Applanix POS MV
HARBOUR ACCEPTANCE TESTS

RV Akademik Nikolaj Strakhov
800836

Date	Revision	Description of Revision	Prepared	Checked	Approved
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1 INTRODUCTION

1.1 General Information

General Information			
Client	GINRAS		
Dates	From: 2012-09-19	To: 2012-09-25	
Vessel	*R/V Akademik Nikolaj Strakhov*		
Location	Cape Town, South Africa		
Key Personnel	**Name**	**Position**	**Company**
	Sergey Sokolov	Project Manager/Geologist	GINRAS
	Richard Fotheringham	Hydrographic Surveyor	RESON
Additional Comments			

Table 1: General Information

1.2 Purpose

The purpose of this document is as follows:

- To ensure that all RESON system components are present and installed
- To verify the integrity of the RESON systems on completion of installation
- To ensure functionality of the RESON systems on completion of installation
- To demonstrate the integration of the complete RESON survey system
- To configure the RESON systems hardware and software and record the settings
- To ensure that the RESON systems are ready for Sea Acceptance Tests (SAT)

The Harbour Acceptance Tests (HAT) shall be carried out whilst the vessel is alongside.

2 RESPONSIBILITIES

The responsibilities, as agreed between all parties involved, shall include, but not be limited to, those contained in the following statements.

2.1 Company Representative

- Review and approve this document prior to HAT
- Ensure all vessel logistical preparations have been made prior to HAT
- Approve and Sign-Off HAT results

2.2 RESON Project Team

2.2.1 Project Manager

- Responsible for coordinating the HAT and meeting contractual obligations
- Preparation of detailed HAT planning and scheduling requirements, including manpower
- Ensure HAT schedule and tests are understood by all HAT personnel
- Instruct HAT personnel in charge of HAT tasks
- Monitor progress of HAT in accordance with HAT requirements
- Consultation with RESON appointed or Company appointed third party contractors

2.2.2 Hydrographic Surveyor

- Responsible for preparation and completion of HAT document
- Perform HAT scope of work
- Manage and archive all HAT data

2.2.3 Engineer

- Ensure all systems are operational prior to HAT (hardware and firmware)
- Make any necessary repairs to equipment during HAT

Note that the roles as defined for the RESON Project Team may be performed either by separate individuals or by a single individual depending on the level of effort required.

3 HARBOUR ACCEPTANCE TESTS PROTOCOL

3.1 Units Under Test

3.1.1 Applanix POS MV System

No	Item No.	Description	Qty	Serial No.	Acceptance Criteria	Comments	Pass / Fail
1		POS MV v 5 PCS	1		Item to be installed and intact		Pass
2		POS MV IMU Type 40	1		Item to be installed and intact		Pass
3		POS MV IMU Base/Interface Plate	1		Item to be installed and intact		Pass
4		Trimble 382AP GNSS Antenna	2		Item to be installed and intact		Pass
5		Cable, IMU to PCS, 8m	1		Item to be installed and intact		Pass
6		Cable, GNSS Ant to PCS, 75m	2		Item to be installed and intact	Terminated on site	Pass

Table 2: Applanix POS MV System Inspection

3.1.2 PDS2000

No	Item	Description	Qty	Serial No.	Acceptance Criteria	Comments	Pass / Fail
1		PDS2000 version 3.7.0.47	1		Item to be installed and intact		Pass
2		PDS2000 Dongles	5		Item to be installed and intact	2 Online, 3 Processing	Pass

Table 3: PDS2000 Inspection

3.2 Functional Tests

3.2.1 Applanix System

No	Test	Description	Acceptance Criteria	Result	Pass / Fail
1	Power On	Test that the system powers up normally.	The system shall power up without errors.	Test successful.	Pass
2	Navigation Status	Test that the navigation mode is operating	The system shall read Nav: Full	Test successful. See screenshot	Pass
3	Attitude Status	Test that the attitude data is within specification	The system shall show attitude accuracy of better than 0.05 degrees	Test successful. See screenshot	Pass
4	GAMS Status	Test that the GAMS is fucntioning	GAMS status shall read Online	Test successful. See screenshot	Pass
5	Heave Status	Test that the heave data is within specification	The heave LED shall be green	Test successful. See screenshot	Pass
6	GNSS Skyplot	Test that both GNSS receivers are functioning	Both GNSS antennas shall show at least four satellites	Test successful. See screenshot	Pass
7	GAMS Parameters	Test that the GAMS parameters are correctly entered	The GAMS parameters shall be entered as measured during the installation	Test successful. See screenshot	Pass
8	Heave Parameters	Test that the heave parameters are correctly entered	The heave parameters shall be entered correctly for the vessel size	Test successful. See screenshot	Pass
9	Lever Arm Parameters	Test that the lever arm parameters are correctly entered	The BITE screen shall display the motion data when interfaced.	Test successful. See screenshot	Pass
10	COM Parameters	Test that the COM parameters are correctly entered	The COM ports shall be setup to broadcast data as required	Test successful. See screenshot	Pass
11	Ethernet Realtime	Test that the position and attitude data is broadcasting	The system shall broadcast navigation data over network	Test successful. See screenshot	Pass
12	PDS Interface	Test that navigation data is being successfully decoded by external software	External software shall successfully receive navigation data over network	Test successful. See screenshot	Pass
13	POS Statistics	Test that the latest firmware is loaded	The system shall be loaded with the latest firmware available	Test successful. See screenshot	Pass

Table 4: SeaBat System Functional Tests

3.3 System Integration

3.3.1 Data Interfacing

No.	From	To	Type	Protocol	Msg	From Port	To Port	I.O. Settings	Hz	Pass / Fail
1	81-P Processor	PDS2000	Bathymetry	Ethernet	RESON 8k	1032		IP 10.0.10.1	Var.	Pass
2	81-P Processor	PDS2000	Sidescan	Ethernet	RESON 8k	1033		IP 10.0.10.1	Var.	Pass
3	81-P Processor	PDS2000	Snippets	Ethernet	RESON 8k	1038		IP 10.0.10.1	Var.	Pass
4	7-P Processor	PDS2000	Bathymetry	Ethernet	RESON 7k	UDP 7000			Var.	Pass
5	7-P Processor	PDS2000	Sidescan	Ethernet	RESON 7k	UDP 7000			Var.	Pass
6	7-P Processor	PDS2000	Snippets	Ethernet	RESON 7k	UDP 7000			Var.	Pass
7	Trimble GPS	PDS2000	Pos/Time/Speed	RS-232	NMEA	Port A	COM 1	9600,8,N,1	Var.	Pass
8	POS MV PCS	DDU	Pos/Time/Speed	RS-232	NMEA	COM 2/PPS Out	DDU 5	115200,8,N,1	Var.	Pass
10	POS MV PCS	DDU	P/R/H	RS-232	TSS	COM 3	DDU 11	115200,8,N,1	50	Pass
11	DDU	81-P	P/R/H	RS-232	TSS	DDU 13	RS-232 7	115200,8,N,1	50	Pass
12	DDU	7-P	P/R/H	RS-232	TSS	DDU 13	DDU 11	115200,8,N,1	50	Pass
13	SVP-70	DDU	Sound Velocity	RS-232	AML	RS-232	DDU13	9600,8,N,1	1	Pass
14	DDU	81-P	Sound Velocity	RS-232	AML	DDU 14	Downlink 1	9600,8,N,1	1	Pass
15	DDU	7-P	Sound Velocity	RS-232	AML	DDU 15	COM 1	9600,8,N,1	1	Pass
16	POS MV PCS	PDS2000	Pos;Att;Hdg;Cfg	Ethernet		UDP 5601	Ethernet NIC		50	Pass

Table 5: System Integration

NOTE: Connections which are not configurable have been omitted for clarity (e.g. Power, Keyboard, Video, Mouse, transducer connections, and GPS aerials). Their functionality is necessary for all other tests to be successful.

3.3.2 Software / Firmware Versions

No.	System	Version	Comments
1	8111 Firmware version	E208-3F66/E101-AFAA	
2	7150 Software version	3.2.6.2	
3	PDS 2000 Software version.	3.7.0.47	
4	POS MV Controller	7.22	
5	POS MV Firmware	7.21	

Table 6: Software / Firmware Versions

3.3.3 I.P. Addresses

No.	System	I.P. Address	Subnet Mask	Comments
	81-P Processor	10.0.10.1	255.255.255.0	Survey Network
	7-P Processor	10.0.10.2	255.255.255.0	Sonar Network
	PDS2000	10.0.10.10	255.255.255.0	Sonar Network
	POS MV PCS	192.168.53.100	255.255.255.0	Survey Network
	PDS2000	192.168.53.200	255.255.255.0	Survey Network

Table 7: I.P. Addresses

4 SCREENSHOTS

4.1 POS MV

4.1.1 Navigation Status

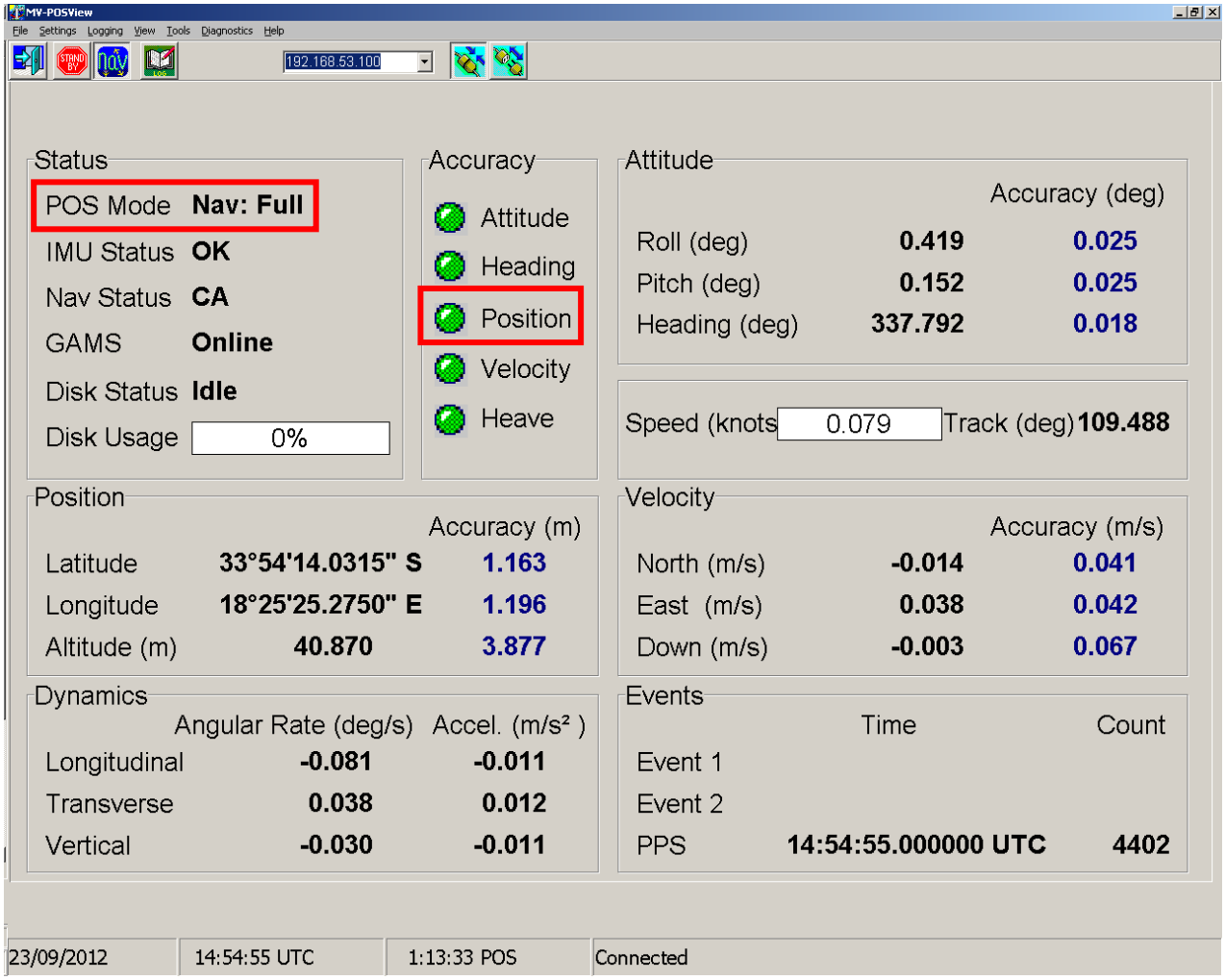

Figure 1: POS MV Navigation Status

4.1.2 Attitude Status

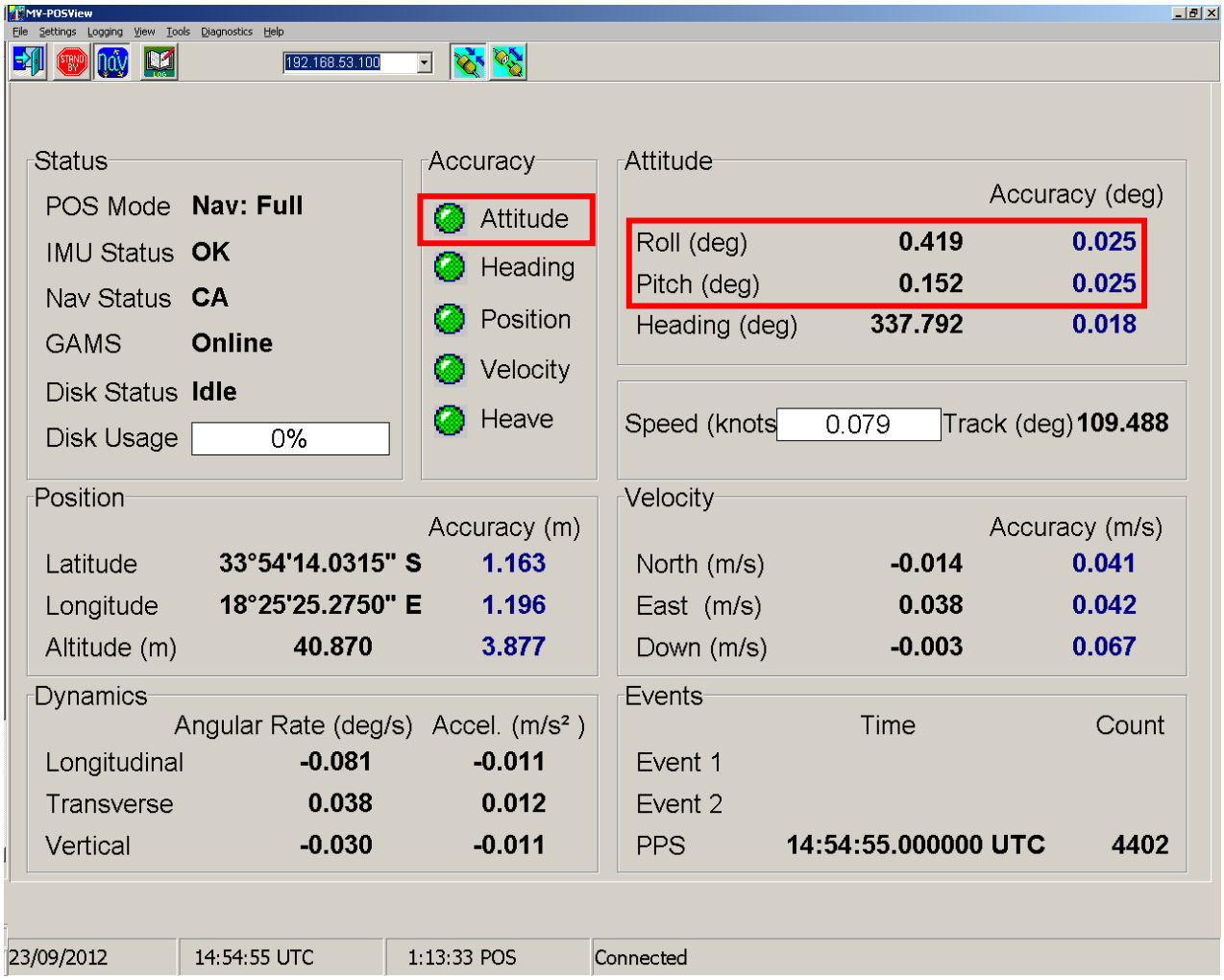

Figure 2: POS MV Attitude Status

4.1.3 GAMS Status

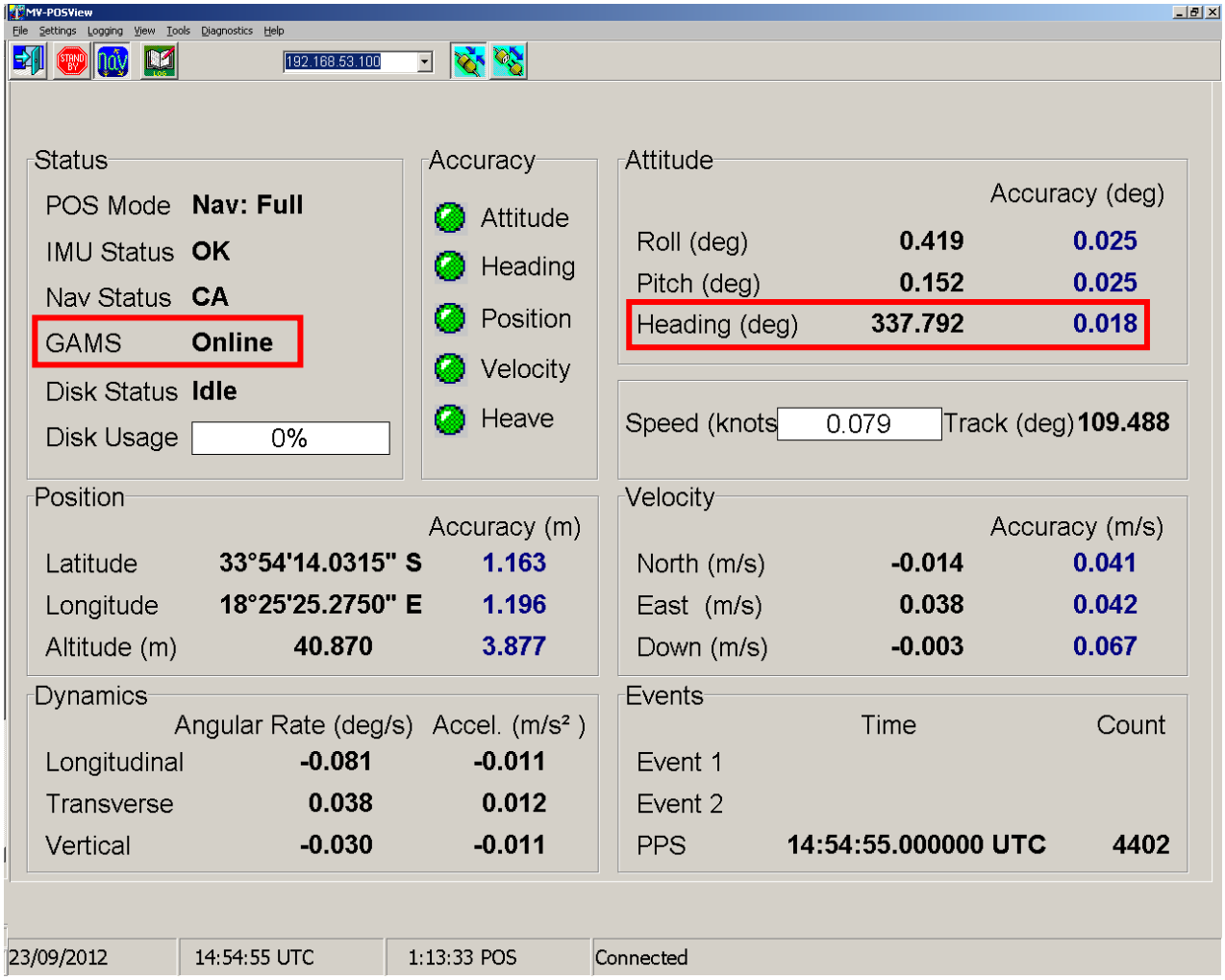

Figure 3: POS MV GAMS Status

4.1.4 Heave Status

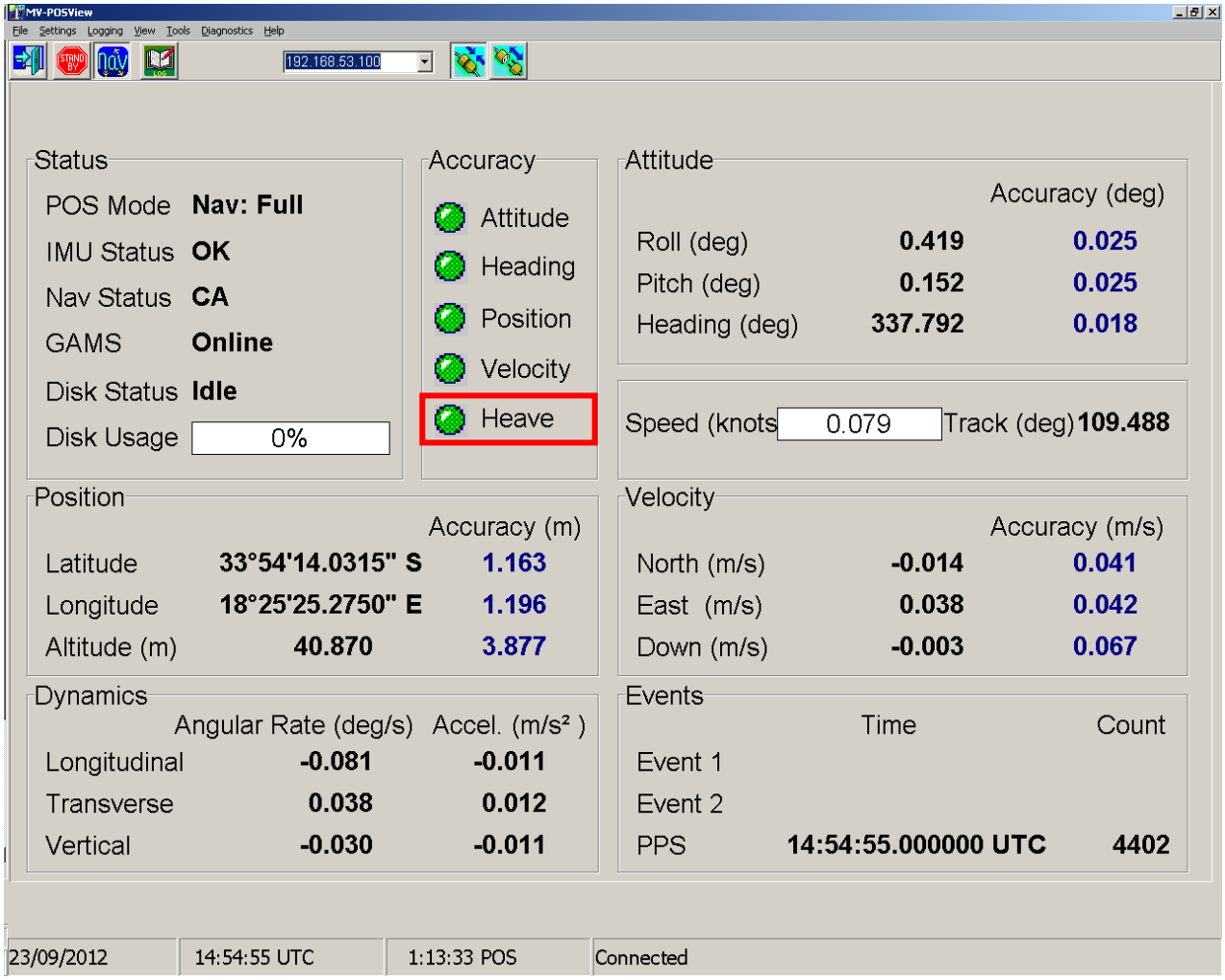

Figure 4: POS MV Heave Status

4.1.5 GNSS Skyplot

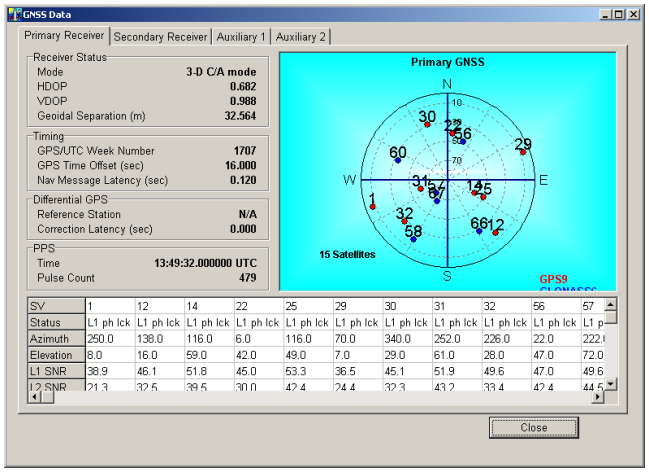

Figure 5: POS MV Primary GNSS Antenna

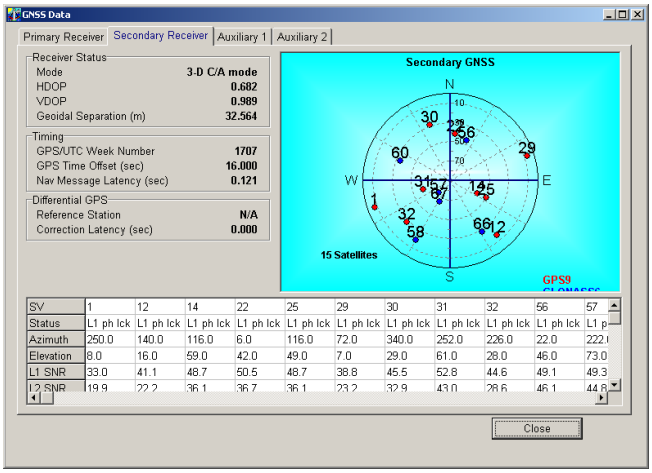

Figure 6: POS MV Secondary GNSS Antenna

4.1.6 GAMS Parameters

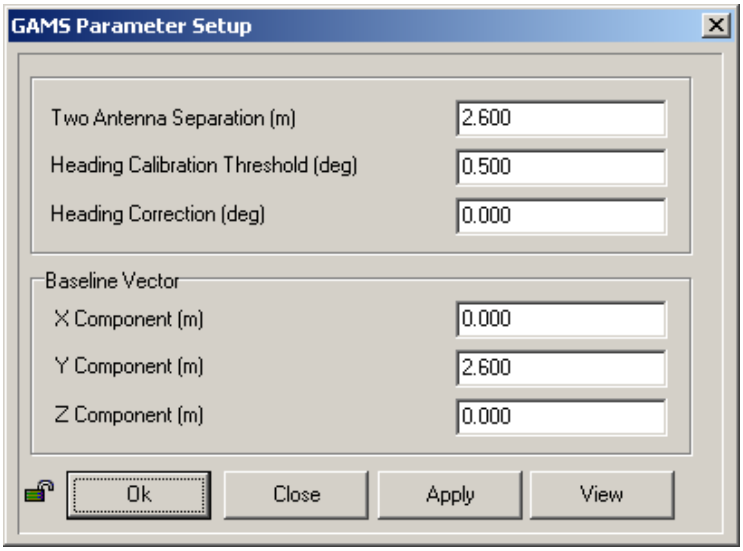

Figure 7: POS MV GAMS Parameters

4.1.7 Heave Parameters

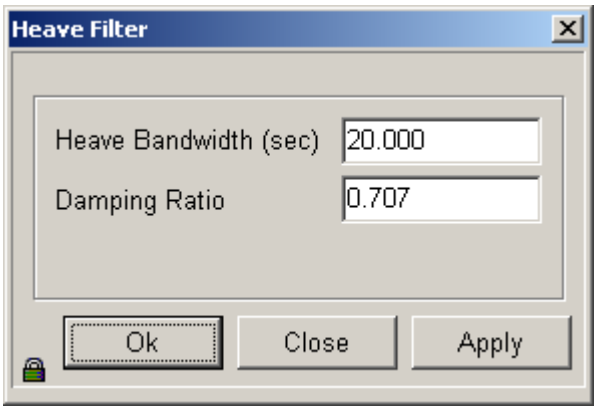

Figure 8: POS MV Heave Parameters

4.1.8 Lever Arm Parameters

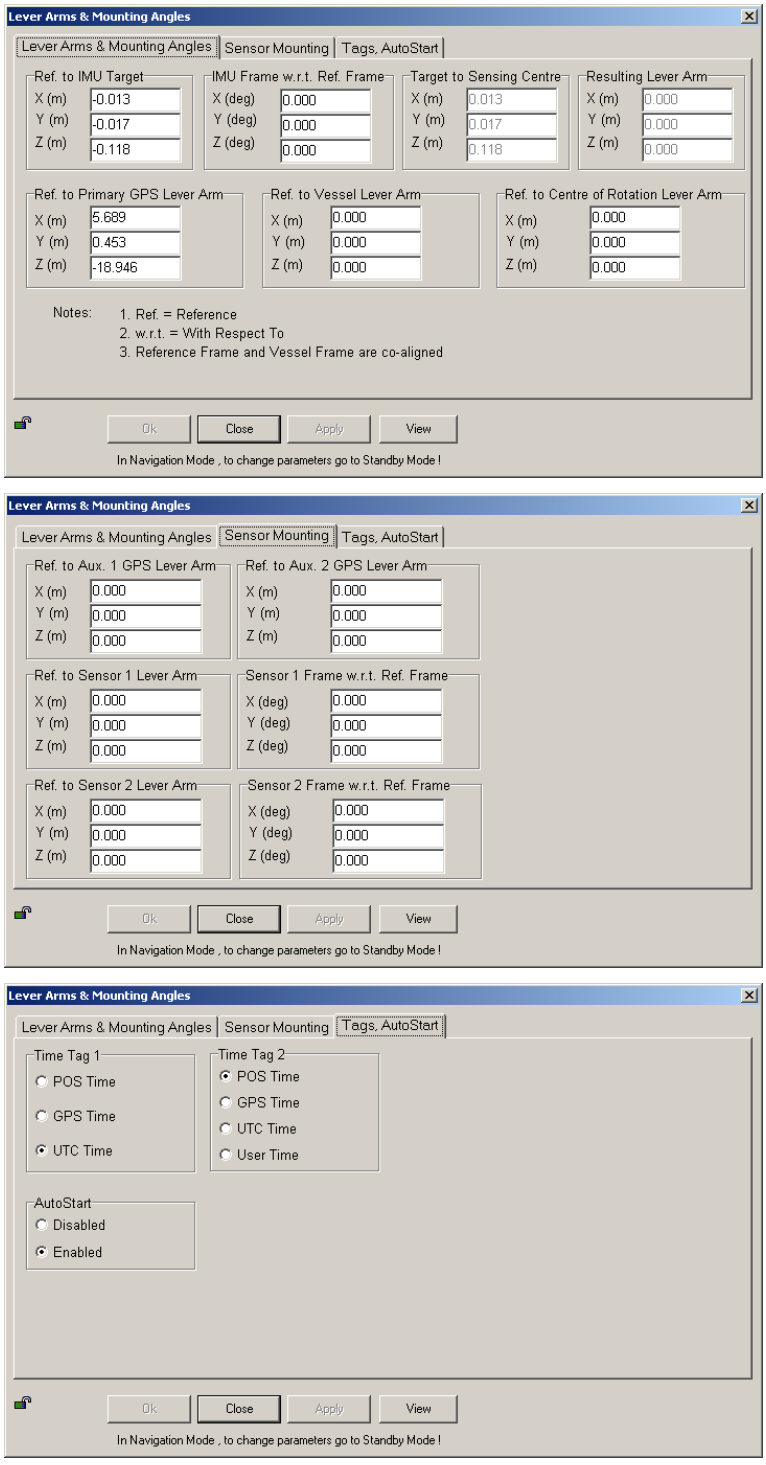

Figure 9: POS MV Lever Arm Parameters

4.1.9 COM Parameters

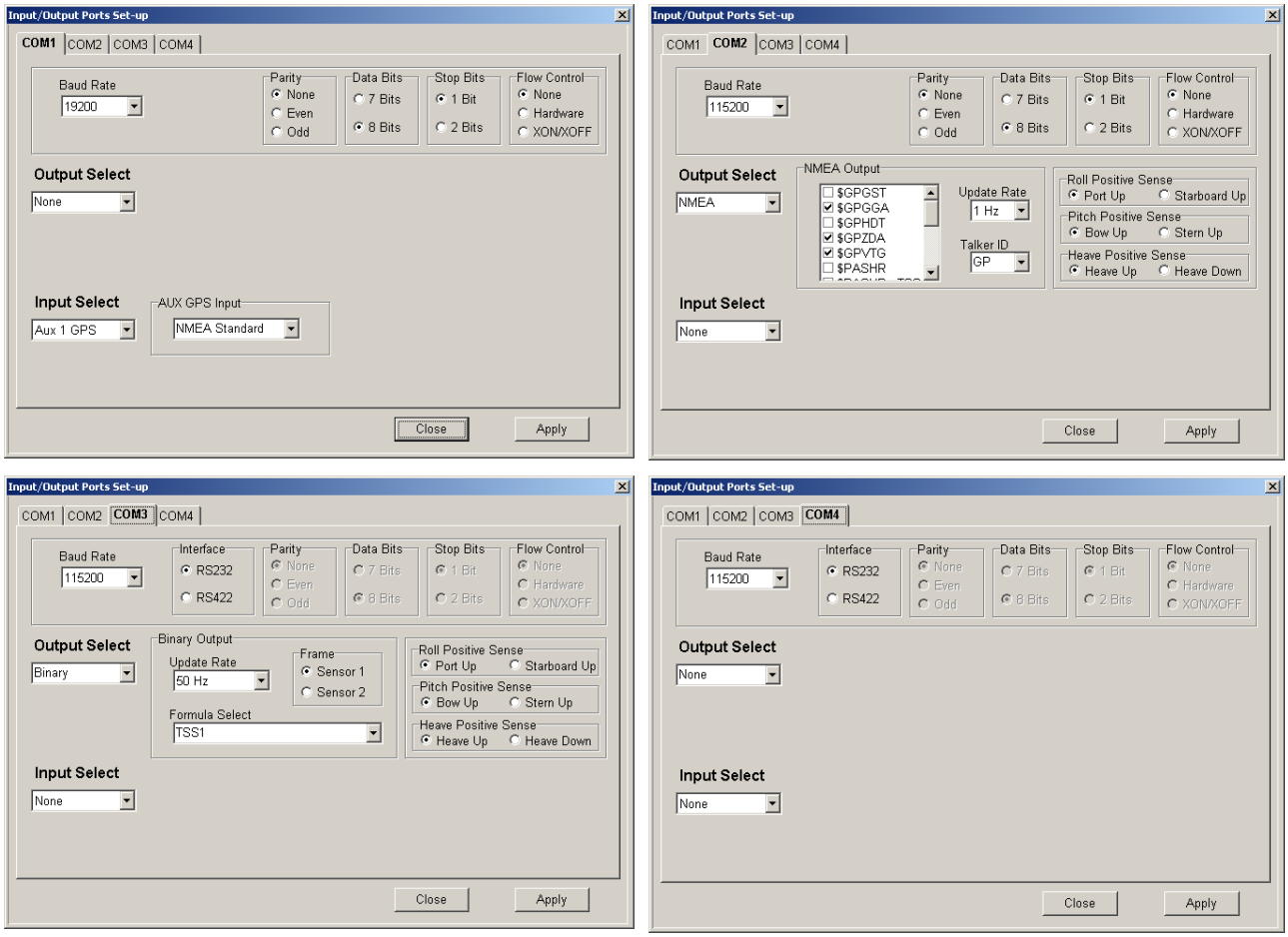

Figure 10: POS MV COM Parameters

4.1.10 Ehternet Realtime

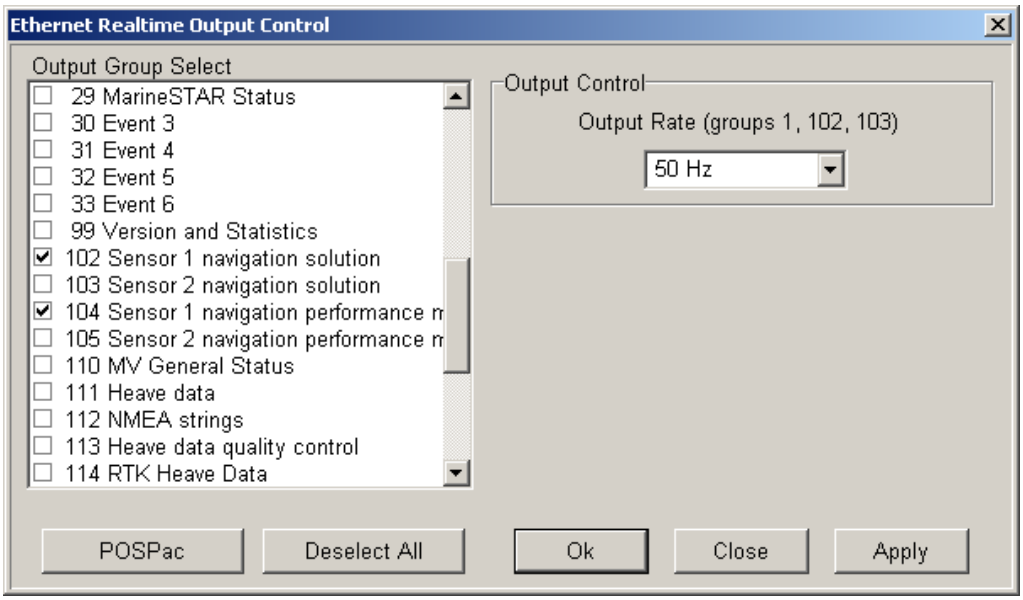

Figure 11: POS MV Ethernet Realtime

4.1.11 POS Statistics

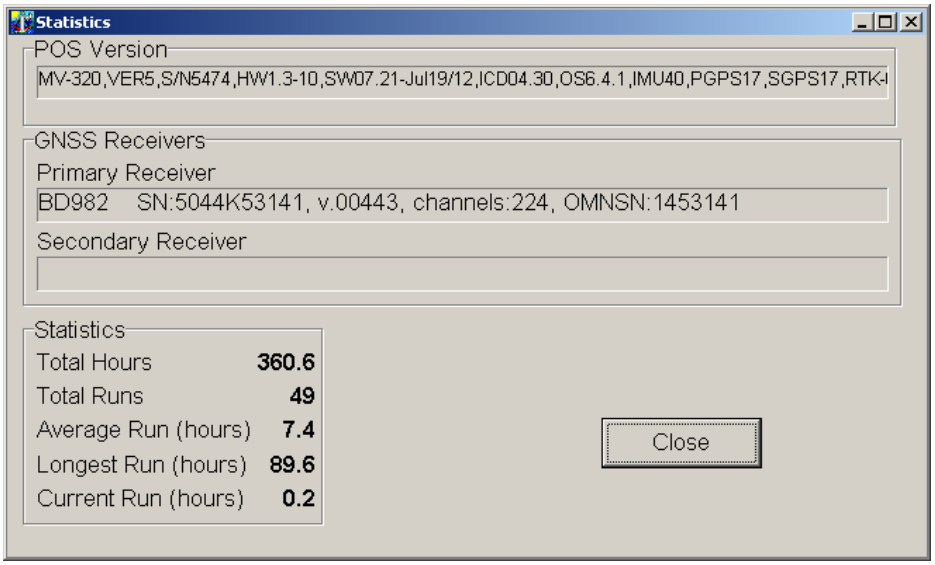

Figure 12: POS MV Statistics

4.2 PDS2000

4.2.1 Clock Synchronisation

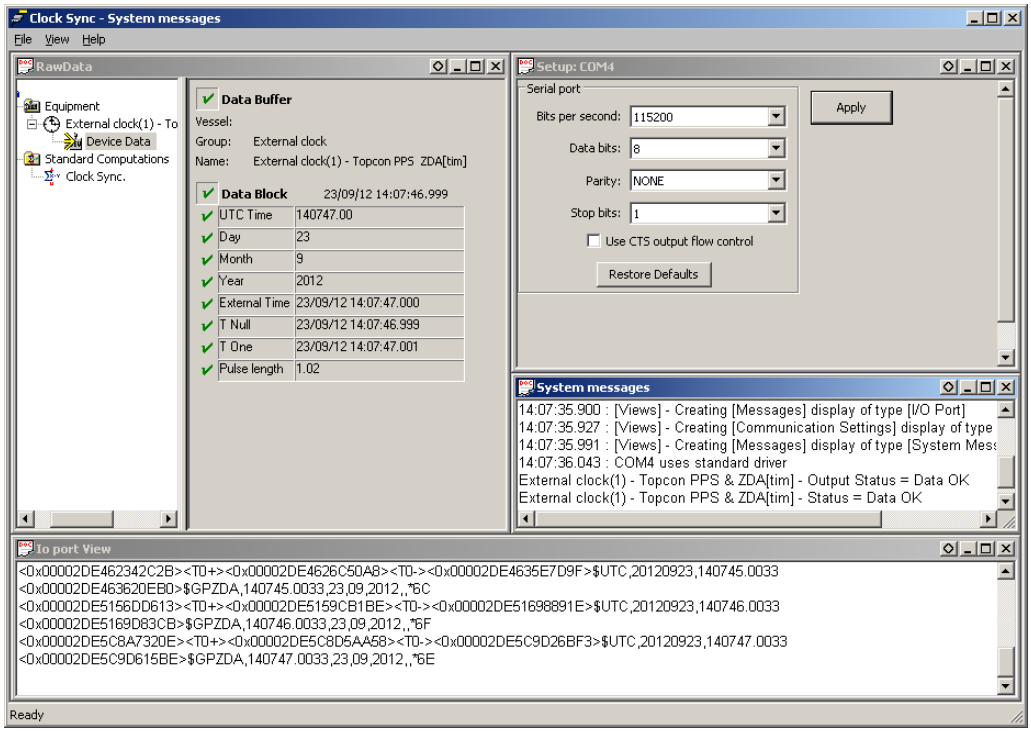

Figure 13: PDS2000 Clock Synchronisation

4.2.2 Geodetics

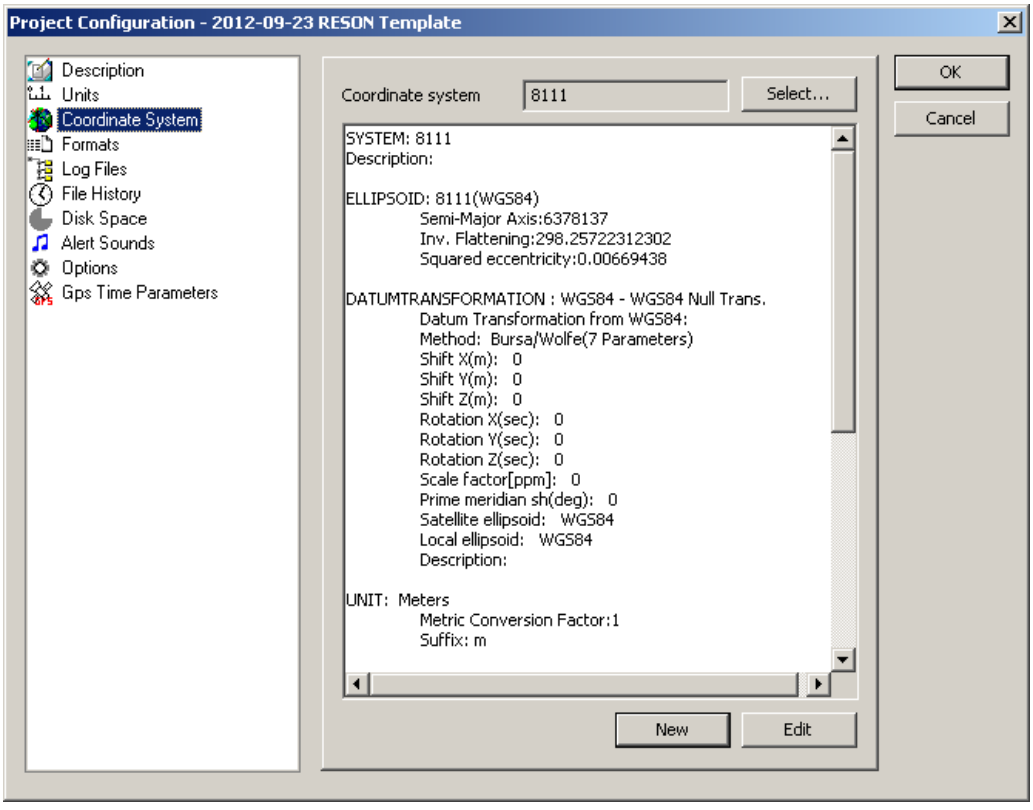

Figure 14: PDS2000 Geodetics

4.2.3 Acquisition

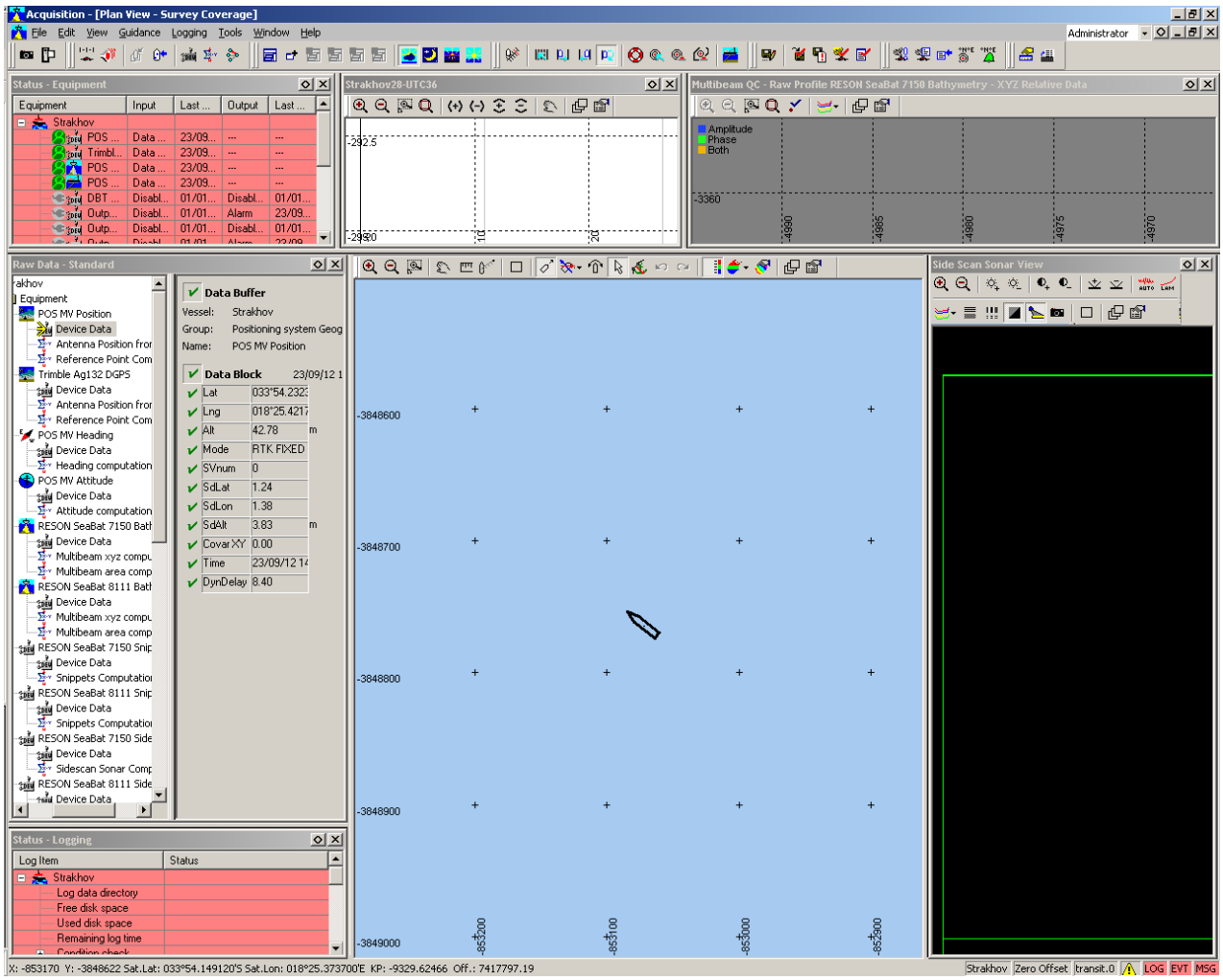

Figure 15: PDS2000 Acquisition

5 MASTER HARBOUR ACCEPTANCE FORM

Client:	**GINRAS**
Vessel	***R/V Akademik Nikolaj Strakhov***
Location:	**Cape Town, South Africa**

No	Acceptance of	Test Date	Pass / Fail	Comments
1	Applanix POS MV	2012-09-24	Pass	
2	PDS2000	2012-09-24	Pass	

Table 8: Master Harbour Acceptance

Acknowledgement of passing the above referenced Test Phases (1-2) constitutes certification of equipment installation and Harbour Acceptance of the systems listed and all additional equipment necessary for their correct operation.

Customer Representative: ***RESON Representative:***

Signature: ***Signature:***

Name: ***Name:***

Title: ***Title:***

Date: ***Date:***

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Date	2012-09-19 to 2012-09-25		
Vessel	*R/V Akademik Nikolaj Strakhov*		
Location	Cape Town, South Africa		
Personnel	Name	Position	Company
	Sergey Sokolov	Project Manager/Geologist	GINRAS
	Richard Fotheringham	Hydrographic Surveyor	RESON
Notes:			

Table 1: General Information

1.2 Scope

The scope of this document is as follows:

- Describe how the Applanix POS MV navigation system is installed on R/V Akademik Nikolaj Strakhov

1.3 References

The following drawings are referenced and included in Appendix A:

800836M141_001 IMU Mounting Plate Dimensions.pdf
800836M131_001 IMU Mechanical Interface.pdf

2 MECHANICAL INTERFACING

2.1 Dry End Components

2.1.1 POS MV System

The POS MV system comprises of the following components:

- POS Computer System (PCS) is a 1U 19” rack mountable unit.
- Inertial Measurement Unit for precision measurement of the attitude of the vessel (heading, pitch, roll, heave).
- Two GNSS aerials.

Figure 1: POS MV V5 PCS, GNSS Antennas and IMU

Note- IMU model supplied varies from photograph

2.1.2 POS MV PCS Installation

The PCS is installed in the survey room, together with the existing survey equipment, in dedicated 19” racking.

Figure 2: POS MV PCS Installation Location

2.1.3 POS MV IMU Installation

The IMU is supplied with a machined base incorporating locating pins for easy installation and removal of the IMU itself. The base plate is bolted onto the floor of the survey room, immediately next to the Octans motion sensor.

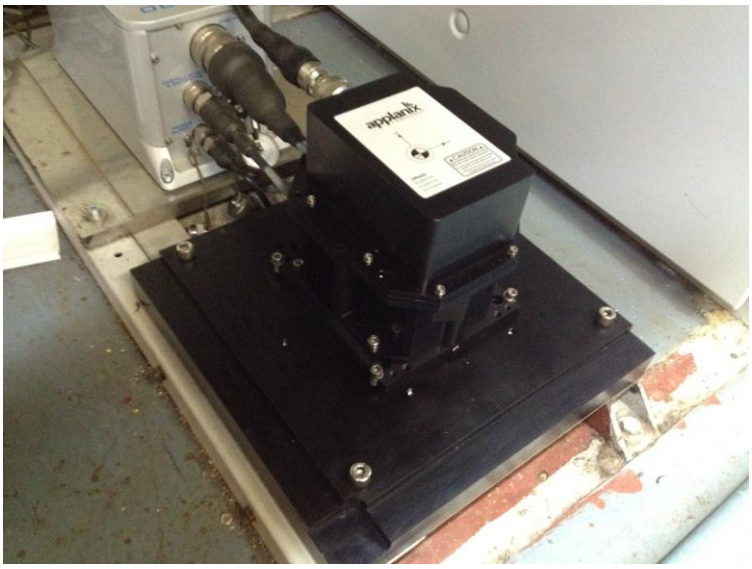

Figure 3: POS MV IMU Installation Location

2.1.4 POS MV IMU Cable

The IMU has a single cable connection to the POS MV PCS. The cable supplied is 8 metres in length.

2.1.5 POS MV GNSS Installation

The GNSS antennas are installed on the mast structure on the top of the vessel, with the primary antenna on the port side close to the existing Trimble antenna, and the secondary antenna located on the starboard side. The separation between the antennas is approximately 2.6 metres.

Figure 4: GNSS Antenna Mounting Arrangement

Figure 5: GNSS Antenna Port (Primary)

2.1.6 POS MV GNSS Cables

Each aerial has a single coaxial cable connection to the POS MV PCS. Unterminated 75 metre GNSS cables were supplied for the installation, which were routed through the ship along existing cable runs and terminated at the required length, approximately 60 metres each.

3 SENSOR OFFSETS & ALIGNMENTS CONFIGURATION

Survey Details:				
Vessel Name:	Akademik Nikolaj Strakhov			
Date of Measurement:	2010-09-23			
Reference Point Description:	POS MV IMU Target			
Co-ordinate System:	Tate-Bryant: X is positive Forward, Y is positive Starboard, Z is positive Down			
Measurement to Sensor	**X (+ive Fwd)**	**Y (+ive Stbd)**	**Z (+ive Down)**	**Comments**
Reference to IMU	0.000	0.000	0.000	
Reference to Prim GPS	5.689	0.453	-18.946	Mounted Port

Table 2: POS MV Offsets and Alignments (Tate-Bryant)

Survey Details:				
Vessel Name:	Akademik Nikolaj Strakhov			
Date of Measurement:	2010-09-23			
Reference Point Description:	POS MV IMU Target			
Co-ordinate System:	Right Handed Cartesian: X is positive Starboard, Y is positive Forward, Z is positive Up			
Measurement to Sensor	**X (+ive Fwd)**	**Y (+ive Stbd)**	**Z (+ive Up)**	
Reference to 8111	1.590	6.940	-5.560	
Reference to 7150	1.590	2.680	-5.880	
Reference to Edgetech SBP	1.590	-0.550	-5.830	
Reference to Trimble GPS	0.960	5.720	19.480	
Reference to Octans	-0.010	0.320	-0.100	

Table 3: POS MV Offsets and Alignments (Right-Handed Cartesian)

APPENDIX A DRAWINGS

A.1 800738M141_001 IMU Mounting Plate Dimensions.pdf

A.2 800738M131_001 IMU Mechanical Interface.pdf

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