Project number, Title of survey

On-Site Multibeam Mobilisation Report

Agency

by

Name of the seabed mapper

(Logo)

Agency/Entities

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# Mobilisation and Calibrations Timeline

Table : Mobilisation and Calibrations diary

|  |  |  |
| --- | --- | --- |
| Date | Personnel | Activity |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

# Equipment Overview

Platform (vessel)

Figure : Photo of the vessel with equipment

Table : Vessel particulars

|  |  |
| --- | --- |
| Vessel Particulars |  |
| **Vessel Name** |  |
| **Vessel Type** |  |
| **Construction** |  |
| **Length** |  |
| **Power** |  |

Survey System Hardware

The following hardware relating to survey data acquisition and processing have been mobilised for the project:

Table : Survey system hardware

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Manufacturer | Model | Serial No. |
| Acquisition Computer |  |  |  |
| Ancillary Computer |  |  |  |
| MBES (Processing Unit – PU) |  |  |  |
| MBES Transducer  |  |  |  |
| MBES Transducer  |  |  |  |
| Motion Reference System |  |  |  |
| Motion Reference Unit (MRU) |  |  |  |
| Standalone GNSS |  |  |  |
| SV Sensor (MBES Tx) |  |  |  |
| SV Sensor - Profiler |  |  |  |
| SV Sensor – Profiler (spare) |  |  |  |

Hardware Specifications

This section only includes relevant information about hardware specifications. Other hardware specifications can be found on the web as all equipment is Commercial off the Shelf.

Table : MBES specifications

| Kongsberg EM2040C MBES Specifications  |
| --- |
| Frequency |  |
| Number of soundings per sonar head |  |
| Beamwidth |  |
| Beam spacing |  |
| Pulse length |  |

Table : Positioning and motion system specifications

|  |
| --- |
| Applanix POS MV V5 Specification |
| Heading Accuracy |  |
| Roll / Pitch Accuracy |  |
| Position Accuracy  |  |
| Heave |  |
| TrueHeave TM  |  |

Survey System Software

The following software relating to survey data acquisition and processing have been mobilised for the project:

Table : Survey system software

|  |  |  |  |
| --- | --- | --- | --- |
| Purpose | Vendor | Product | Version |
| Data Acquisition  |  |  |  |
| Motion Reference Unit |  |  |  |
| Sound Velocity |  |  |  |
| GNSS |  |  |  |
| Data Processing |  |  |  |

#

# System installation

Offset summary

Who, when and how the offsets were measured and where were these entered in the system software (MRU, acquisition or processing software)

Motion Reference Unit Offsets

Figure : Screenshot example of the vessel coordinate system offsets from the software

Acquisition system offsets

The following offsets were applied in the acquisition system software **from date** (Figure 3). The transducers angular offsets were calculated from the calibration done on **date**

Figure : Screenshot of vessel coordinate system and angular offsets entered in aquisition software.

Processing software offsets

The following offsets are the final offsets applied to the raw data and were not accounted directly in the acquisition system software.

Table : Offsets applied in processing software.

|  |  |  |  |
| --- | --- | --- | --- |
| DateApplied From | PitchPort Stbd | RollPort Stbd | Yaw Port Stbd |
|  |  |  |  |  |  |  |

# Vessel Calibrations

The following calibrations and checks were done and results are presented below:

1) MBES transducer BIST tests

Brief description of what test was used and when, and what were the general results (Appendix X).

2) Sound Velocity Profiler Comparison

Brief description of tests undertaken to validate SVP readings

Table : Sound velocity sensor comparison (between transducer head and profiler sensor)

|  |  |  |
| --- | --- | --- |
| SVP file | SVP value at 0.75 m depth | SVS Screenshots |
|  |  |  |

3) Navigation validation

A brief description of the navigation validation check method used. The following methods can be used:

1. **Internal test:** Set an independent GNSS unit over the IMU and record data simultaneously from all components of positioning system (eg. Marinestar and C-Nav). Convert the files collected using Geoscience Australia AUSPOS (<http://www.ga.gov.au/bin/gps.pl> ) to get **accurate position.** Compare the position derived with the solutions.
2. **Benchmark test:** 1) Set one GNSS antennae over a known benchmark and acquired data for at least an hour. Convert the files collected using Geoscience Australia AUSPOS (<http://www.ga.gov.au/bin/gps.pl>) to get **accurate position.** Compare position and determine error. 2) Place the same antennae over one unit of the positioning system and record data from all system units (eg. Marinestar and C-Nav). Convert the files collected using Geoscience Australia AUSPOS (<http://www.ga.gov.au/bin/gps.pl>) to get **accurate position.** Compare the position derived with the solutions considering the measured offsets and the benchmark error.
3. **Total station:** From a known benchmark, calculate the position of the GNSS antennae using a total station and record simultaneously the position given by the antennae. Repeat the method over a minimum of 2 sets of 10 readings each. Derive the uncertainty.

Table : Navigation validation results using method “C”

|  |  |
| --- | --- |
| Mean |  |
| **SD** |  |
| **95% CE** |  |

Figure : Graph of solution spread

4) Bar Check

**Methodology**

Brief description of the methodology used for the check and when

**Processed Results**

Description of the results with the setting used

Figure : Screenshot of the processed Bar Check Results

Table : Statistics for Bar check

|  |  |  |
| --- | --- | --- |
| **Average** | **Std\_dev** | **Range** |
|  |  |  |

5) Calibrations

Brief description of the patch test results and reference to the Calibration Report

|  |
| --- |
| Calibration survey lines |
| **Misalignment** | **Line name** | **Heading (°)** | **Speed (kn)** |
| **Sonar head 1 Pitch** |  |  |  |
|  |  |  |  |
| **Sonar head 1 Heading** |  |  |  |
|  |  |  |  |
| **Sonar head 1 Roll** |  |  |  |
|  |  |  |  |
| **Sonar head 2 Pitch** |  |  |  |
|  |  |  |  |
| **Sonar head 2 Heading** |  |  |  |
|  |  |  |  |
| **Sonar head 2 Roll** |  |  |  |
|  |  |  |  |
| **Latency** |  |  |  |
|  |  |  |  |
| **Check line** |  |  |  |
| **Sonar Head 1 Backscatter** |  |  |  |
| **Sonar Head 2 Backscatter** |  |  |  |

|  |
| --- |
| Calibration target details |
| **Target description** |  |
| **Target dimensions** | **Length** |  | **Width** |  | **Height** |  |
| **Datum** |  |
| **Latitude** |  | **Longitude** |  |
| **Vertical Datum** |  |
| **Depth** |  |

|  |
| --- |
| Installation parameters |
| Sensor Offset | X (Stbd +ve) | Y (Fwd +ve) | Z (Upwd +ve) |
| **Sonar Head 1** |  |  |  |
| **Sonar Head 2** |  |  |  |
| **MRU/IMU/INS** |  |  |  |
| **Positioning system** |  |  |  |
| Installation angle | Pitch (Bow down +ve) | Heading | Roll (Stb down +ve) |
| **Sonar Head 1** |  |  |  |
| **Sonar Head 2** |  |  |  |
| **MRU/IMU/INS** |  |  |  |

\*Values of installation angle are as per (Software) sign convention

|  |  |  |  |
| --- | --- | --- | --- |
| Installation angle | Pitch (Bow up +ve) | Heading | Roll (Stb down +ve) |
| **Sonar Head 1** |  |  |  |
| **Sonar Head 2** |  |  |  |

**Comments**:Any additional comments that are necessary to explain the calibration process that is not captured above.

**Visual assessment of calibration results before and after**

|  |  |
| --- | --- |
| Surface uncalibrated (before) | Surface calibrated (after) |
|  |  |

|  |  |
| --- | --- |
| Pitch uncalibrated (Before) | Pitch calibrated (after) |
|  |  |

|  |  |
| --- | --- |
| Heading Tdx 1 (starboard) uncalibrated (Before) | Heading Tdx 1 (starboard) calibrated (after) |
|  |  |

|  |  |
| --- | --- |
| Heading Tdx 2 (port) uncalibrated (Before) | Heading Tdx 2 (starboard) calibrated (after) |
|  |  |

|  |  |
| --- | --- |
| Roll Tdx 1 (port) uncalibrated (Before) | Roll Tdx 1 (port) calibrated (after) |
|  |  |

|  |  |
| --- | --- |
| Roll Tdx 2 (starboard) uncalibrated (Before) | Roll Tdx 2 (starboard) calibrated (after) |
|  |  |

### Comparison with reference surface (optional)

Brief description of the comparison analysis

Figure Difference map between test surfaces. The colour scheme used shows …. Negative values indicate that (vessel) results are (positive or negative) over (reference surface). Polygona show the areas where statistics in Table 1 are derived.

Table Statistics from the differential surface. The flat area used for the calculation is indicated in Figure 1.

|  |  |  |  |
| --- | --- | --- | --- |
| **Mean** | **SD** | **Min** | **Max** |
|  |  |  |  |

# Appendix I Summary of Buil-in test results