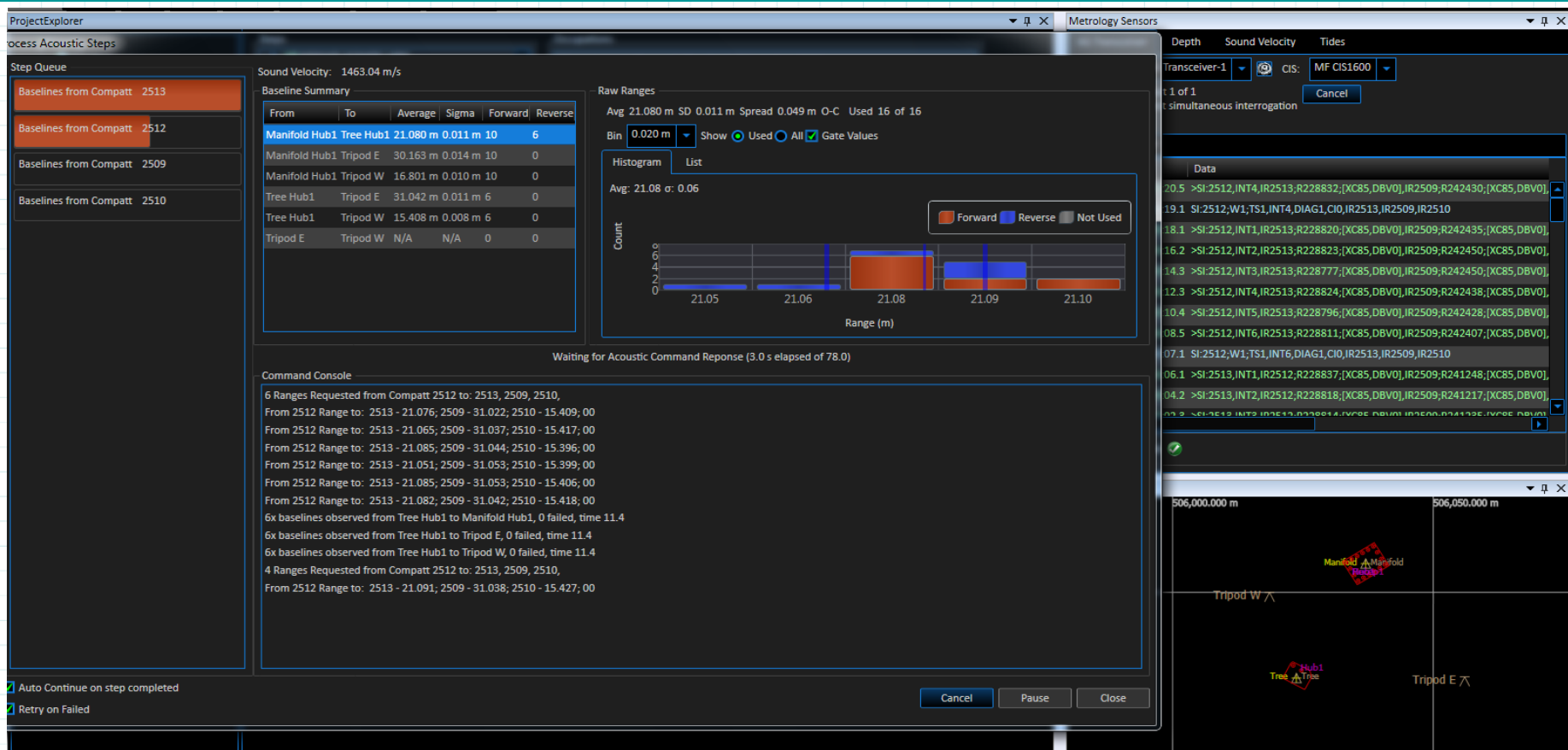
Confirm Compatt 2513 has been rotated to 2

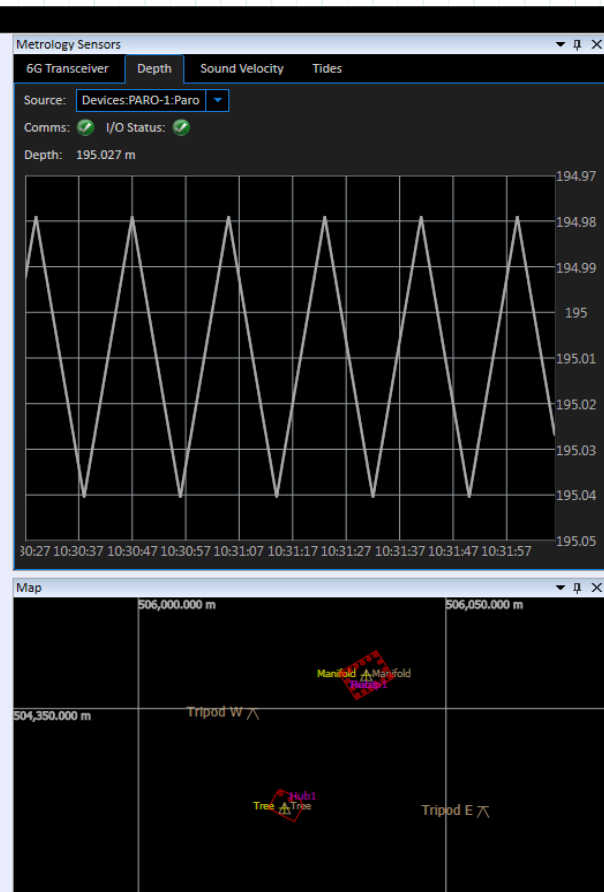
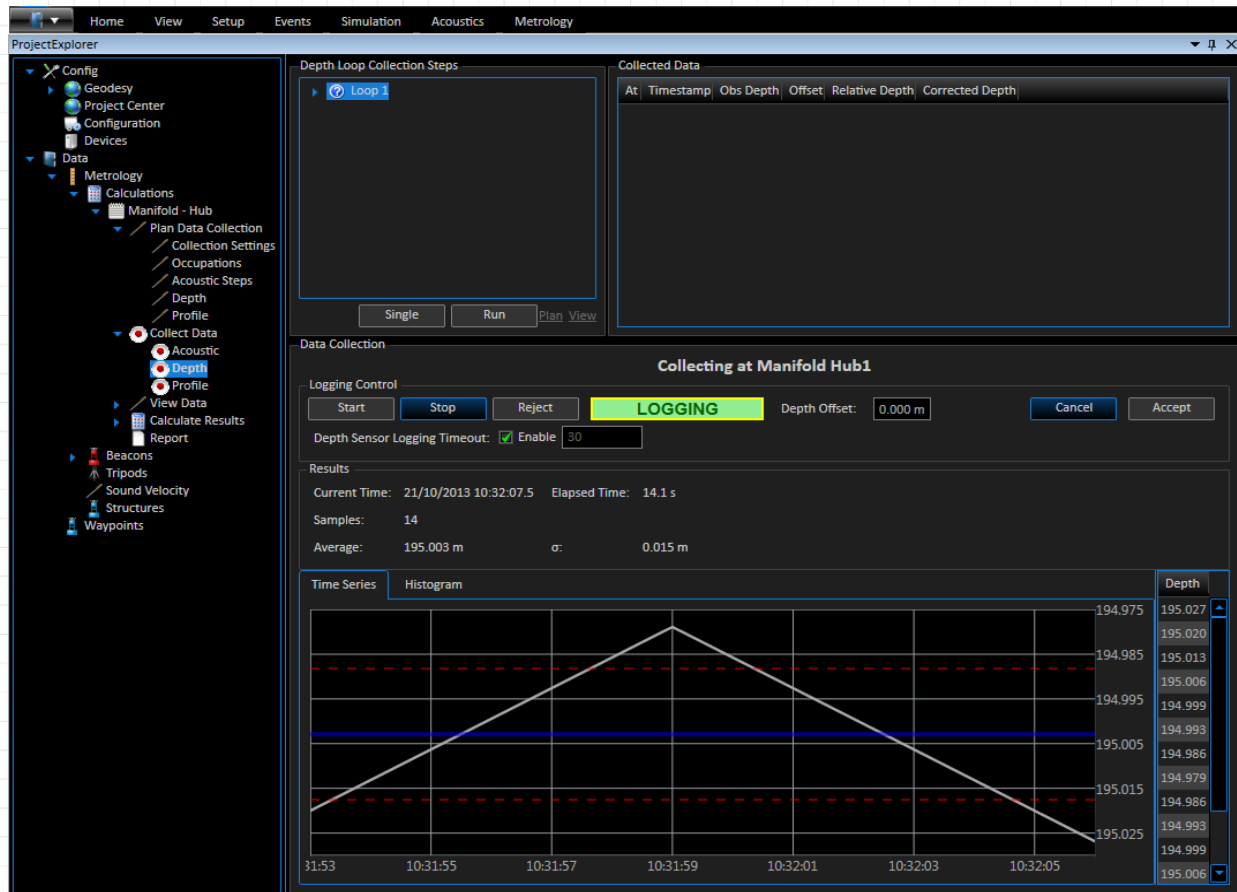
Ok Cancel

☒ Auto Continue on step completed

☒ Retry on Failed

Cancel Pause Close







## Sanity Check and Offline QC/Editing of all Data

Project Explorer

- Config
  - Geodesy
  - Project Center
  - Configuration
  - Devices
- Data
  - Metrology
    - Calculations
      - Manifold - Hub
        - Plan Data Collection
          - Collection Settings
          - Occupations
          - Acoustic Steps
          - Depth
          - Profile
        - Collect Data
          - Acoustic
          - Depth
          - Profile
        - View Data
          - Attitude
          - Acoustic
          - Depth
          - Profile
          - Tide
        - Calculate Results
        - Report
  - Beacons
  - Tripods
  - Sound Velocity
  - Structures
  - Waypoints

Observed Ranges

From	Height	To	Height	Range	Sigma	Residual	Used	Num
Manifold Hub1	0.972 m	Tree Hub1	None	21.081 m	0.020 m	714,433.361 m	Yes	20
Manifold Hub1	0.972 m	Tripod E	None	30.165 m	0.020 m	0.478 m	Yes	20
Manifold Hub1	0.972 m	Tripod W	None	16.803 m	0.020 m	0.153 m	Yes	20
Tree Hub1	None	Tripod E	None	31.043 m	0.020 m	714,423.423 m	Yes	20
Tree Hub1	None	Tripod W	None	15.409 m	0.020 m	714,424.435 m	Yes	20
Tripod E	None	Tripod W	None	40.322 m	0.020 m	0.747 m	Yes	20

Add Delete All On Import

Selected Range Summary

From: Manifold Hub1

To: Tree Hub1

Range: 21.081 m

Std Dev: 0.020 m

Used: ☒

Raw Ranges

Avg 21.081 m SD 0.011 m Spread 0.049 m O-C Used 20 of 20

Bin 0.020 m Show ☒ Used ☐ All ☒ Gate Values

Histogram List

Avg: 21.08  $\sigma$ : 0.06

Count

Range (m)

Forward Reverse Not Used

Map

506,000.000 m

504,350.000 m

Tripod W

Manifold

Hub1

Tree

Tide

Metrology Sensors

6G Transceiver Depth Sound Velocity Tides

Transceiver: 6G Transceiver-1 CIS: MF CIS1600

Request: Request simultaneous interrogation Complete Cancel

> Enter Request

Timestamp	Data
21/10/2013 10:31:06.9	>SI:2510,INT1,IR2513,R222974,[XC85,DBV0],IR2512
21/10/2013 10:31:05.0	>SI:2510,INT2,IR2513,R222958,[XC85,DBV0],IR2512
21/10/2013 10:31:03.1	>SI:2510,INT3,IR2513,R222961,[XC85,DBV0],IR2512
21/10/2013 10:31:01.1	>SI:2510,INT4,IR2513,R222958,[XC85,DBV0],IR2512
21/10/2013 10:30:59.7	SI:2510,W1,TS1,INT4,DIAG1,C10,IR2513,IR2512,IR2510
21/10/2013 10:30:58.7	>SI:2510,INT1,IR2513,R222957,[XC85,DBV0],IR2512
21/10/2013 10:30:56.8	>SI:2510,INT2,IR2513,R223002,[XC85,DBV0],IR2512
21/10/2013 10:30:54.8	>SI:2510,INT3,IR2513,R222986,[XC85,DBV0],IR2512
21/10/2013 10:30:52.9	>SI:2510,INT4,IR2513,R222970,[XC85,DBV0],IR2512
21/10/2013 10:30:51.0	>SI:2510,INT5,IR2513,R222992,[XC85,DBV0],IR2512
21/10/2013 10:30:49.0	>SI:2510,INT6,IR2513,R222958,[XC85,DBV0],IR2512

Port ☒ Decode ☒

File Setup View Help

Explorer

- Setup
  - Geodesy
    - Configuration
    - Time Sync
    - Devices
  - Beacons
- Metrology
  - Waypoints
  - Sound Velocity
  - Tripods
  - Structures
  - Calculations
    - Distance
      - Plan Data Collection
      - Collect Data
      - View Data
    - Calculate Results
      - Attitude Calculation
      - Depth Calculation
      - Network Calculation

Summary and Control

Jumper Metrology Summary

	Tree 12" Prod	Tree to Manifold 12" Prod Man
	At Tree 12" Prod	At Manifold 12"
Horizontal Rang	73.004 m	
Vertical Range	0.942 m (Manifold 12" Prod Man is	
Hub Heading	40.000°	290.000°
Hub Pitch	0.000°	0.000°
Hub Roll	0.000°	0.000°
Jumper Bearing	90.872°	270.872°
Jumper Pitch	0.000°	0.000°
Jumper Roll	0.000°	0.000°

Calculation Control

Calc	Status		
From Attitude	✓	Compute	Reset Calcs
To Attitude	✓	Compute	Reset
Depth	✗	Compute	Reset/Extract
Horizontal	?	Compute	Reset
Overall	?	Compute	
Install Results		Install	

## Comprehensive Report with all Data Included

Config

Geodesy

Project Center

Configuration

Devices

Data

Metrology

Calculations

Manifold - Hub

Plan Data Collection

Collection Settings

Occupations

Acoustic Steps

Depth

Profile

Collect Data

Acoustic

Depth

Profile

View Data

Attitude

Acoustic

Depth

Profile

Tide

Calculate Results

Attitude Calculation

Depth Calculation

Network Calculation

Report

Beacons

Tripods

Sound Velocity

Structures

Waypoints

Select Sections

☒ Site Details

☒ Metrology Summary

☒ Structure Details

☒ Attitude Determination

☒ Depth Determination

☒ Network Adjustment

☒ Show Raw Ranges

Reload

Jumper Metrology Report

Project Details

Manifold Hub1 to Tree Hub1 details

Client	Sonardyne
Project	Connect Images
Created By	PWM
Checked By	PWm
Approved By	PWM

Field Name

Site Details

Block Reference	
Geodetics	
Latitude	N 4° 33.2415'
Working Depth	1,223.382
Sound Velocity	1463.04 m/s
Vessel	Sonardyne

Metrology Results

Horizontal Range	21.433	m
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Metrology Results

Vertical Distance	0.618	m (Tree Hub1 is
Hub to Hub Az	207.49	°

Pitch (°)	0.00	Pitch (°)	0.00
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Jumper Attitude At Manifold Hub1		Jumper Attitude At Tree	
Roll (°)	0.00	Roll (°)	0.00

PDF

XPS

Excel 2003

Excel 2007

PDF

1 of 13

Export

Refresh

100

6G Transceiver

Depth

Sound Velocity

Tides

Transceiver: 6G Transceiver-1

CIS: MF CIS1600

Request: Cancel

Enter Request

Timestamp	Data
21/10/2013 10:43:59.8	>AKEY:1701,KEY_DECLINED
21/10/2013 10:43:59.8	AKEY:PKD932073BFC8B7723E6BA4DD3
21/10/2013 10:43:56.0	>ARND:1701,RN312D018062B4AA35
21/10/2013 10:43:56.0	ARND:IDK2

Port ☒ Decode ☒

Map

506,000.000 m

506,050.000 m

504,350.000 m

Manifold

Hub1

Tripod W

Tripod E



**How can we help you?  
Any questions?**

**Darren murphy**

Senior Survey Engineer, Survey Support Group.