U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

Data Acquisition & Processing Report

Type of Survey Navigable Areas & Field Examination

Project No: S-G905-NRT2-09

Time Frame October, 2009—April, 2010

LOCALITY

State South Carolina

General Locality Georgetown

2010

CHIEF OF PARTY

Robert W. Ramsey Jr. – Team Leader

Library & Archives

DATE

Data Acquisition & Processing Report
Title Sheet

Project No. S-G905-NRT2-09

*Date of Project Instructions:*____ **30 September 2009**

*Vessel*_____NOAA Launch 1210_____

*Field Unit*___Navigation Response Team 2_____

*Chief of Branch*___CDR. Lawrence T. Krepp_____

*Chief of Party*___Robert W. Ramsey Jr. – Team Leader_____

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Data Acquisition and Processing Report
For Calendar year 2010

NOAA Launch 1210, Navigation Response Team 2

A. Equipment

The following sections describe major operational systems used to acquire survey data or control survey operations:

A.1 Platform

NOAA launch 1210, a 30-foot SeaArk with an 8.5-foot beam and draft of 0.5 meters, was used to collect all survey data. Launch 1210 is equipped with a J-arm to deploy the side scan sonar. An electric winch controls the tow-fish height during side scan acquisition. The operator maintains the proper depth for the best coverage at the sonar scale. The vessel DGPS (POS MV) was checked weekly to a known GPS reference point. There were no unusual vessel configurations or problems encountered with the vessel.

Launch 1210 is equipped with a 3PS Inc SD-41 counter that measures the side scan towfish tow cable by counting revolutions of the towing block (IS-.3K-002 Rev C-) on the J-Arm. The length of cable deployed is computed automatically and output to Hypack, and Klein SonarPro.

Launch 1210 is equipped with a POS MV Applanix system for heave, pitch and roll corrections, as well as vessel position and speed.

Coastal Oceanographic Hypack Max is used for survey navigation, Detached Positioning (DP), and VBES data logging bathymetry, as well as outputting the cable out values to the Klein Sonar system. Sonar Pro was used for on line acquisition of side scan sonar. Caris & Pydro were used for data processing, and MapInfo Professional, were used to support processing and plotting.

The PCs running Hypack and Sonar Pro are automatically synchronized to UTC time from the NMEA-0183 (zda) GPS messages. The time update occurs during the start and stop logging messages on the Hypack computer.

A.2 Sounding Instruments

Vertical Beam Echo Sounder

An ODOM Echotrac CV Fathometer, Ser # 23031 was used to collect all echo soundings on this survey. A standard lead line calibrated in meters, was used during this survey for depth comparison checks with the echo sounder. No problems were encountered with any of the sounding equipment.

Side Scan Sonar

A Klein 3000 side scan sonar system was used throughout this survey. The Model # 3110 TPU (Topside Processing Unit) Ser# 389 and Model # 3210 Towfish Ser# 498 are part of this system. The side scan sonar equipment was used to conduct dual Freq surveying and investigate AWOIS items. The system used frequency of 100 & 500 kHz. The recorder was set on one of either 25/50/75-meter range scales. The confidence checks were performed daily by identifications made to known features, such as active buoy blocks.

Side scan sonar lines are planned to run along current axis, spaced in accordance with the Side Scan Sonar Manual. Lines are planned with at least 10m of overlap with adjacent swaths on either side. Range scales during acquisition are determined primarily by water depth. Vessel speed is adjusted to ensure that an object one meter in characteristic size would be detected and clearly imaged across the sonar swath.

A.3 Positioning and Attitude Instruments

An Applanix POS MV 320 Ver4 (S/N 2546) was used as the primary navigation station and motion sensor on launch 1210 for all hydrographic data acquisition.

A Trimble DGPS Beacon Receiver (S/N 0220261525) was used to supply the RTCM corrector to the POS MV.

A GPS Trimble GeoXH (Handheld) (SN: 4928419767) was used for all ENC high accuracy positioning and establishment of calibration points. Trimble TerraSync software v4.10 was used for data acquisition. Trimble Pathfinder Office v4.20 software was used for processing the ENC high accuracy position data. This data was then post-processed for local COR site correctors, to finalize the data submitted.

A.4 Ancillary Instruments

The Instruments used for determining corrections for the speed of sound through the water column were an ODOM Digibar Ser # 98295-020606 and a Seabird-Seacat Velocity Profiler, model 19-03, Ser# 198671-1477. Velocity casts are downloaded and processed in the Velociwin program supplied by the Hydrographic Systems and Technology Program (HSTP).

Lead Line

Leadline comparisons are conducted weekly, these calibrations show that under the prevailing conditions at that time and location, Launch 1210's fathometer meets the International Hydrographic Organization "Special Order" specification for vertical soundings.

Diver Least Depth Gauge

Not Applicable

Bottom Samples

Where required by project instructions, NRT2 personnel acquire sediment samples from the sea floor in the survey area adjacent to charted bottom characteristics. The primary tool for this operation is a "clamshell" style gravity-closed sediment sampler, which penetrates approximately 0.05m into the bottom. Subset method of samples showed agreement with charted sedimentary descriptions in all cases except any specifically noted in respective surveys.

A.5 Data Acquisition and Processing Software

2/1/2010 14:58:02
NRT-2 / S-1210
Active Software Versions

Name	Version		SP/HF	Remarks
Caris Hips/Sips	7.0		SP-1 HF-1	Processing
Pydro	9.10		{r2735}	Processing
Velocity	8.96			Processing
MapInfo Professional	10.0.1			Processing
Hydro_MI	8.3{r250}			Processing
Vertical Mapper	3.1.1.002			Processing
SBE Data Processing	SBEDataProcessing_Win32_V5_37e			Processing
Sea-Term	Seaterm_Win32_V1_57			Processing
Pathfinder Office	4.20			Processing
Digibar Pro	3.0			Processing
Adobe 8.0 Pro	8.1.6			Documentation
MV- POSVIEW	3.4.0.0		sw: 03.42 HW: 2.9-7	Controller PGM
Hypack	2009a			Acquiring / Processing
SonarPro	11.3			Acquiring / Processing
Odom eChart	1.3.6	4.06/4.01	1.22/1.22	Controller PGM
TSIP Talker	2.00			Communication DGPS
Trimble DM12/212L	1.71			Acquiring (Firmware)

Fugawi	3.1.4.881	Secondary Navigation
TerraSync	4.10	Acquiring
Offshore Navigator	5.08	Secondary Chart viewer
Windows Mobile	6.1	Data Transfer

Calibrations:

Digibar Pro	s/n: 98295	JAN 2010
Sea-Bird SBE 19	s/n: 198671-1477	DEC 2009

B. Quality Control

B.1 Bathymetry Data

Vertical Beam Sonar Data

Survey data for single beam and side scan sonar Hydrography is transferred to a removable hard drive on the launch and entered into the post processing system in the Office trailer. Vertical Beam sonar data is converted from Hypack format to CARIS format using the CARIS "Hypack" data converter. After conversion, the data is opened in CARIS Navigation Editor, Attitude Editor, and Single Beam Editor. Vessel navigation data is manually checked for errors, which are rejected with interpolation. Attitude data are checked for errors or gaps. Sounding data are checked for irregular pings.

Final Processing of Sounding Data

Survey personnel scan raw VBES soundings in CARIS Single Beam Editor, any sounding questions are then compared directly to the sounders graphic record file (.bin) for edits required to validate or correct the values in question. Once VBES soundings are scanned, the raw data is corrected by applying sound velocity, tides, and true heave; then TPE values are applied, and then the data is merged. The tide data is applied either by Pydro via TCARI, or Caris by a ZDF file.

B.2 Side Scan Sonar Imagery

All side scan sonar imagery is converted from SDF formats to CARIS format using CARIS SDF converters. After conversion, the data is opened in CARIS Navigation Editor, Attitude Editor, and Side Scan Editor. Survey personnel check vessel attitude (if present), cable out, Gyro, and sonar height. Due to the higher rate of current data logging of position 10-20Hz some minor noise is present in the speed data, these are left unedited due to their insignificance. Data showing speed jumps may be rejected with interpolation. After confirming the validity of the vessel navigation, cable out, and towfish depth values, survey personnel then use the "recomputed towfish navigation" function to calculate towfish position.

Side scan sonar data is scanned in CARIS Side Scan Editor. Survey personnel correct errors in bottom tracking, slant range correct the imagery at 0.02m resolution and scan the data for significant contacts. Contacts deemed "significant" include, but are not limited to, contacts with a shadow indicating a contact height of 1.0 m or greater in water depths of 20m or less, that fall in channels, or critical navigation areas. Contact heights that are 10% of the water depth in water deeper than 20m are addressed if it is believed that they warrant development. Other contacts that may be considered significant by NRT2 personnel include smaller contacts in particularly shoal areas or channels, cables and pipelines, and contacts of possible historical significance.

Point feature contacts are picked using CARIS "single point contacts". Larger contacts and line features are picked using CARIS "multipoint contacts". All contacts are descriptively labeled and feature codes selected if conclusive identification is possible, and the software has the ability to do so. TIF format images of all contacts are saved. After the initial SSS imagery scan, a check scan of all data is conducted.

HSTP's Pydro software package is the primary tool for sounding and feature integration and assessment. Side scan contacts and detached positions are inserted into the Pydro Preliminary Smooth Sheet (PSS).

Coverage of 200% was obtained in the required survey areas and where AWOIS items and water depth or hazards permitted. The coverage was verified by generation of 1m resolution mosaics, to evaluate any gaps in coverage. Side scan sonar coverage was conducted to the limits that were assigned in the project letter when vessel and personnel safety allowed. Single beam reduced line spacing was performed in other areas where warranted. The towfish was deployed off the starboard quarter of the vessel, which proved very stable. Distorted images caused by strong tidal currents were seen periodically. Some localized areas were found to have bottom characteristics that provided poor reflectivity and week signal return on both the Hi and Lo Freq channels.

Pydro provides five flags for categorizing features: "Significant", "Chart", "Report", "Investigate", and "DTON". In addition, Pydro provides "Primary" and "Secondary" flags for grouping correlated features. After insertion, SSS features are first categorized by significance. Contacts that meet the standard of significance described in section B.2. , are marked as such; those contacts which are deemed insignificant are marked "Resolved" and Rejected and not investigated further. Also, multiple contacts representing the same physical feature are grouped. The contact that the Hydrographer believes well represents the feature (typically, the most clear SSS image) is selected as the "Investigate" contact.

"Investigate" flagged contacts are then reassessed to determine if additional investigation (typically VBES development) is required. Hypack target files are generated for significant contacts, and investigated. After contacts are sufficiently investigated, they are further assessed to determine whether they require charting. Features that the Hydrographer believes should be added, retained, or modified on the chart are marked as

such. Features that will be reported in the survey Descriptive Report are flagged "Report." Features that pose a special threat to vessel traffic have their shoal soundings marked as "DTONS", and a Danger to Navigation Report is generated. Features that are dangers, however are not felt to be imminent hazards due to normal traffic in the area, may not have DTON's issued by the field, and are left to the processing branch for final disposition.

The High accuracy DGPS positions for ENC (Electronic Navigational Chart) are transferred to Trimble Pathfinder Office software on the post processing system in the Office trailer. The data points are then loaded into the Pydro PSS where they are addressed. Appropriate exports of this data are made in the end users requested format, and are transferred to those users.

The NOS program Velocity, and MS Word was also used during survey post processing.

C. Corrections to Echo Soundings

C.1 Vessel Offsets and Static Draft

It is OCS and NRT2 policy that all data be acquired and logged in raw format without application of any corrections for vessel offsets, sensor alignment, sound velocity profile, or tides. These factors are logged separately or contained in the CARIS "Vessel Configuration File" (VCF), and applied in post-acquisition data processing (a copy of the VBES VCF Report is embedded at the end of this report).

The lead line for launch 1210 was calibrated using a steel tape on Jan. 20, 2010 (DN: 020). No corrections were necessary.

The Caris waterline value was determined by the difference in the vertical "Z" of the reference point to the transducer face.

C.2 Dynamic Draft

Settlement and squat measurements for launch 1210 were taken on Jan. 20, 2009 (DN: 020). These measurements were conducted in Charleston, SC using the level method. Settlement and squat correctors were entered into the Caris vessel configuration file for Launch 1210.

C.3 Attitude and Heave

An Applanix POS MV 320 Ver4 (S/N 2546) was used as the primary navigation station and motion sensor on launch 1210 for all hydrographic data acquisition. The POS MV

was calibrated on 20 January, 2010. Detailed supporting documentation can be found in the HSRR for 2010.

C.4 Sound Velocity Profile

Conductivity, temperature, and depth profiles are acquired using two velocity (CTD) profilers. The primary instrument used for determining corrections for the speed of sound through the water column was a Digibar-Pro, S/N 98295-011007. (01/2010 last calibrated). Data quality assurance tests were performed by the "Compare two Profiles" method of two casts acquired at the same time with two different instruments.

The check instrument used for determining corrections for the speed of sound through the water column was a Seabird-Seacat Velocity Profiler, model 19-03, S/N 198671-1477. (12/2009 last calibrated). The calibration records are included with the HSSR for 2010.

C.5 Water Levels

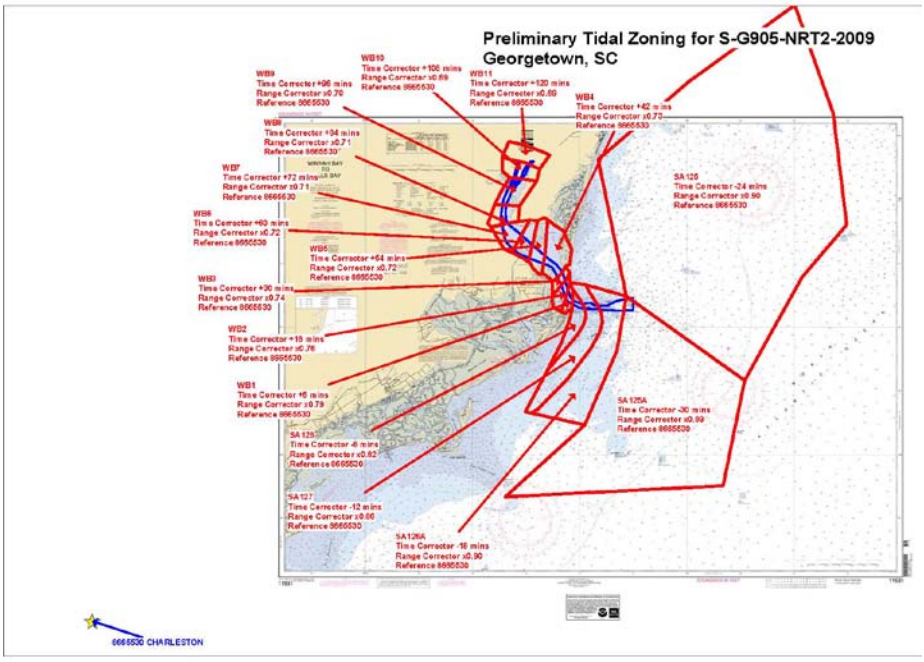
Field soundings are corrected by verified tides data from NOAA/CO-OPS, as per

WATER LEVEL INSTRUCTIONS
S-G905-NRT2-2009 Georgetown, SC
(05/07/2009 LH)

This is a ZDF controlled project.

Pertinent water level data were provided via email data transmissions through TIDEBOT, to the Field unit. Water level data requested and used were both 6 min Preliminary; and Verified for final data submission

The operating water level station at Charleston, SC (8665530) provided water level reducers for this project, during all periods of hydrography. ZDF graphic below.




```
Vessel Name: NRT2_1210_SB.hvf
Vessel created: May 05, 2009


Depth Sensor:

      Sensor Class:     Swath
      Time Stamp:  2006-001 00:00

      Comments: R=0.01m / A=0.01m
      Time Correction(s) 0.000

      Transduer #1:
      -------------
      Pitch Offset:    0.000
      Roll Offset:     0.000
      Azimuth Offset:  0.000

      DeltaX:     0.000
      DeltaY:     0.000
      DeltaZ:     0.000

      Manufacturer:     Odom
      Model:            oecv
      Serial Number:    23031

Depth Sensor:

      Sensor Class:     Swath
```

```
      Time Stamp:  2008-057 00:00

      Comments: R=0.01m / A=0.01m // RP to XDCR
      Time Correction(s) 0.000

      Transduer #1:
      -------------
      Pitch Offset:    0.000
      Roll Offset:     0.000
      Azimuth Offset:  0.000

      DeltaX:     -0.176
      DeltaY:     2.060
      DeltaZ:     0.169

      Manufacturer:     Odom
      Model:            oecv
      Serial Number:    23031

Depth Sensor:

      Sensor Class:     Swath
      Time Stamp:  2009-258 00:00

      Comments: R=0.01m / A=0.01m // RP to XDCR(new XDCR)
      Time Correction(s) 0.000

      Transduer #1:
      -------------
      Pitch Offset:    0.000
      Roll Offset:     0.000
      Azimuth Offset:  0.000

      DeltaX:     -0.176
      DeltaY:     2.060
      DeltaZ:     0.135

      Manufacturer:     Odom
      Model:            oecv
      Serial Number:    23031

_____________________________________________________________
Navigation Sensor:

      Time Stamp:  2005-061 00:00

      Comments: <1m HP, Speed @ 0.1kts
      Time Correction(s) 0.000
      DeltaX:     0.200
      DeltaY:     -0.770
      DeltaZ:     -3.600

      Manufacturer:     Trimble
      Model:            DSM12/212_L
```

Serial Number: 0220261525

Time Stamp: 2008-057 00:00

Comments: HW v1.9 // SEP 2006 {RP}
Time Correction(s) 0.000
DeltaX: 0.000
DeltaY: 0.000
DeltaZ: 0.000

Manufacturer: Applanix
Model: MV V4
Serial Number: 2546

Gyro Sensor:

Time Stamp: 2005-061 00:00

Comments: From DGPS VTG msg
Time Correction(s) 0.000

Heave Sensor:

Time Stamp: 2008-057 00:00

Comments: RP to IMU
Apply Yes
Time Correction(s) 0.000
DeltaX: 0.000
DeltaY: -0.127
DeltaZ: -0.167
Offset: 0.000

Manufacturer: Applanix
Model: POS M/V V4
Serial Number: 2546

Pitch Sensor:

Time Stamp: 2008-057 00:00

Comments: IMU
Apply Yes
Time Correction(s) 0.000
Pitch offset: 0.000

Manufacturer: Applanix
Model: POS M/V V4
Serial Number: 2546

Roll Sensor:

Time Stamp: 2008-057 00:00

Comments: IMU
Apply Yes
Time Correction(s) 0.000
Roll offset: 0.000

Manufacturer: Applanix
Model: POS M/V V4
Serial Number: 2546

Draft Sensor:

Time Stamp: 2005-061 00:00

Apply Yes
Comments: SS 2005
Time Correction(s) 0.000

Entry 1) Draft: 0.000 Speed: 0.000
Entry 2) Draft: 0.010 Speed: 4.500
Entry 3) Draft: 0.020 Speed: 5.500
Entry 4) Draft: 0.030 Speed: 7.000
Entry 5) Draft: 0.040 Speed: 8.300
Entry 6) Draft: 0.020 Speed: 10.600
Entry 7) Draft: -0.050 Speed: 14.700

Time Stamp: 2006-032 00:00

Apply Yes
Comments: SS 2006
Time Correction(s) 0.000

Entry 1) Draft: 0.000 Speed: 0.000
Entry 2) Draft: 0.012 Speed: 4.525
Entry 3) Draft: 0.025 Speed: 5.517
Entry 4) Draft: 0.031 Speed: 7.019
Entry 5) Draft: 0.042 Speed: 8.287
Entry 6) Draft: 0.024 Speed: 10.598
Entry 7) Draft: -0.051 Speed: 14.717

Time Stamp: 2007-004 00:00

Apply Yes
Comments: SS 2007
Time Correction(s) 0.000

Entry 1) Draft: 0.000 Speed: 0.000
Entry 2) Draft: 0.014 Speed: 4.530
Entry 3) Draft: 0.027 Speed: 5.520

Entry 4) Draft: 0.030 Speed: 7.018
Entry 5) Draft: 0.043 Speed: 8.290
Entry 6) Draft: 0.023 Speed: 10.625
Entry 7) Draft: -0.052 Speed: 14.719

Time Stamp: 2008-015 00:00

Apply Yes
Comments: SS 2008
Time Correction(s) 0.000

Entry 1) Draft: 0.000 Speed: 0.000
Entry 2) Draft: 0.010 Speed: 2.994
Entry 3) Draft: 0.050 Speed: 4.490
Entry 4) Draft: 0.040 Speed: 6.395
Entry 5) Draft: 0.060 Speed: 7.989
Entry 6) Draft: -0.010 Speed: 10.594

Time Stamp: 2009-007 00:00

Apply Yes
Comments: SS 2009
Time Correction(s) 0.000

Entry 1) Draft: 0.000 Speed: 0.000
Entry 2) Draft: 0.010 Speed: 2.994
Entry 3) Draft: 0.050 Speed: 4.471
Entry 4) Draft: 0.050 Speed: 6.395
Entry 5) Draft: 0.060 Speed: 7.989
Entry 6) Draft: 0.000 Speed: 10.497
Entry 7) Draft: -0.080 Speed: 14.987

Time Stamp: 2010-020 00:00

Apply Yes
Comments: SS 2010
Time Correction(s) 0.000

Entry 1) Draft: 0.000 Speed: 0.000
Entry 2) Draft: 0.010 Speed: 2.994
Entry 3) Draft: 0.050 Speed: 4.490
Entry 4) Draft: 0.050 Speed: 6.415
Entry 5) Draft: 0.060 Speed: 7.989
Entry 6) Draft: -0.010 Speed: 10.594
Entry 7) Draft: -0.070 Speed: 15.492

TPU

Time Stamp: 2008-057 00:00

Comments: POS M/V install date
Offsets

Motion sensing unit to the transducer 1

```
      X Head 1 -0.176
      Y Head 1 2.187
      Z Head 1 0.336
Motion sensing unit to the transducer 2
      X Head 2 0.000
      Y Head 2 0.000
      Z Head 2 0.000
Navigation antenna to the transducer 1
      X Head 1 -0.916
      Y Head 1 -1.150
      Z Head 1 3.147
Navigation antenna to the transducer 2
      X Head 2 0.000
      Y Head 2 0.000
      Z Head 2 0.000

Roll offset of transducer number 1 0.000
Roll offset of transducer number 2 0.000

Heave Error: 0.050 or 5.000'' of heave amplitude.
Measurement errors: 0.010
Motion sensing unit alignment errors
Gyro:0.000  Pitch:0.000 Roll:0.000
Gyro measurement error: 0.025
Roll measurement error: 0.020
Pitch measurement error: 0.020
Navigation measurement error: 1.000
Transducer timing error: 0.000
Navigation timing error: 0.010
Gyro timing error: 0.010
Heave timing error: 0.005
PitchTimingStdDev: 0.005
Roll timing error: 0.005
Sound Velocity speed measurement error: 0.000
Surface sound speed measurement error: 0.000
Tide measurement error: 0.000
Tide zoning error: 0.000
Speed over ground measurement error: 0.030
Dynamic loading measurement error: 0.010
Static draft measurement error: 0.010
Delta draft measurement error: 0.010
StDev Comment: Applanix POS M/V V4

Time Stamp:  2010-020 00:00

Comments: POS MV Updates
Offsets

Motion sensing unit to the transducer 1
      X Head 1 -0.176
      Y Head 1 2.187
      Z Head 1 0.302
Motion sensing unit to the transducer 2
      X Head 2 0.000
```

```
      Y Head 2 0.000
      Z Head 2 0.000
   Navigation antenna to the transducer 1
      X Head 1 -0.916
      Y Head 1 -1.150
      Z Head 1 3.113
   Navigation antenna to the transducer 2
      X Head 2 0.000
      Y Head 2 0.000
      Z Head 2 0.000

   Roll offset of transducer number 1 0.000
   Roll offset of transducer number 2 0.000

   Heave Error: 0.050 or 5.000'' of heave amplitude.
   Measurement errors: 0.010
   Motion sensing unit alignment errors
   Gyro:0.000  Pitch:0.000 Roll:0.000
   Gyro measurement error: 0.025
   Roll measurement error: 0.020
   Pitch measurement error: 0.020
   Navigation measurement error: 1.000
   Transducer timing error: 0.000
   Navigation timing error: 0.010
   Gyro timing error: 0.010
   Heave timing error: 0.005
   PitchTimingStdDev: 0.005
   Roll timing error: 0.005
   Sound Velocity speed measurement error: 0.000
   Surface sound speed measurement error: 0.000
   Tide measurement error: 0.000
   Tide zoning error: 0.000
   Speed over ground measurement error: 0.030
   Dynamic loading measurement error: 0.010
   Static draft measurement error: 0.010
   Delta draft measurement error: 0.010
   StDev Comment: Applanix POS M/V V4
```

```
Svp Sensor:

   Time Stamp:  2005-061 00:00

   Comments: SBE 19 cast
   Time Correction(s) 0.000

   Svp #1:
   -------------
   Pitch Offset:    0.000
   Roll Offset:     0.000
   Azimuth Offset:  0.000

   DeltaX:    0.000
   DeltaY:    0.000
   DeltaZ:    0.000
```

```
SVP #2:
-------------
Pitch Offset:    0.000
Roll Offset:     0.000
Azimuth Offset:  0.000

DeltaX:    0.000
DeltaY:    0.000
DeltaZ:    0.000


Time Stamp:  2008-057 00:00

Comments: Digibar Pro
Time Correction(s) 0.000

Svp #1:
-------------
Pitch Offset:    0.000
Roll Offset:     0.000
Azimuth Offset:  0.000

DeltaX:    -0.176
DeltaY:    2.060
DeltaZ:    0.169

SVP #2:
-------------
Pitch Offset:    0.000
Roll Offset:     0.000
Azimuth Offset:  0.000

DeltaX:    0.000
DeltaY:    0.000
DeltaZ:    0.000


Time Stamp:  2009-258 00:00

Comments:
Time Correction(s) 0.000

Svp #1:
-------------
Pitch Offset:    0.000
Roll Offset:     0.000
Azimuth Offset:  0.000

DeltaX:    -0.176
DeltaY:    2.060
DeltaZ:    0.135

SVP #2:
```

```
      -------------
      Pitch Offset:    0.000
      Roll Offset:     0.000
      Azimuth Offset:  0.000

      DeltaX:    0.000
      DeltaY:    0.000
      DeltaZ:    0.000
```

```
WaterLine:

      Time Stamp:  2005-061 00:00

      Comments: 208khz 8dgr beam
      Apply Yes
      WaterLine -0.500

      Time Stamp:  2008-057 00:00

      Comments: RP to Static WL
      Apply Yes
      WaterLine -0.196
```

D. APPROVAL SHEET

Data Acquisition and Processing Report

For Calendar year 2010

For Accompanying Surveys

The Data Acquisition and Processing Report information and all accompanying records and data are approved.

Submitted by: Robert W Ramsey Jr

Digitally signed by Robert W Ramsey Jr
DN: cn=Robert W Ramsey Jr, o=USDOC/NOAA/NOS/NRB, ou=NRT-2, email=Robert.Ramsey@NOAA.GOV, c=US
Date: 2010.02.01 15:00:07 Z

Robert W. Ramsey Jr. – Team Leader
Navigation Response Team 2