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UTM
UNIDAD DE TECNOLOGÍA MARINA

Informe de los equipos acústicos durante la campaña FORMED 3

Título Informe de los equipos acústicos durante la campaña FORMED 3
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Dpto. Acústica
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Páginas. ¿?
Localización.
Grupo temático. Campaña
Descriptores ELAC SEABEAM 1050D, EK500

FICHA DE LA CAMPAÑA

FICHA TÉCNICA				
ACRÓNIMO	FORMED-3			
CÓDIGO REN	CGL2012-33989		**CÓDIGO UTM**	¿?GC20140406
JEFE CIENTÍFICO	Jorge Guillén	**INSTITUCIÓN**	ICM	
INICIO	Barcelona, 06/04/2014	**FINAL**	Barcelona, 08/04/2014	
BUQUE	B/O García del Cid			
Zona de trabajo	Delta del Ebro			
Resp. Técnico		**ORG.**	UTM	
Equipo Técnico	Marcos Pastor (acústica) y Joel Sans (equipos electrónicos)			
Instrumentación utilizada	ELAC SEABEAM 1050D y EK500			

DESARROLLO DE LA CAMPAÑA. INCIDENCIAS

La campaña FORMED 3 ha tenido lugar entre los días 6 y 8 de abril de 2014 en el Mediterráneo. El tiempo durante la campaña ha sido en general estable.

INCIDENCIAS POR EQUIPOS

Sonda multihaz ELAC SEABEAM 1050D

Días antes del inicio de la campaña se realiza una salida de pruebas con el fin de comprobar que el equipo funciona correctamente. En dicha salida de pruebas se utilizan las configuraciones Hypack 2013 + Hydrostar 4 y Hypack 2011 + Hydrostar 3.5.5. Al procesar con el Caris los datos obtenidos se aprecia un desfase entre la señal de navegación y la de batimetría, que hace que no se aplique la corrección de heave de manera adecuada, lo que repercute en la calidad de los datos. Por ello, en la campaña se decide trabajar únicamente con el Hydrostar 4, pero los datos adquiridos vuelven a presentar el mismo problema. Posteriormente se cambia la configuración a Hypack 2011 + Hydrostar 3.5.5, pero dicho cambio tampoco consigue solucionar el problema existente.

Sonda biológica EK500

En este caso no hay que reseñar ninguna incidencia.

DESCRIPCIÓN DE OPERACIONES

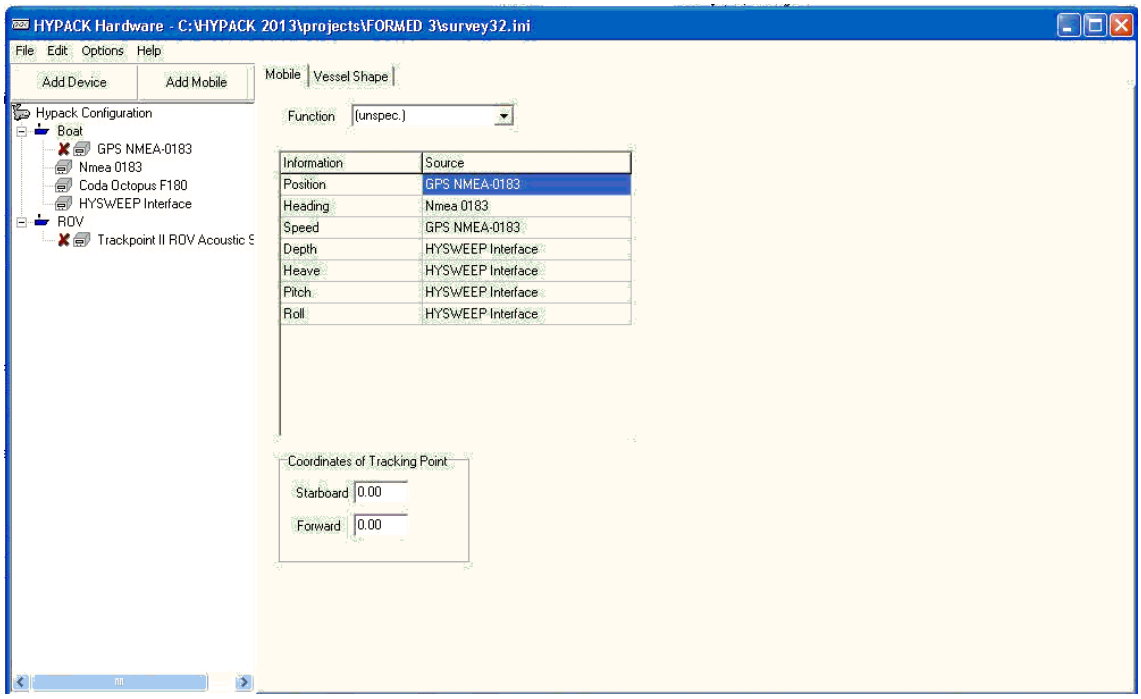
Descripción de las operaciones por equipos

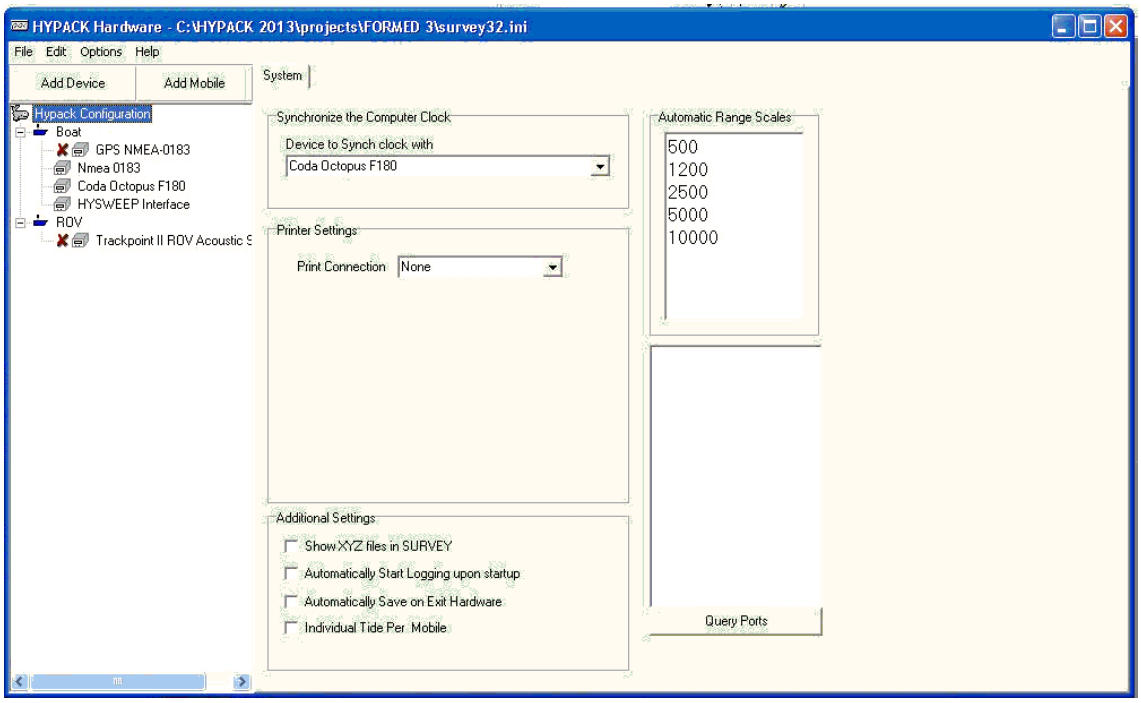
SONDA MULTIHAZ ELAC SEABEAM 1050D

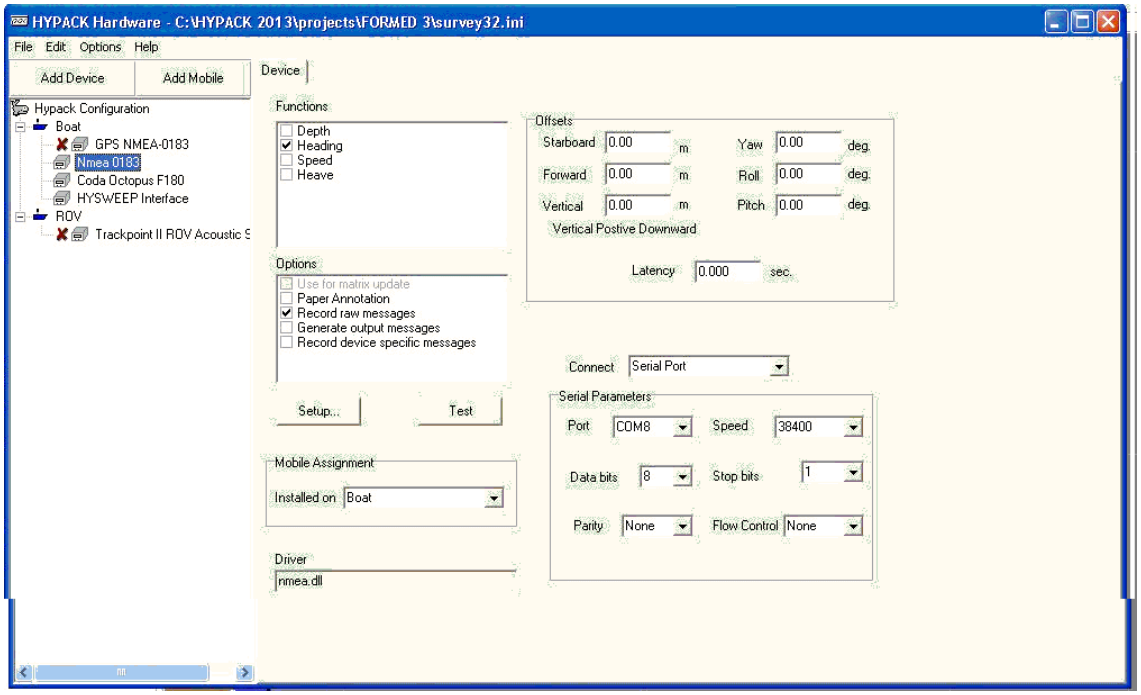
Metodología

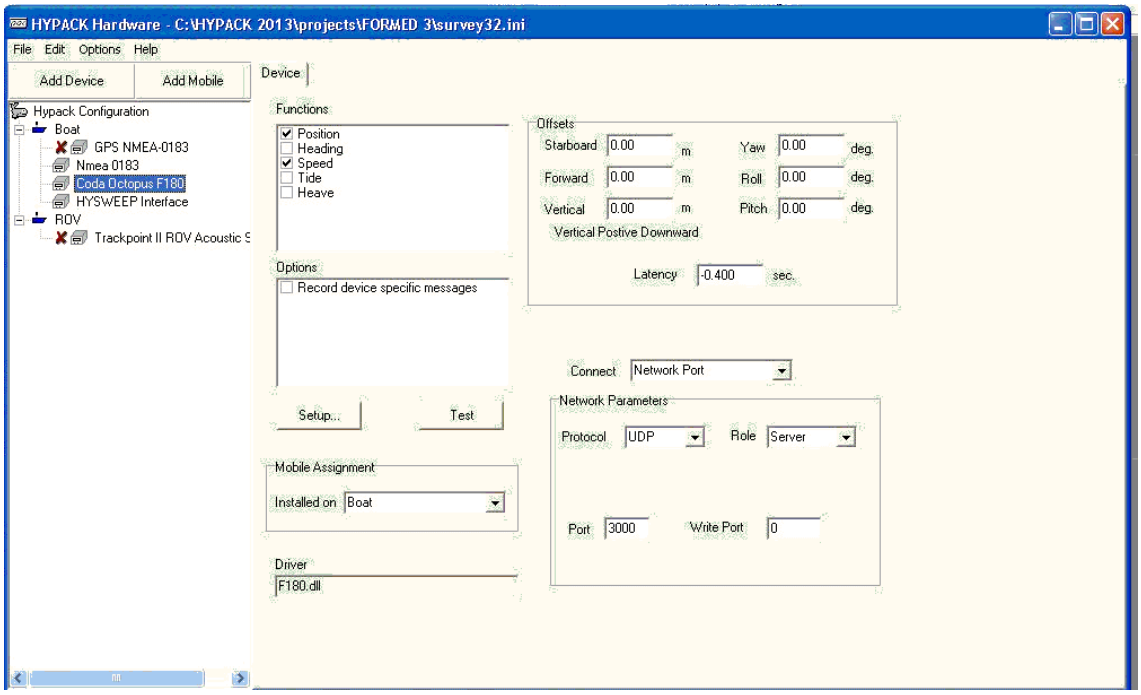
La sonda multihaz se ha utilizado únicamente para grabar unas líneas en la zona del Delta del Ebro, ya que los datos obtenidos presentaban un desfase entre la señal de batimetría y la señal de navegación. La frecuencia utilizada fue 180 kHz, y las aberturas de haz utilizadas fueron 131º y 153º. Las diferentes configuraciones utilizadas han sido las siguientes:

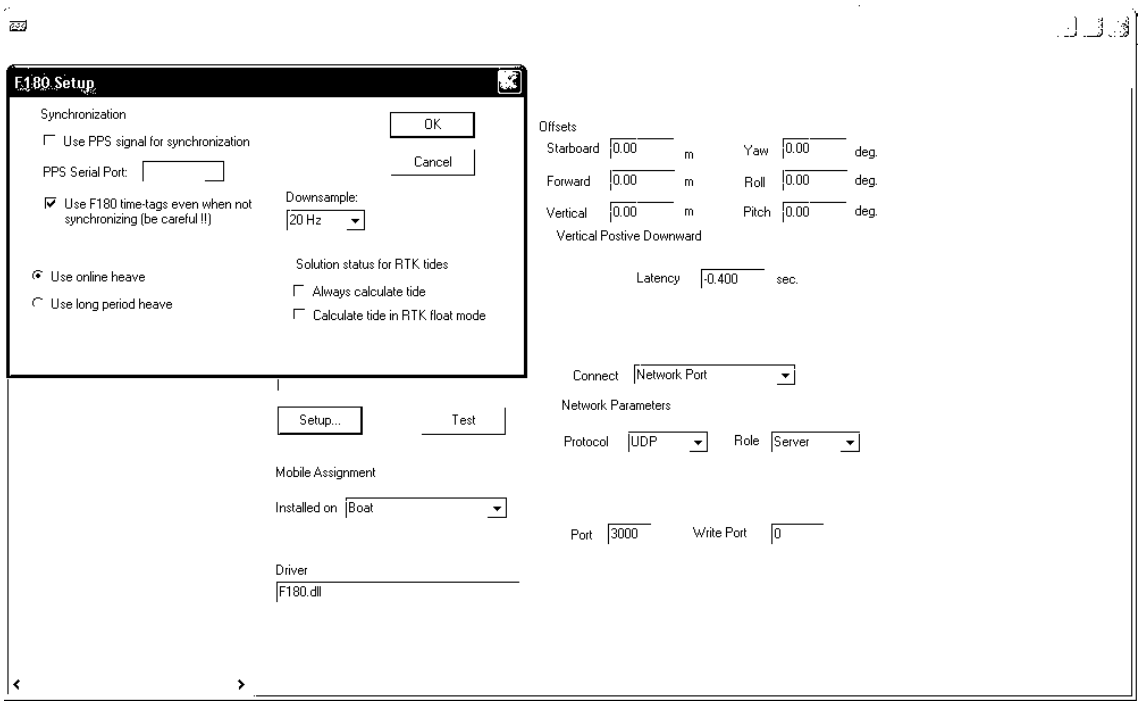
Hypack 2013 + Hydrostar 4:

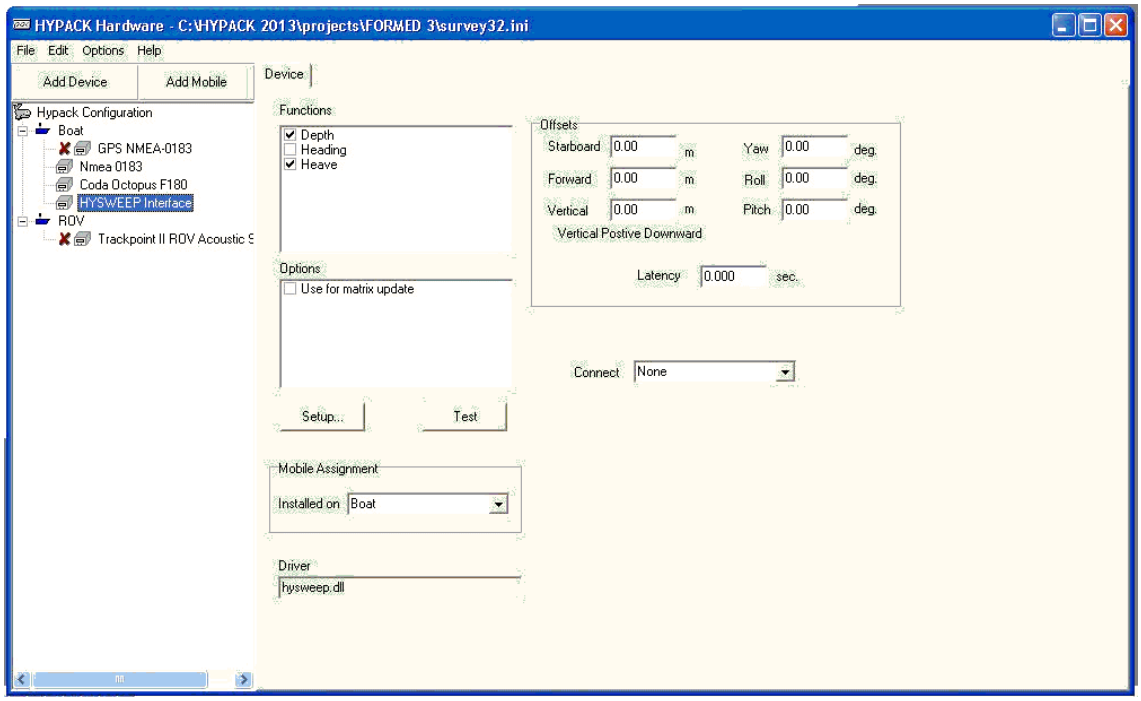


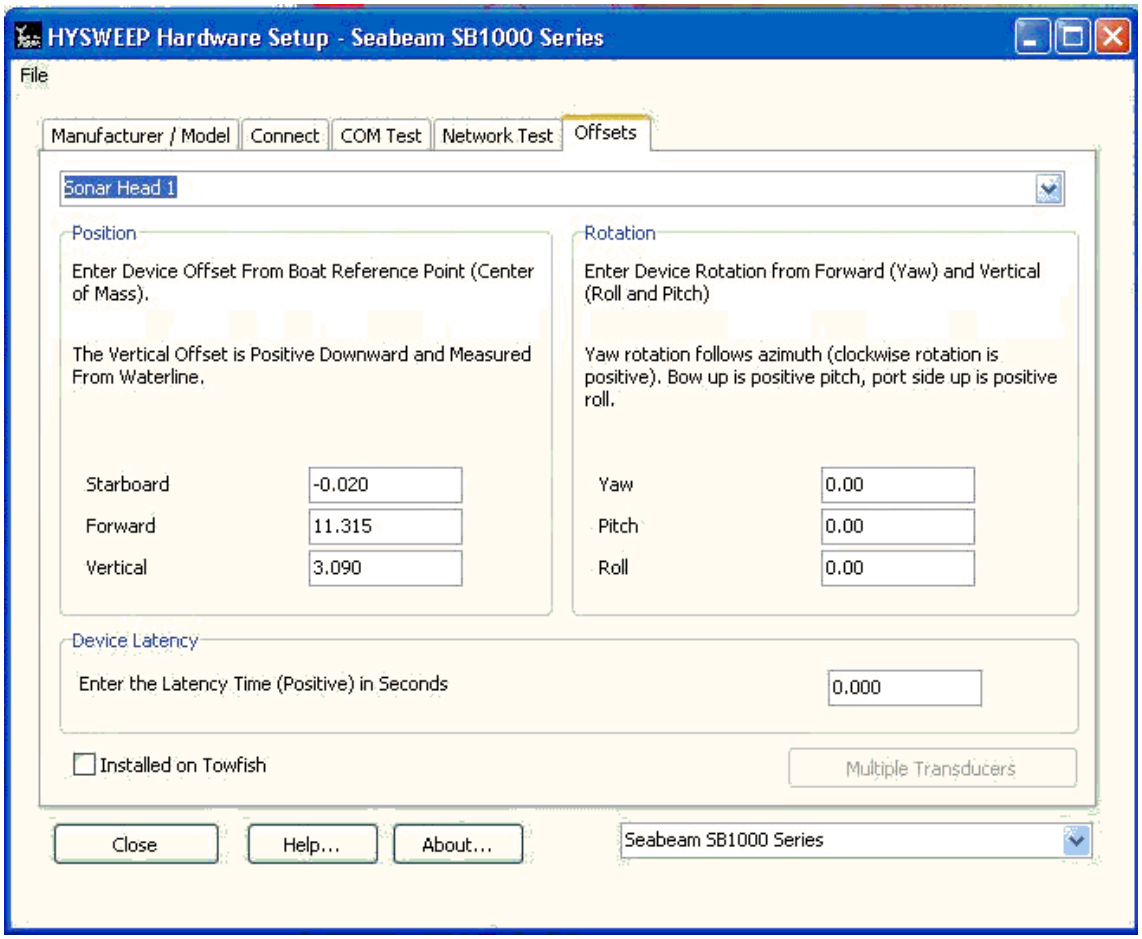


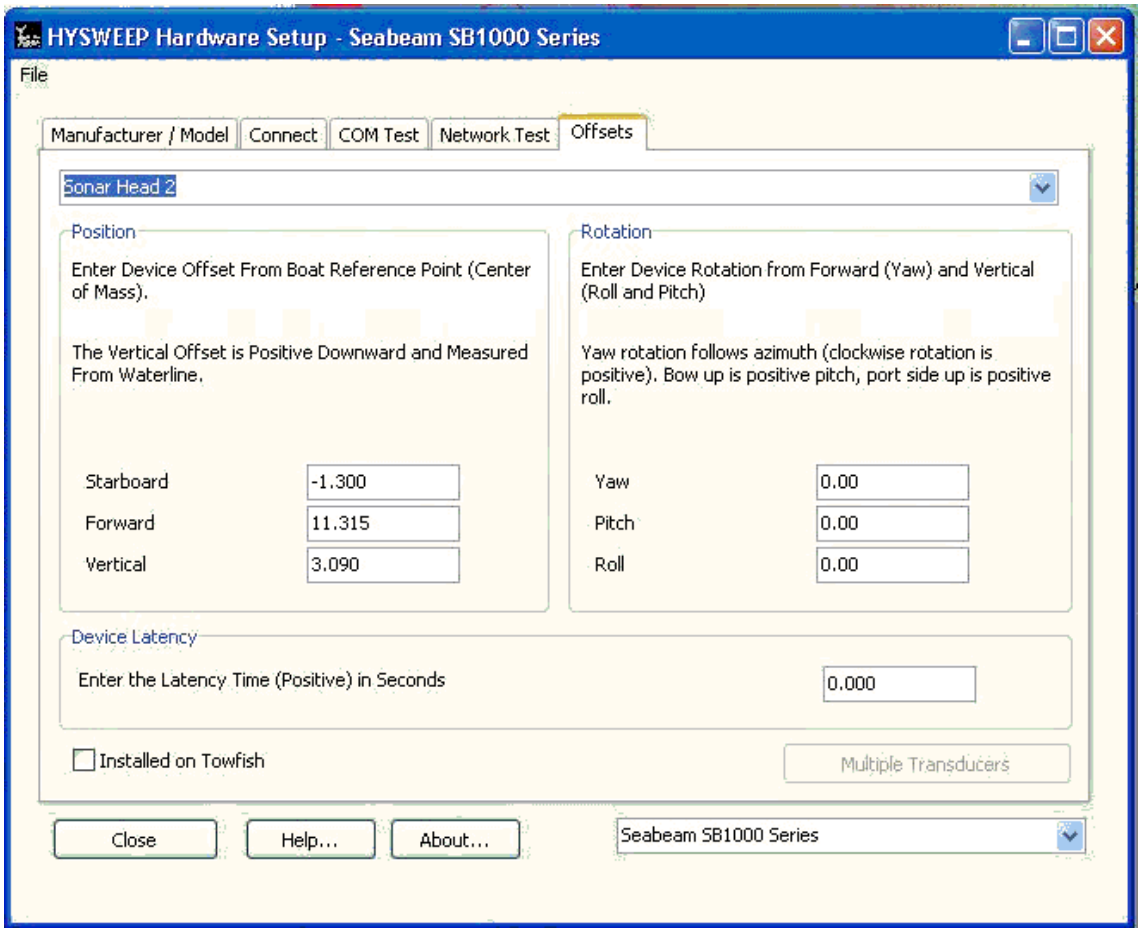

HYPACK Hardware - C:\HYPACK 2013\projects\FORMED 3\survey32.ini
File Edit Options Help
Add Device
Add Mobile
Device
Hypack Configuration
Boat
GPS NMEA-0183
Nmea 0183
Coda Octopus F180
HYSWEEP Interface
ROV
Trackpoint II ROV Acoustic S
Functions
Depth
Heading
Speed
Heave
Offsets
Starboard 0.00 m
Yaw 0.00 deg.
Forward 0.00 m
Roll 0.00 deg.
Vertical 0.00 m
Pitch 0.00 deg.
Vertical Postive Downward
Latency 0.000 sec.
Options
Use for matrix update
Paper Annotation
Record raw messages
Generate output messages
Record device specific messages
Connect Serial Port
Setup...
Test
Serial Parameters
Port COM8
Speed 38400
Mobile Assignment
Installed on Boat
Data bits 8
Stop bits 1
Parity None
Flow Control None
Driver
nmea.dll

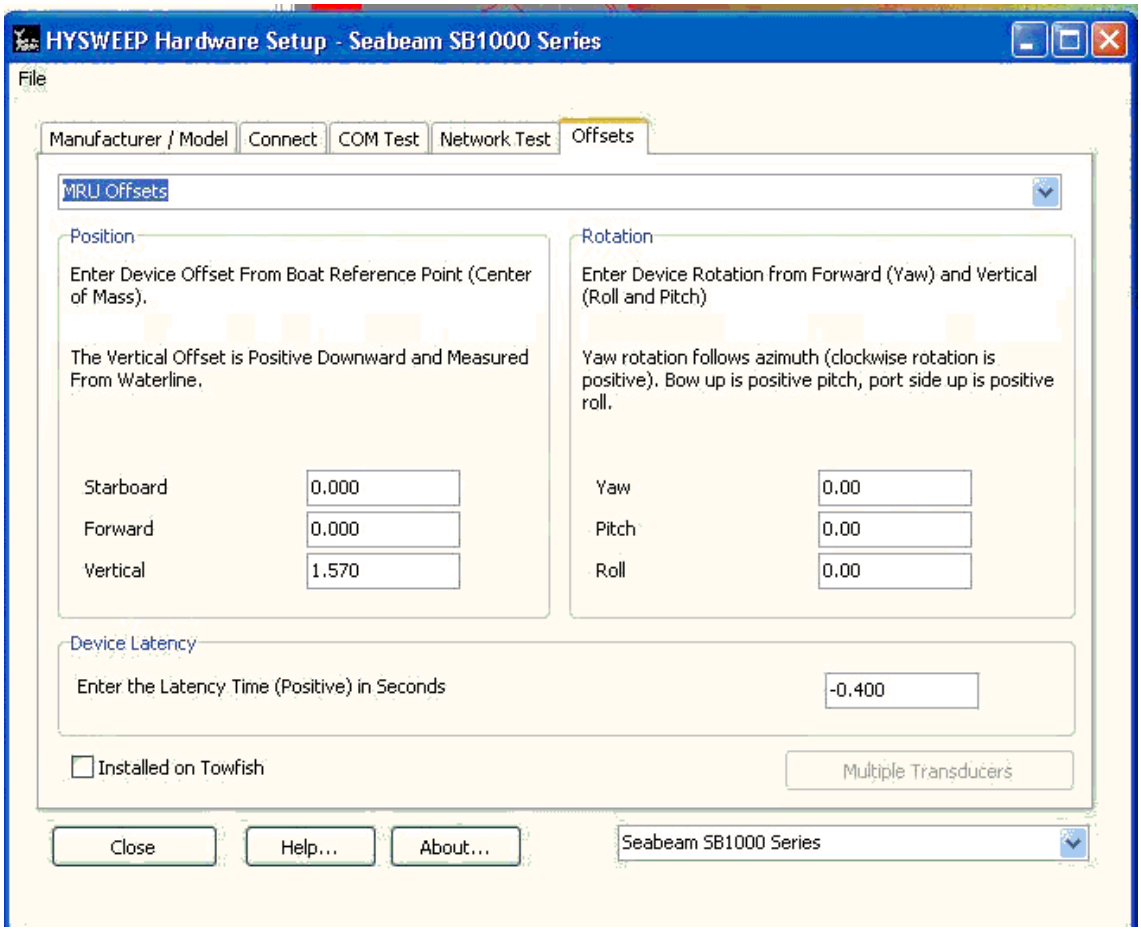

HYPACK Hardware - C:\HYPACK 2013\projects\FORMED 3\survey32.ini
File Edit Options Help
Add Device
Add Mobile
Device
Hypack Configuration
Boat
GPS NMEA-0183
Nmea 0183
Coda Octopus F180
HYSWEEP Interface
ROV
Trackpoint II ROV Acoustic S
Functions
Position
Heading
Speed
Tide
Heave
Offsets
Starboard 0.00 m
Yaw 0.00 deg.
Forward 0.00 m
Roll 0.00 deg.
Vertical 0.00 m
Pitch 0.00 deg.
Vertical Postive Downward
Latency -0.400 sec.
Options
Record device specific messages
Connect Network Port
Setup...
Test
Network Parameters
Protocol UDP
Role Server
Mobile Assignment
Installed on Boat
Port 3000
Write Port 0
Driver
F180.dll

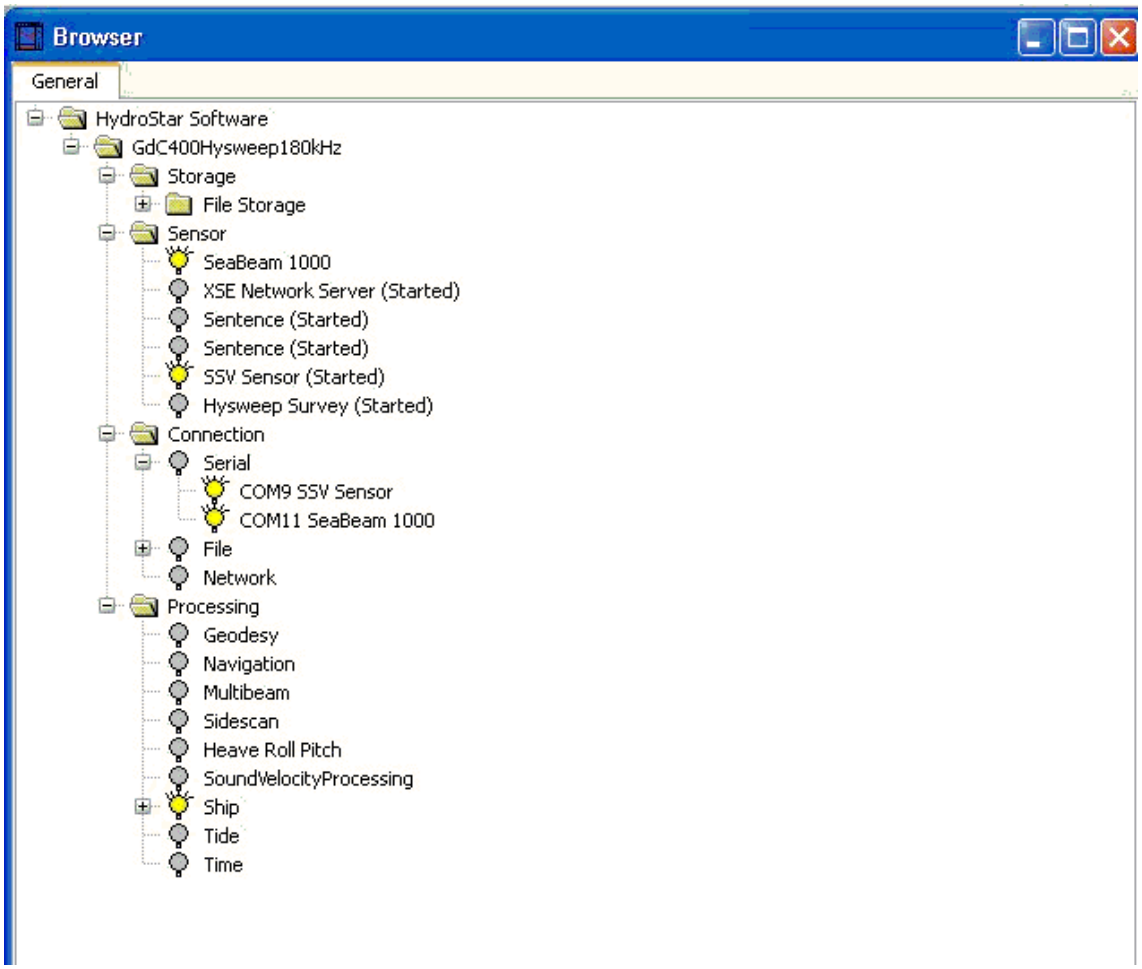

F180 Setup
Synchronization
Use PPS signal for synchronization
PPS Serial Port:
Use F180 time-tags even when not synchronizing (be careful !!)
Downsample:
20 Hz
OK
Cancel
Use online heave
Use long period heave
Solution status for RTK tides
Always calculate tide
Calculate tide in RTK float mode
Offsets
Starboard 0.00 m
Forward 0.00 m
Vertical 0.00 m
Yaw 0.00 deg.
Roll 0.00 deg.
Pitch 0.00 deg.
Vertical Postive Downward
Latency -0.400 sec.
Connect Network Port
Network Parameters
Protocol UDP
Role Server
Port 3000
Write Port 0
Setup...
Test
Mobile Assignment
Installed on Boat
Driver
F180.dll

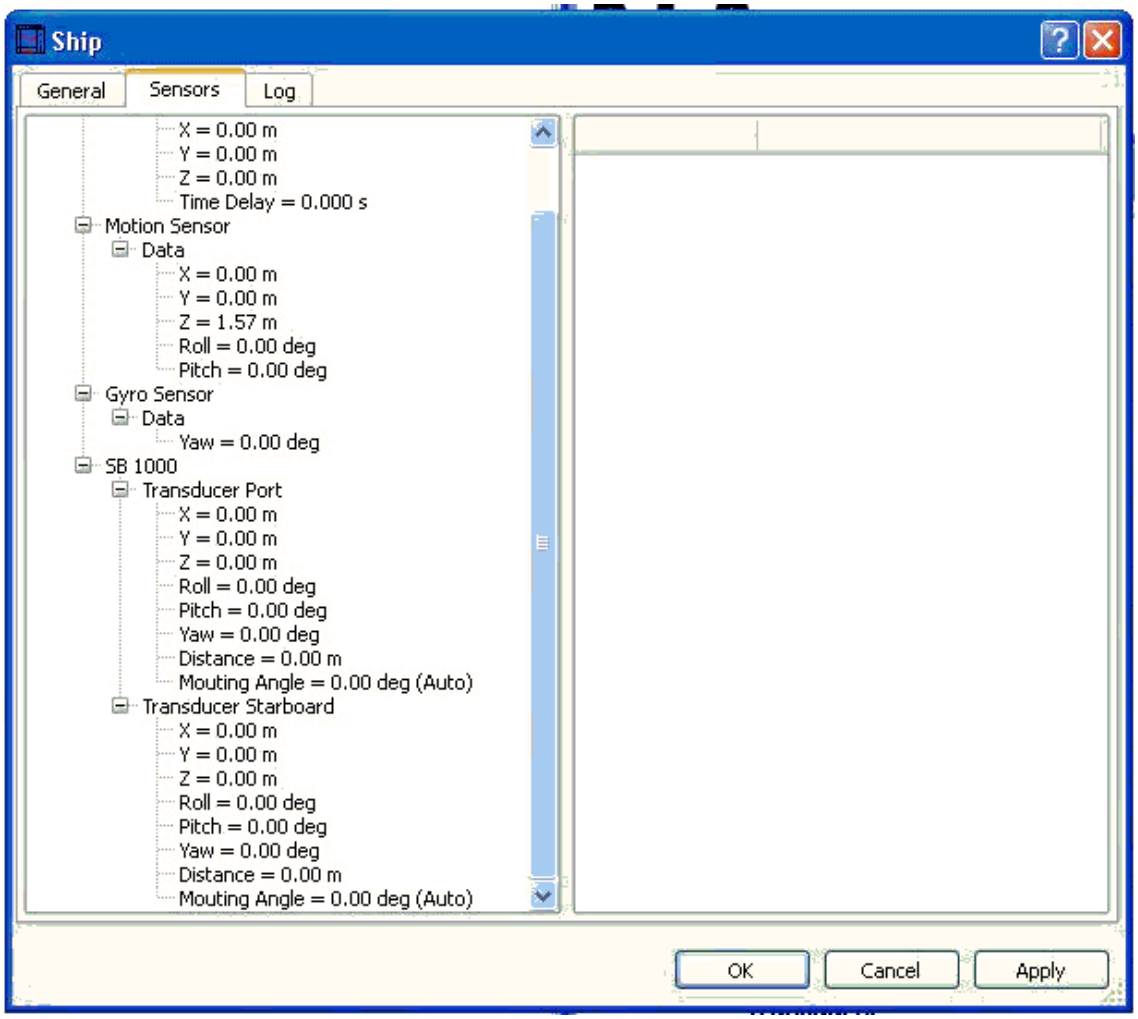

HYPACK Hardware - C:\HYPACK 2013\projects\FORMED 3\survey32.ini
File Edit Options Help
Add Device
Add Mobile
Device
Hypack Configuration
Boat
GPS NMEA-0183
Nmea 0183
Coda Octopus F180
HYSWEEP Interface
ROV
Trackpoint II ROV Acoustic S
Functions
Depth
Heading
Heave
Options
Use for matrix update
Setup...
Test
Mobile Assignment
Installed on Boat
Driver
hysweep.dll
Offsets
Starboard 0.00 m
Forward 0.00 m
Vertical 0.00 m
Yaw 0.00 deg.
Roll 0.00 deg.
Pitch 0.00 deg.
Vertical Postive Downward
Latency 0.000 sec.
Connect None


HYSWEEP Hardware Setup - Seabeam SB1000 Series
File
Manufacturer / Model
Connect
COM Test
Network Test
Offsets
Sonar Head 1
Position
Enter Device Offset From Boat Reference Point (Center of Mass).
The Vertical Offset is Positive Downward and Measured From Waterline.
Starboard
-0.020
Forward
11.315
Vertical
3.090
Rotation
Enter Device Rotation from Forward (Yaw) and Vertical (Roll and Pitch)
Yaw rotation follows azimuth (clockwise rotation is positive). Bow up is positive pitch, port side up is positive roll.
Yaw
0.00
Pitch
0.00
Roll
0.00
Device Latency
Enter the Latency Time (Positive) in Seconds
0.000
Installed on Towfish
Multiple Transducers
Close
Help...
About...
Seabeam SB1000 Series

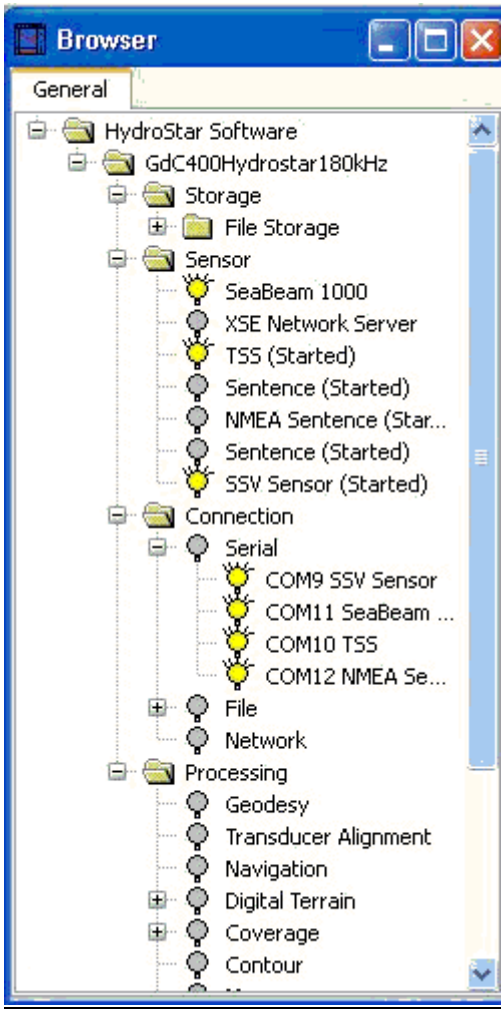

HYSWEEP Hardware Setup - Seabeam SB1000 Series
File
Manufacturer / Model
Connect
COM Test
Network Test
Offsets
Sonar Head 2
Position
Enter Device Offset From Boat Reference Point (Center of Mass).
The Vertical Offset is Positive Downward and Measured From Waterline.
Starboard
-1.300
Forward
11.315
Vertical
3.090
Rotation
Enter Device Rotation from Forward (Yaw) and Vertical (Roll and Pitch)
Yaw rotation follows azimuth (clockwise rotation is positive). Bow up is positive pitch, port side up is positive roll.
Yaw
0.00
Pitch
0.00
Roll
0.00
Device Latency
Enter the Latency Time (Positive) in Seconds
0.000
Installed on Towfish
Multiple Transducers
Close
Help...
About...
Seabeam SB1000 Series

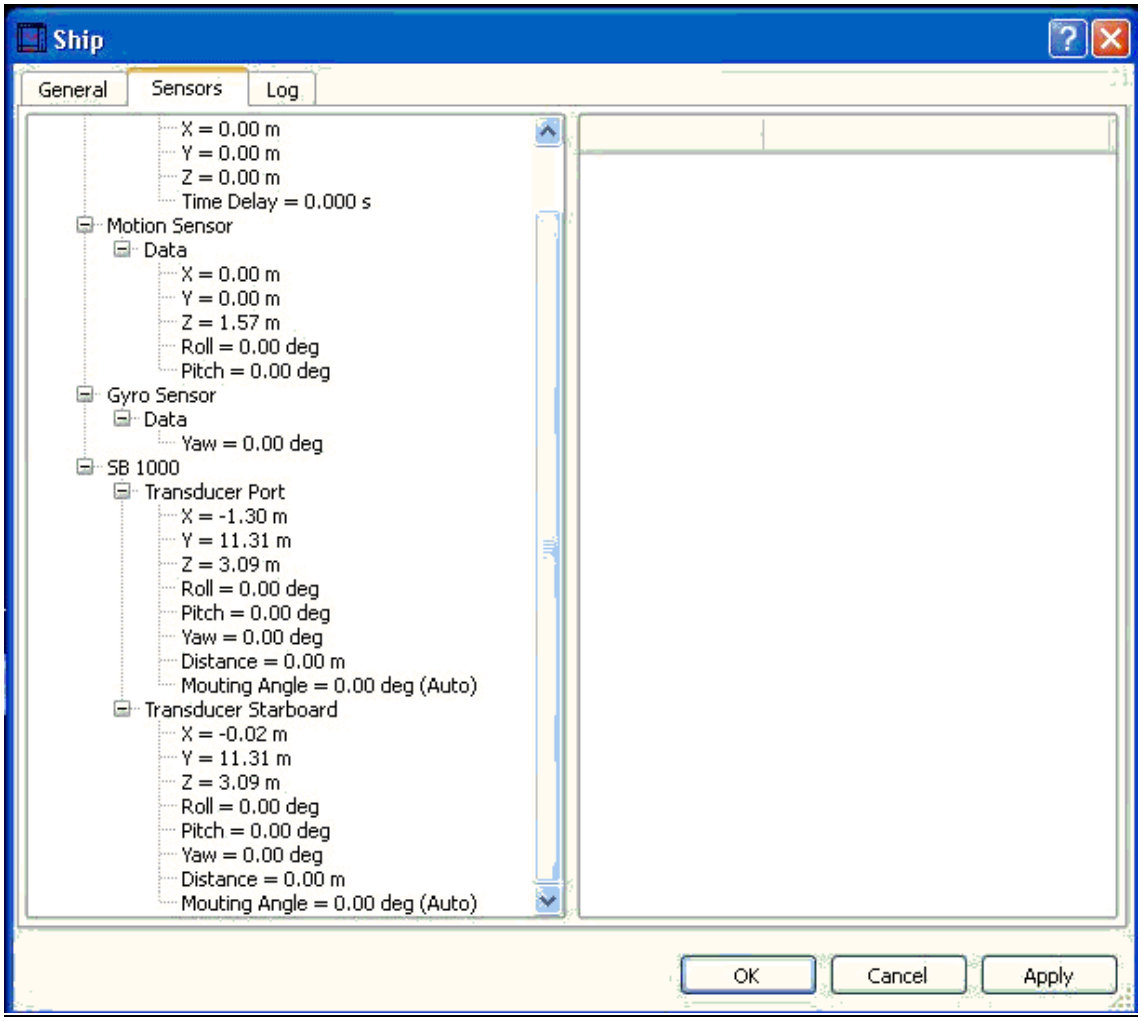

HYSWEEP Hardware Setup - Seabeam SB1000 Series
File
Manufacturer / Model
Connect
COM Test
Network Test
Offsets
MRU Offsets
Position
Enter Device Offset From Boat Reference Point (Center of Mass).
The Vertical Offset is Positive Downward and Measured From Waterline.
Starboard
0.000
Forward
0.000
Vertical
1.570
Rotation
Enter Device Rotation from Forward (Yaw) and Vertical (Roll and Pitch)
Yaw rotation follows azimuth (clockwise rotation is positive). Bow up is positive pitch, port side up is positive roll.
Yaw
0.00
Pitch
0.00
Roll
0.00
Device Latency
Enter the Latency Time (Positive) in Seconds
-0.400
Installed on Towfish
Multiple Transducers
Close
Help...
About...
Seabeam SB1000 Series


Browser
General
HydroStar Software
GdC400Hysweep180kHz
Storage
File Storage
Sensor
SeaBeam 1000
XSE Network Server (Started)
Sentence (Started)
Sentence (Started)
SSV Sensor (Started)
Hysweep Survey (Started)
Connection
Serial
COM9 SSV Sensor
COM11 SeaBeam 1000
File
Network
Processing
Geodesy
Navigation
Multibeam
Sidescan
Heave Roll Pitch
SoundVelocityProcessing
Ship
Tide
Time

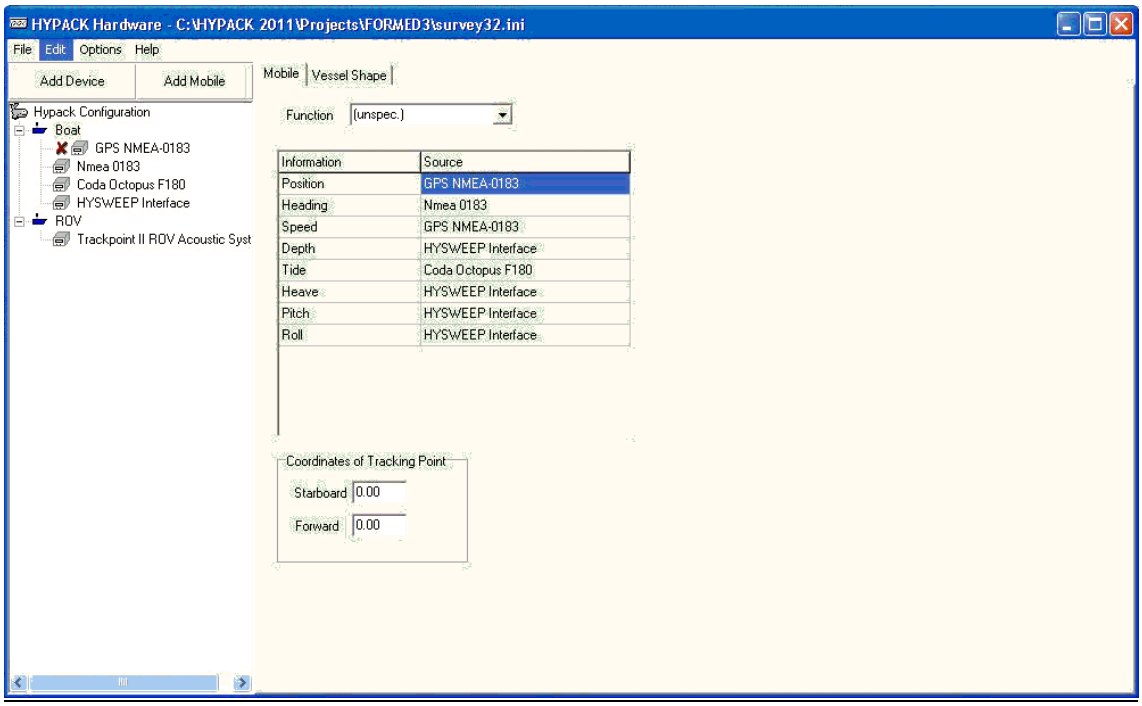

Ship
General
Sensors
Log
X = 0.00 m
Y = 0.00 m
Z = 0.00 m
Time Delay = 0.000 s
Motion Sensor
Data
X = 0.00 m
Y = 0.00 m
Z = 1.57 m
Roll = 0.00 deg
Pitch = 0.00 deg
Gyro Sensor
Data
Yaw = 0.00 deg
SB 1000
Transducer Port
X = 0.00 m
Y = 0.00 m
Z = 0.00 m
Roll = 0.00 deg
Pitch = 0.00 deg
Yaw = 0.00 deg
Distance = 0.00 m
Mouting Angle = 0.00 deg (Auto)
Transducer Starboard
X = 0.00 m
Y = 0.00 m
Z = 0.00 m
Roll = 0.00 deg
Pitch = 0.00 deg
Yaw = 0.00 deg
Distance = 0.00 m
Mouting Angle = 0.00 deg (Auto)
OK
Cancel
Apply

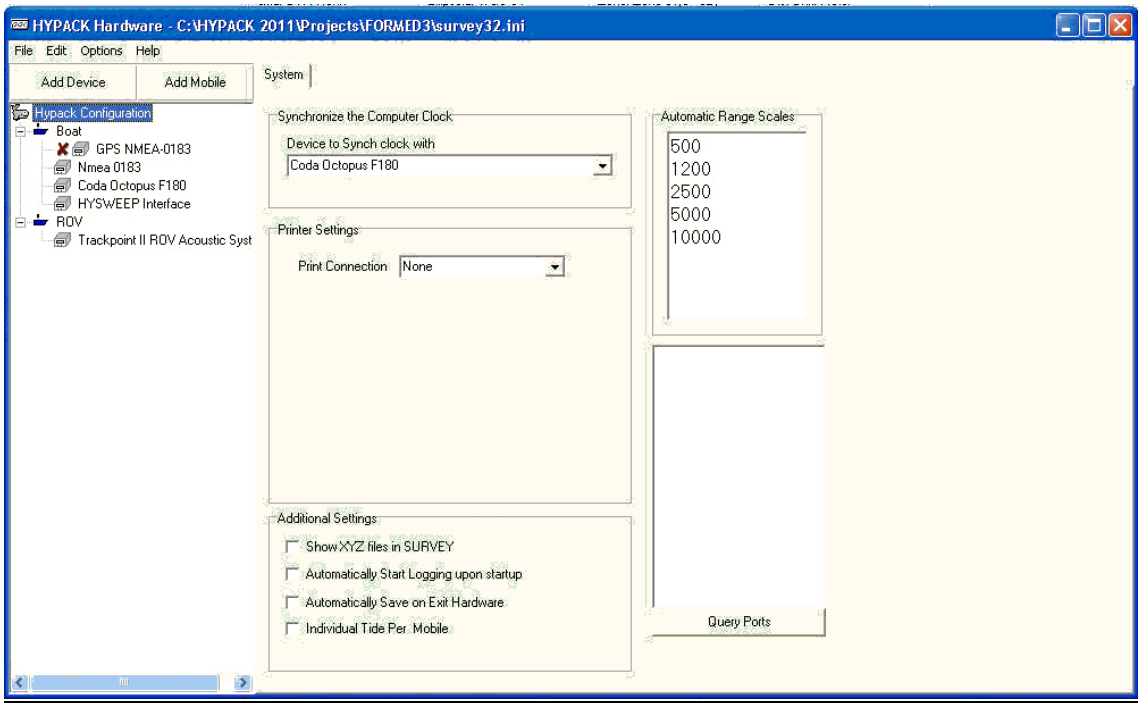
Hydrostar 4:

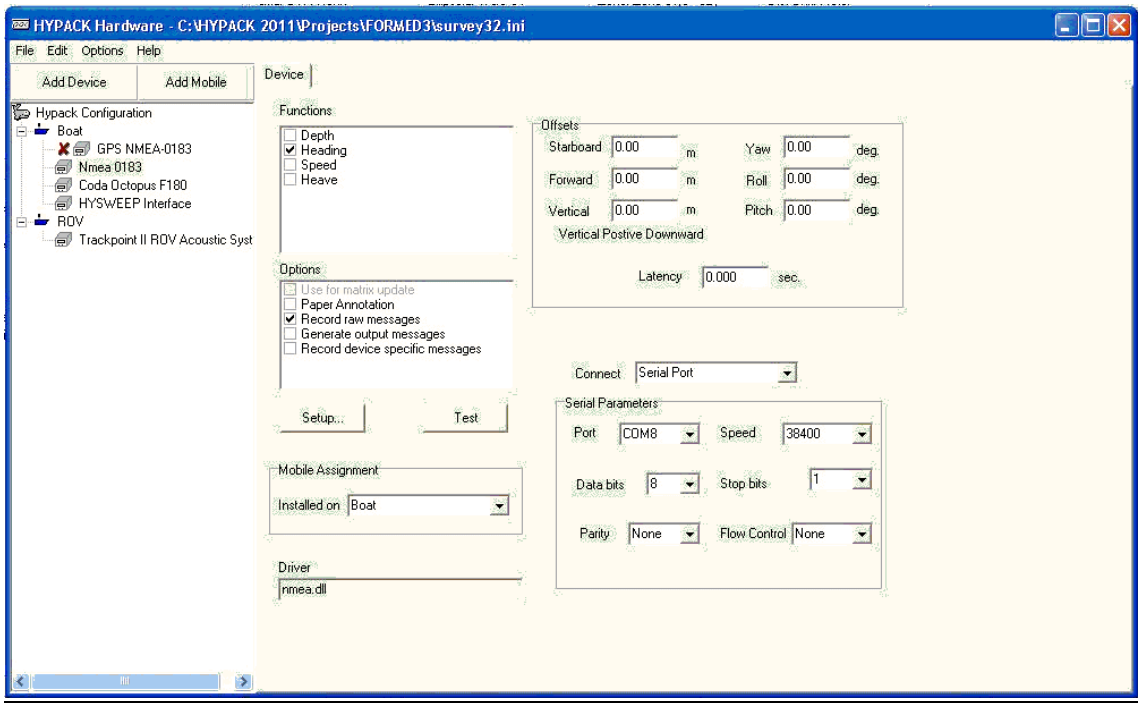

Browser
General
HydroStar Software
GdC400Hydrostar180kHz
Storage
File Storage
Sensor
SeaBeam 1000
XSE Network Server
TSS (Started)
Sentence (Started)
NMEA Sentence (Star...
Sentence (Started)
SSV Sensor (Started)
Connection
Serial
COM9 SSV Sensor
COM11 SeaBeam ...
COM10 TSS
COM12 NMEA Se...
File
Network
Processing
Geodesy
Transducer Alignment
Navigation
Digital Terrain
Coverage
Contour

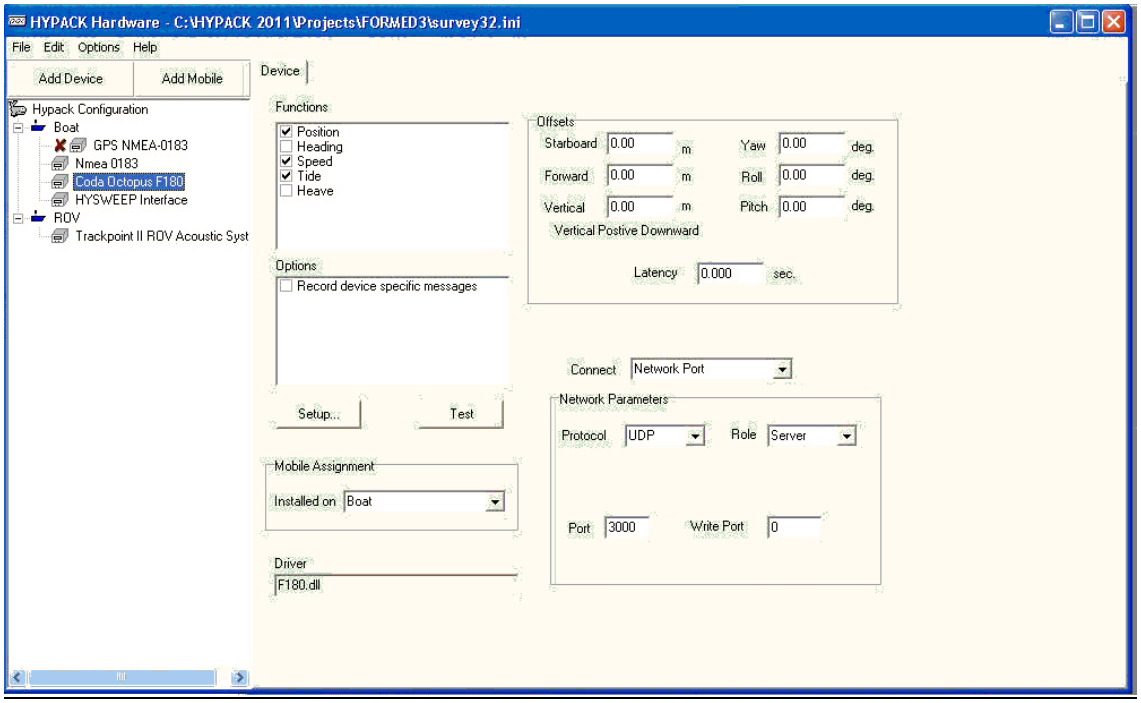


Hypack 2011 + Hydrostar 3.5.5:




HYPACK Hardware - C:\HYPACK 2011\Projects\FORMED3\survey32.ini
File Edit Options Help
Add Device
Add Mobile
System
Hypack Configuration
Boat
GPS NMEA-0183
Nmea 0183
Coda Octopus F180
HYSWEEP Interface
ROV
Trackpoint II ROV Acoustic Syst
Synchronize the Computer Clock
Device to Synch clock with
Coda Octopus F180
Automatic Range Scales
500
1200
2500
5000
10000
Printer Settings
Print Connection
None
Additional Settings
Show XYZ files in SURVEY
Automatically Start Logging upon startup
Automatically Save on Exit Hardware
Individual Tide Per Mobile
Query Ports


HYPACK Hardware - C:\HYPACK 2011\Projects\FORMED3\survey32.ini
File Edit Options Help
Add Device
Add Mobile
Device
Hypack Configuration
Boat
GPS NMEA-0183
Nmea 0183
Coda Octopus F180
HYSWEEP Interface
ROV
Trackpoint II ROV Acoustic Syst
Functions
Depth
Heading
Speed
Heave
Offsets
Starboard 0.00 m
Forward 0.00 m
Vertical 0.00 m
Vertical Postive Downward
Yaw 0.00 deg.
Roll 0.00 deg.
Pitch 0.00 deg.
Latency 0.000 sec.
Options
Use for matrix update
Paper Annotation
Record raw messages
Generate output messages
Record device specific messages
Connect
Serial Port
Setup...
Test
Serial Parameters
Port
COM8
Speed
38400
Data bits
8
Stop bits
1
Parity
None
Flow Control
None
Mobile Assignment
Installed on
Boat
Driver
nmea.dll


HYPACK Hardware - C:\HYPACK 2011\Projects\FORMED3\survey32.ini
File Edit Options Help
Add Device
Add Mobile
Device
Hypack Configuration
Boat
GPS NMEA-0183
Nmea 0183
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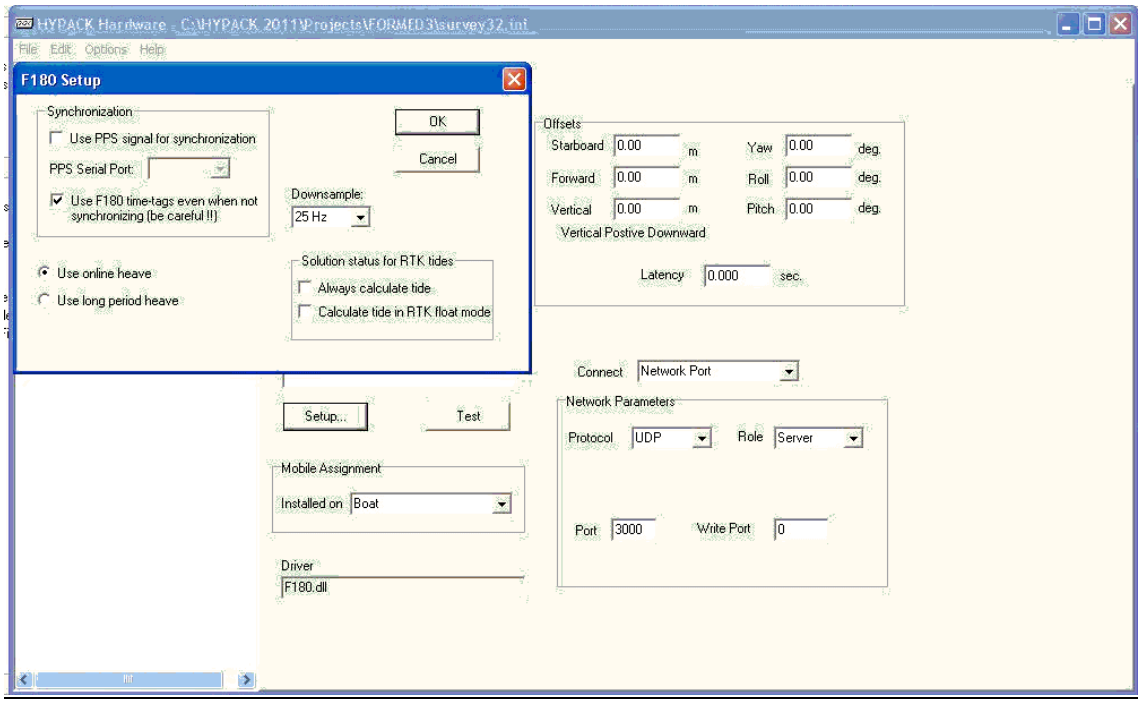
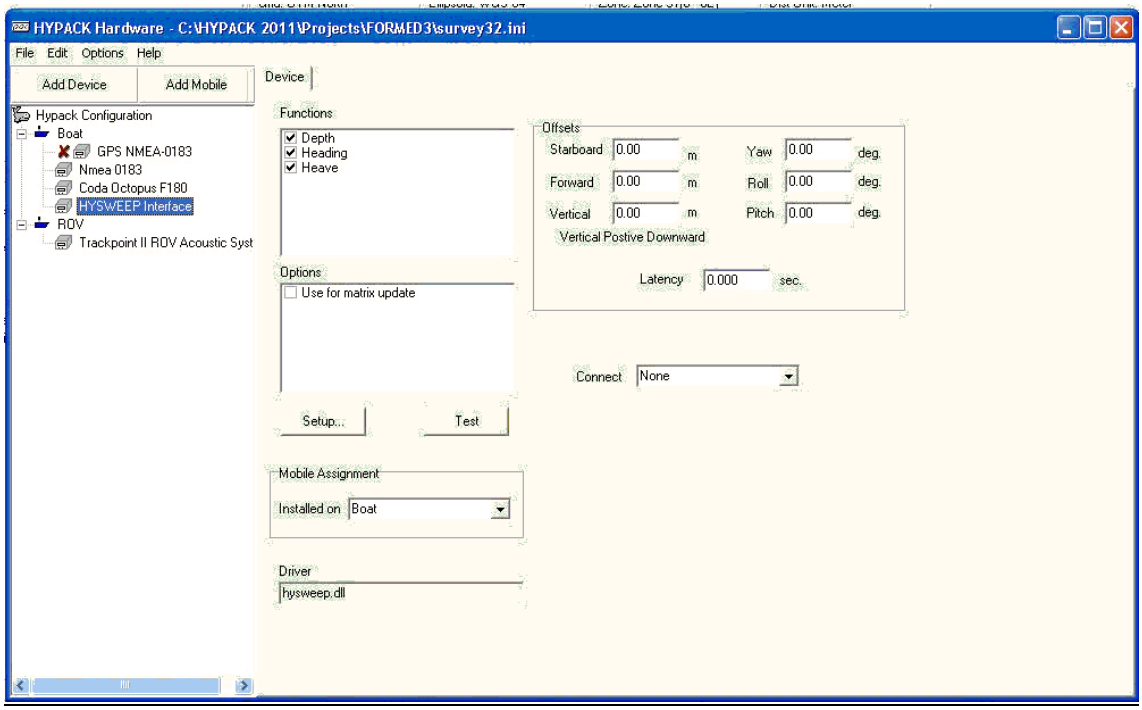
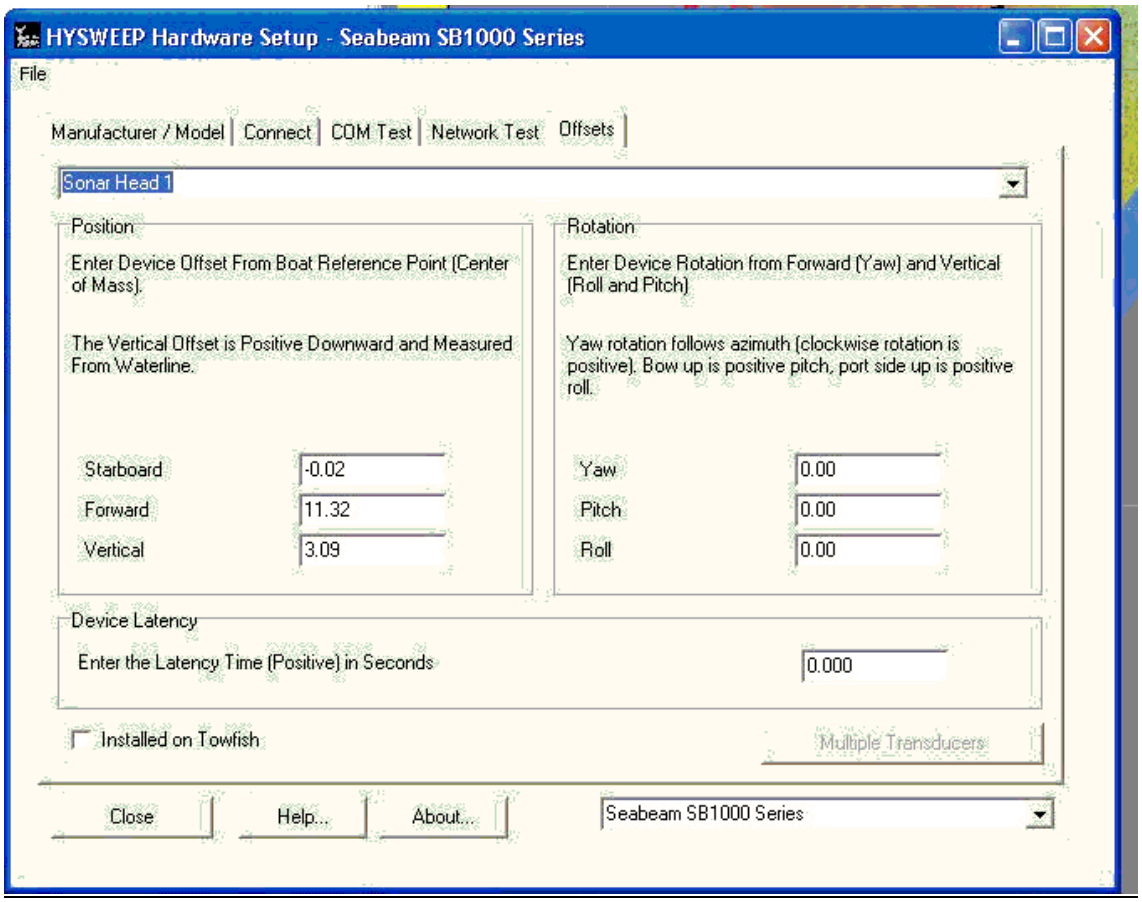
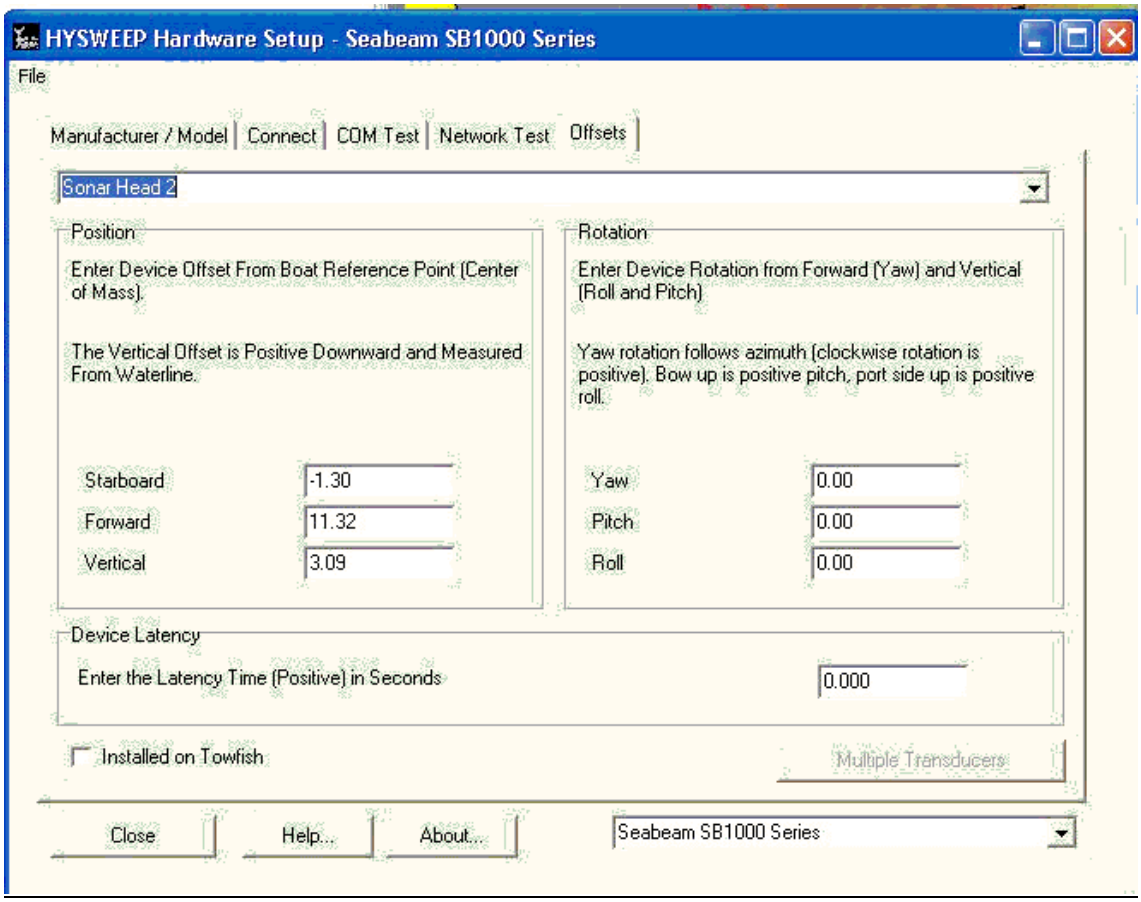
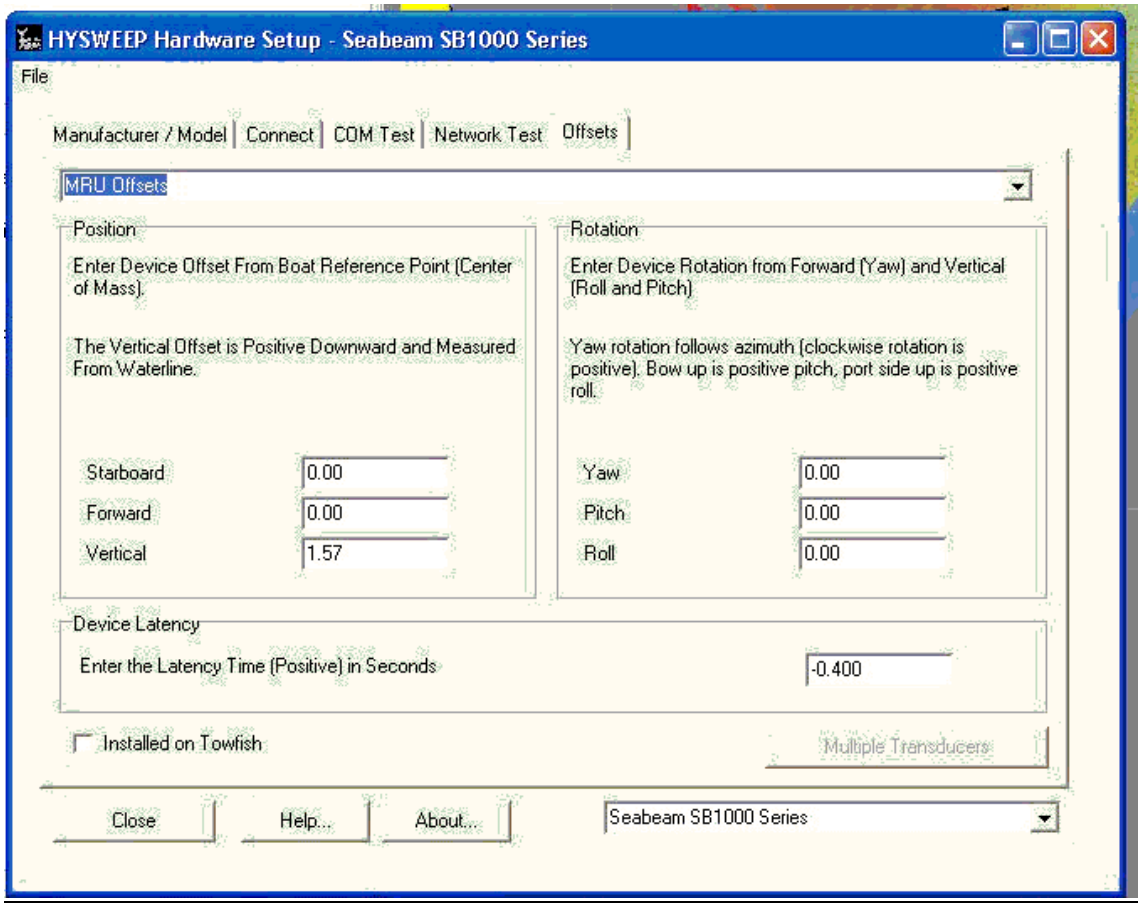
HYSWEEP Interface
ROV
Trackpoint II ROV Acoustic Syst
Functions
Position
Heading
Speed
Tide
Heave
Offsets
Starboard 0.00 m
Yaw 0.00 deg.
Forward 0.00 m
Roll 0.00 deg.
Vertical 0.00 m
Pitch 0.00 deg.
Vertical Postive Downward
Latency 0.000 sec.
Options
Record device specific messages
Connect Network Port
Setup...
Test
Network Parameters
Protocol UDP
Role Server
Mobile Assignment
Installed on Boat
Port 3000
Write Port 0
Driver
F180.dll

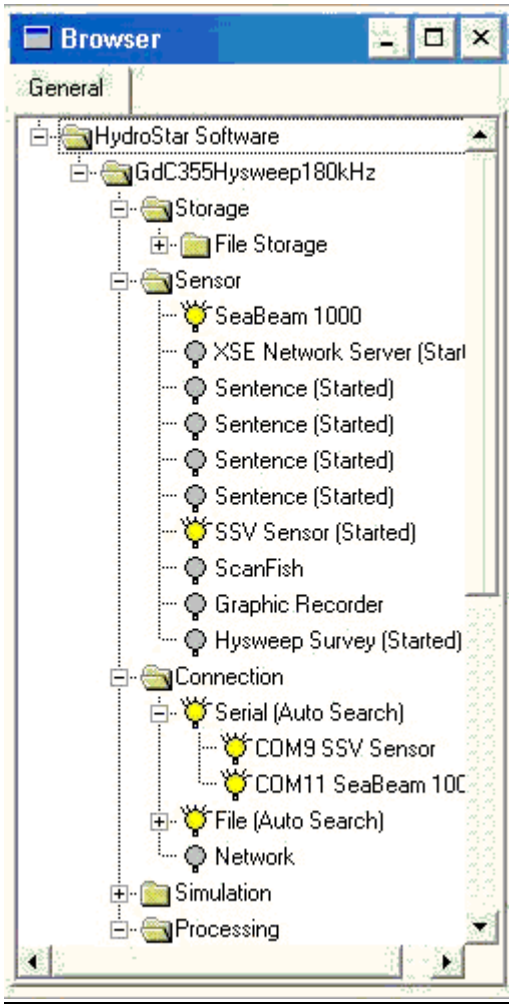

HYPACK Hardware - C:\HYPACK 2011\Projects\FORMED3\survey32.ini
File Edit Options Help
F180 Setup
Synchronization
Use PPS signal for synchronization
PPS Serial Port:
Use F180 time-tags even when not synchronizing (be careful !!)
OK
Cancel
Downsample:
25 Hz
Use online heave
Use long period heave
Solution status for RTK tides
Always calculate tide
Calculate tide in RTK float mode
Offsets
Starboard 0.00 m
Yaw 0.00 deg.
Forward 0.00 m
Roll 0.00 deg.
Vertical 0.00 m
Pitch 0.00 deg.
Vertical Postive Downward
Latency 0.000 sec.
Connect Network Port
Setup...
Test
Network Parameters
Protocol UDP
Role Server
Mobile Assignment
Installed on Boat
Port 3000
Write Port 0
Driver
F180.dll

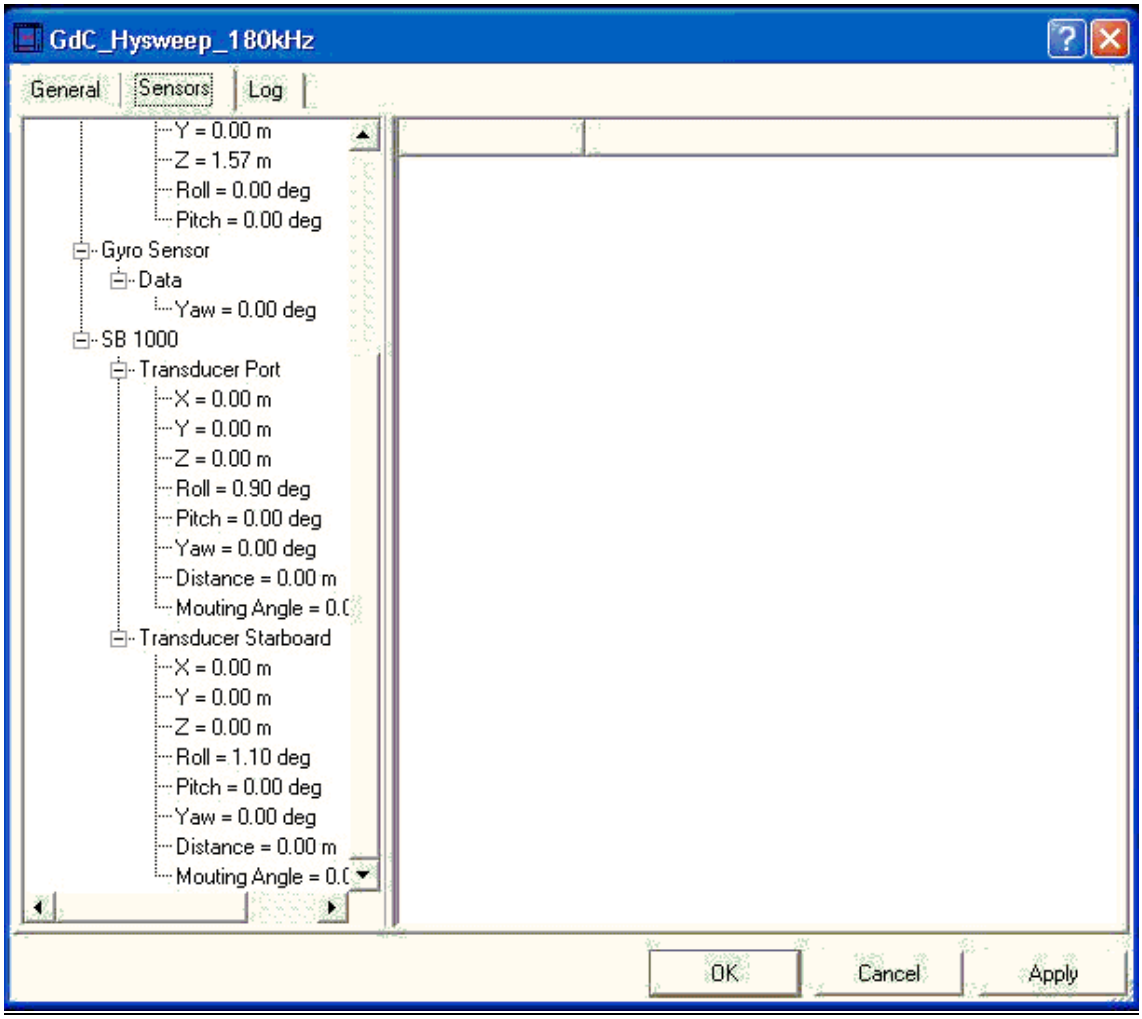

HYPACK Hardware - C:\HYPACK 2011\Projects\FORMED3\survey32.ini
File Edit Options Help
Add Device
Add Mobile
Device
Hypack Configuration
Boat
GPS NMEA-0183
Nmea 0183
Coda Octopus F180
HYSWEEP Interface
ROV
Trackpoint II ROV Acoustic Syst
Functions
Depth
Heading
Heave
Offsets
Starboard 0.00 m
Forward 0.00 m
Vertical 0.00 m
Yaw 0.00 deg.
Roll 0.00 deg.
Pitch 0.00 deg.
Vertical Postive Downward
Latency 0.000 sec.
Options
Use for matrix update
Connect None
Setup...
Test
Mobile Assignment
Installed on Boat
Driver
hysweep.dll


HYSWEEP Hardware Setup - Seabeam SB1000 Series
File
Manufacturer / Model
Connect
COM Test
Network Test
Offsets
Sonar Head 1
Position
Enter Device Offset From Boat Reference Point (Center of Mass).
The Vertical Offset is Positive Downward and Measured From Waterline.
Starboard -0.02
Forward 11.32
Vertical 3.09
Rotation
Enter Device Rotation from Forward (Yaw) and Vertical (Roll and Pitch)
Yaw rotation follows azimuth (clockwise rotation is positive). Bow up is positive pitch, port side up is positive roll.
Yaw 0.00
Pitch 0.00
Roll 0.00
Device Latency
Enter the Latency Time (Positive) in Seconds 0.000
Installed on Towfish
Multiple Transducers
Close
Help...
About...
Seabeam SB1000 Series

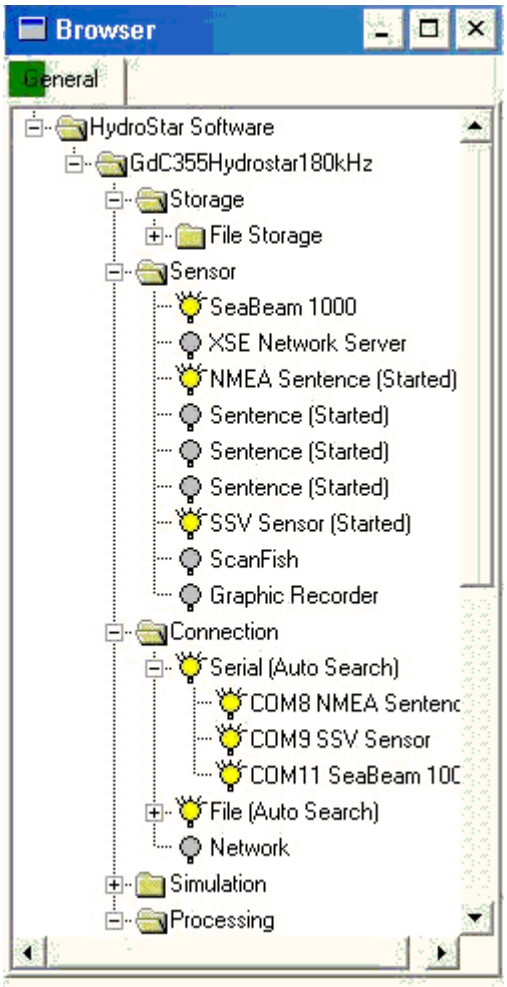

HYSWEEP Hardware Setup - Seabeam SB1000 Series
File
Manufacturer / Model
Connect
COM Test
Network Test
Offsets
Sonar Head 2
Position
Enter Device Offset From Boat Reference Point (Center of Mass).
The Vertical Offset is Positive Downward and Measured From Waterline.
Starboard
-1.30
Forward
11.32
Vertical
3.09
Rotation
Enter Device Rotation from Forward (Yaw) and Vertical (Roll and Pitch)
Yaw rotation follows azimuth (clockwise rotation is positive). Bow up is positive pitch, port side up is positive roll.
Yaw
0.00
Pitch
0.00
Roll
0.00
Device Latency
Enter the Latency Time (Positive) in Seconds
0.000
Installed on Towfish
Multiple Transducers
Close
Help...
About...
Seabeam SB1000 Series

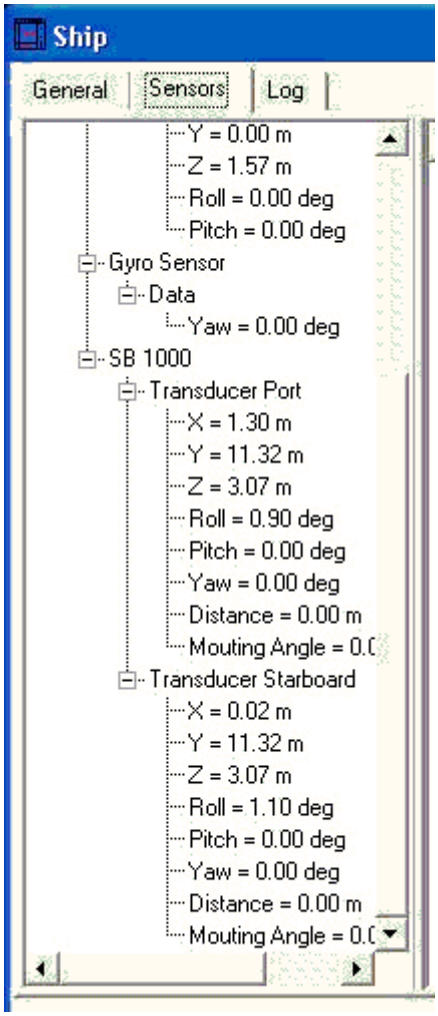

HYSWEEP Hardware Setup - Seabeam SB1000 Series
File
Manufacturer / Model
Connect
COM Test
Network Test
Offsets
MRU Offsets
Position
Enter Device Offset From Boat Reference Point (Center of Mass).
The Vertical Offset is Positive Downward and Measured From Waterline.
Starboard
0.00
Forward
0.00
Vertical
1.57
Rotation
Enter Device Rotation from Forward (Yaw) and Vertical (Roll and Pitch)
Yaw rotation follows azimuth (clockwise rotation is positive). Bow up is positive pitch, port side up is positive roll.
Yaw
0.00
Pitch
0.00
Roll
0.00
Device Latency
Enter the Latency Time (Positive) in Seconds
-0.400
Installed on Towfish
Multiple Transducers
Close
Help...
About...
Seabeam SB1000 Series


Browser
General
HydroStar Software
GdC355Hysweep180kHz
Storage
File Storage
Sensor
SeaBeam 1000
XSE Network Server (Star
Sentence (Started)
Sentence (Started)
Sentence (Started)
Sentence (Started)
SSV Sensor (Started)
ScanFish
Graphic Recorder
Hysweep Survey (Started)
Connection
Serial (Auto Search)
COM9 SSV Sensor
COM11 SeaBeam 10
File (Auto Search)
Network
Simulation
Processing

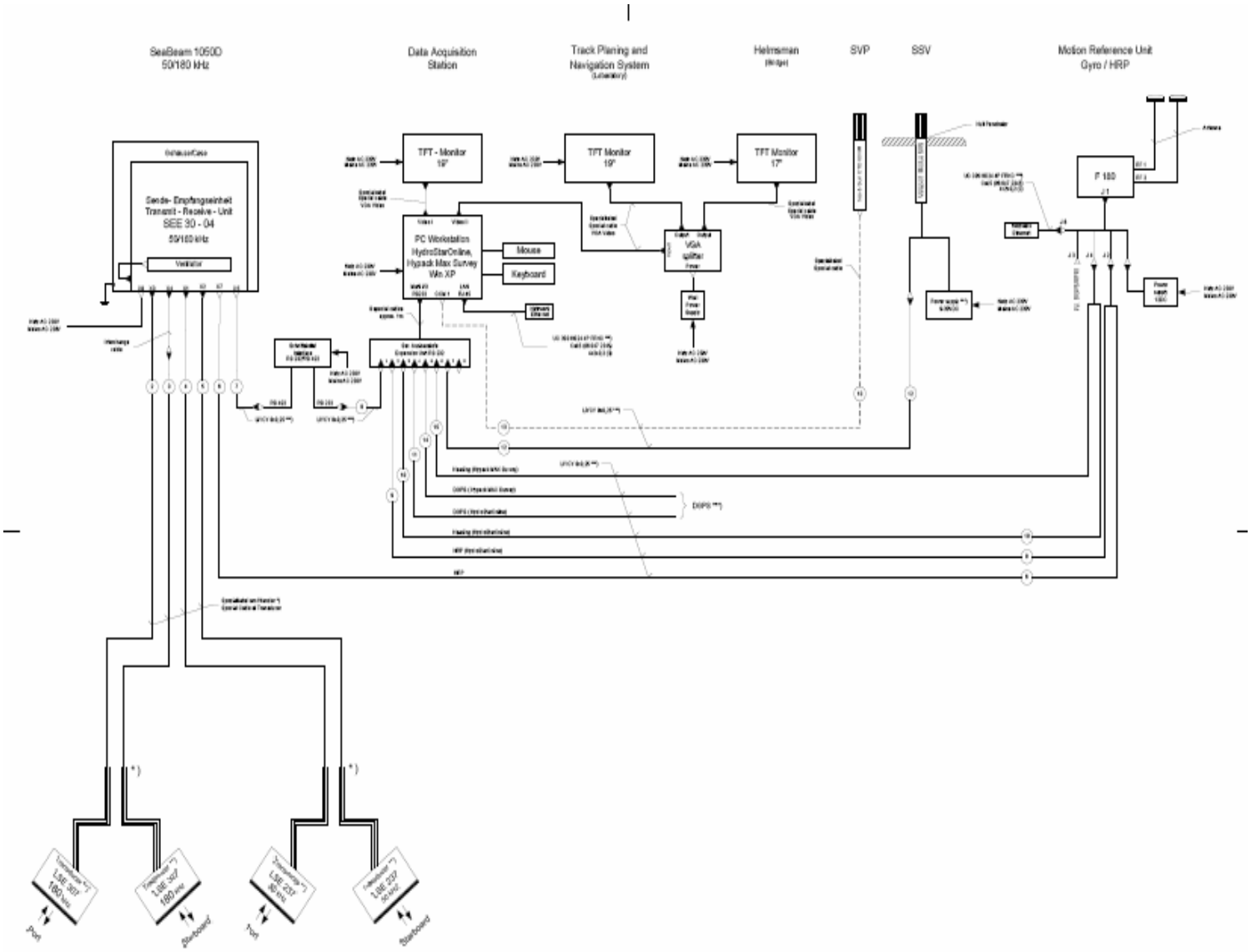

GdC_Hysweep_180kHz
General
Sensors
Log
Y = 0.00 m
Z = 1.57 m
Roll = 0.00 deg
Pitch = 0.00 deg
Gyro Sensor
Data
Yaw = 0.00 deg
SB 1000
Transducer Port
X = 0.00 m
Y = 0.00 m
Z = 0.00 m
Roll = 0.90 deg
Pitch = 0.00 deg
Yaw = 0.00 deg
Distance = 0.00 m
Transducer Starboard
X = 0.00 m
Y = 0.00 m
Z = 0.00 m
Roll = 1.10 deg
Pitch = 0.00 deg
Yaw = 0.00 deg
Distance = 0.00 m
OK
Cancel
Apply

Hydrostar 3.5.5:




Ship
General
Sensors
Log
Y = 0.00 m
Z = 1.57 m
Roll = 0.00 deg
Pitch = 0.00 deg
Gyro Sensor
Data
Yaw = 0.00 deg
SB 1000
Transducer Port
X = 1.30 m
Y = 11.32 m
Z = 3.07 m
Roll = 0.90 deg
Pitch = 0.00 deg
Yaw = 0.00 deg
Distance = 0.00 m
Mouting Angle = 0.0
Transducer Starboard
X = 0.02 m
Y = 11.32 m
Z = 3.07 m
Roll = 1.10 deg
Pitch = 0.00 deg
Yaw = 0.00 deg
Distance = 0.00 m
Mouting Angle = 0.0

El esquema de instalación del equipo es el siguiente:

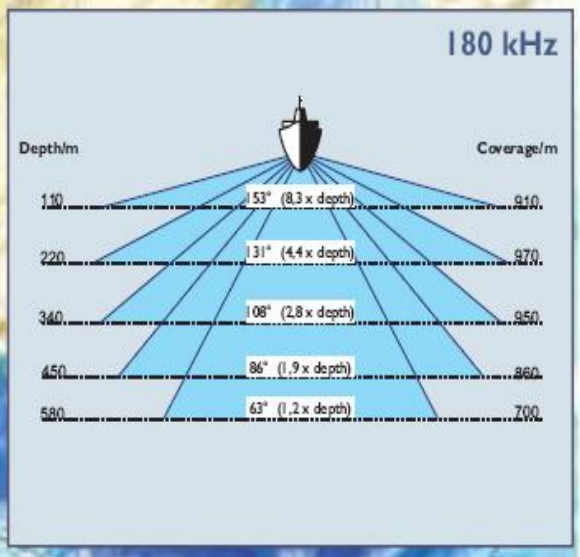


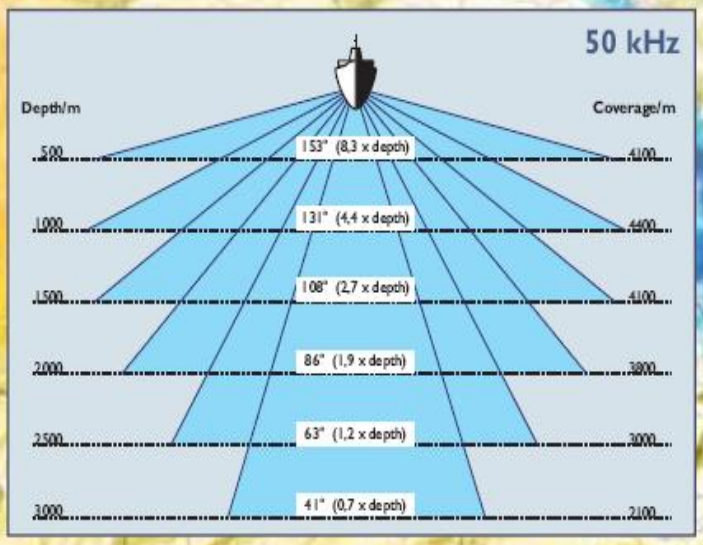
Las especificaciones de la ecosonda ELAC Seabeam 1050D son:

Frequency	50 kHz	180 kHz
Number of Beams	126 (fewer selectable)	126 (fewer selectable)
Beam Width	153°	153°
Power Supply	115 / 230V AC, user selectable	115 / 230V AC, user selectable
Max. Pulse Power	3,5 KW per transducer array	500 W per transducer array
Max. Source Level	234 dB 1 µPa/1 m	220 dB 1µPa/1 m
Pulse Length	0.3, 1, 3, 10 ms; selectable	0.15, 0.3, 1.3 ms; selectable
Bandwidth	12 kHz, 3.3 kHz, 1 kHz; selectable	12 kHz, 3 Hz, 1 kHz selectable
Sidelobe Suppression	36 dB (transmission and reception)	36 dB (transmission and reception)
Survey Speed	up to 16 kn for continuous seafloor coverage	up to 16 kn for continuous seafloor coverage

Sonar Processor Unit (SEE 30)	Dimensions:	480 x 540 x 360 mm
	Weight:	approx. 33 kg
Transducer (LSE 237)	Dimensions:	530 x 290 mm each
	Weight w/ cable:	60 kg
Transducer (LSE 307)	Dimensions:	390 x 280 mm each
	Weight w/o cable:	17 kg

Motion	DMS-2, Octans, POS M/V, MRU 5
Heading	NMEA 0183 standard, sentence HDT
Position	NMEA 0183 standard, sentence GGA or VTG
Sound Velocity	Data input via RS 232
Software	ELAC HDP 4061, CARIS, COASTAL OCEANOGRAPHCS, EIVA, QPS, ROXAR





SONDA BIOLÓGICA EK500

Metodología

La sonda biológica EK500 ha estado en marcha durante toda la campaña como sonda hidrográfica, funcionando a una frecuencia de 38 kHz, para contrastar el valor de profundidad de la sonda multihaz y durante las maniobras de CTD.

Configuración utilizada durante la campaña:

Ping Interval: 0.0 segundos
Transmit Power: Rreduced
Noise Margin: 3 dB
Profundidad del transductor: 4.20 m
Pulse Length: Medium
Frecuencia: 38 kHz
Potencia máxima: 4250 W

DESCRIPCIÓN DE EQUIPOS

SONDA MULTIHAZ ELAC SEABEAM 1050D

Descripción

La sonda multihaz ELAC SEABEAM 1050D es una ecosonda utilizada principalmente para realizar batimetrías (cartografías del fondo marino). Esta ecosonda consta de dos transductores (de 50 y 180 kHz) situados en el casco del barco, además de una unidad de referencia Octopus F-180, que actúa como sensor de movimiento. La profundidad máxima a 50 kHz son 3000 metros, mientras que a 180 kHz dicha profundidad máxima son 600 metros, cumpliendo las normativas IHO S44 para levantamientos batimétricos. Esta sonda consta de 126 beams individuales, con una amplitud máxima de 153º. Con esta amplitud máxima la cobertura es de más de ocho veces la profundidad. Además cuenta con un side scan integrado y con compensación del movimiento en tiempo real. Además de los transductores, esta ecosonda dispone de los siguientes elementos:

- Electrónica, situada en el Rack del laboratorio.
- PC de control y adquisición con el siguiente software:

  Hypack, con módulo Hysweep. (las versiones utilizadas en esta campaña han sido la 2011 y la 2013)

  Hydrostar (las versiones utilizadas en esta campaña han sido la 3.5.5 y la 4.0.0)

- SAI, situado en el Rack de la entrada del laboratorio, a babor.
- Sensor de velocidad del sonido en superficie Mod: Modus SVS de Valeport S/N: 25776. Este está situado en el pañol de proa, en el castillo del barco. Se introduce en el agua antes de cada trabajo.

SONDA BIOLÓGICA EK500

Descripción

Se trata de una ecosonda científica de haz partido, lo cual permite determinar la distribución de tamaños de los blancos presentes en un volumen concreto. Dicha ecosonda cuenta con tres transductores (de 38, 120 y 200 kHz respectivamente), que se encuentran situados en la quilla del barco. Cabe destacar que, a diferencia de los otros dos transductores, el de 200 kHz no es un transductor de haz partido, sino de haz sencillo. Las características técnicas de estos transductores son las siguientes:

38 kHz:

Rango: 3000 m
Precisión: 10 cm

120 kHz:

Rango: 900 m
Precisión: 3 cm

200 kHz:

Rango: 600 m
Precisión: 2 cm

Cuenta además con tres transceptores (GPT) y una estación hidrográfica operadora o HOS (situada en el laboratorio seco).