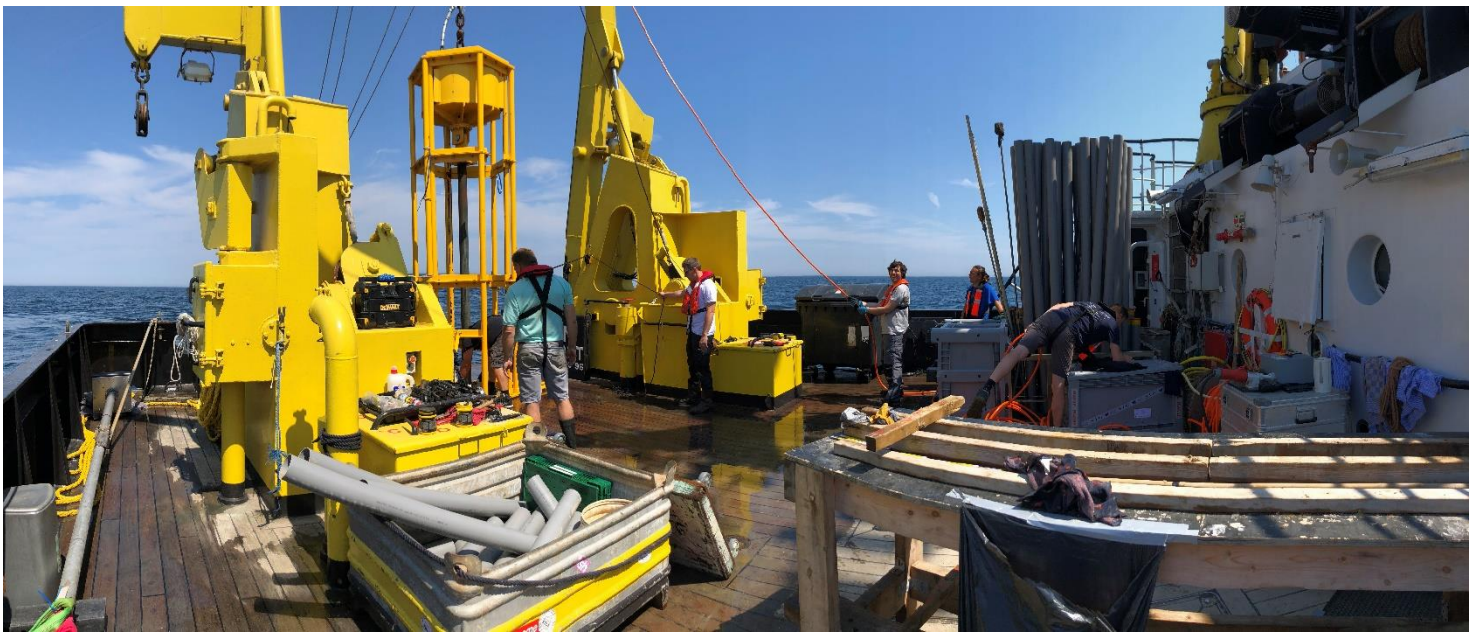
RV Simon Stevin – Cruise report

Vlaams Instituut Voor De Zee

RV SIMON STEVIN 2023/490 – CRUISE REPORT



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Geological/geophysical survey: 08/06/2023 - 15/06/2023

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1. CRUISE DETAILS

1.	Cruise number	23-490
2.	Date/time	Departure: Oostende 09/06/2023 20:00 UTC Return: Oostende: 15/06/2023 12.39 UTC
3.	Chief Scientists Participating institutes	Dr. Ruth Plets VLIZ, UGent
4.	Area of interest	southern North Sea

2. LIST OF PARTICIPANTS

INSTITUTE	NAME	09/06 – 15/06/2023
VLIZ	Ruth PLETS*	X
VLIZ	Thomas MESTDAGH	X
VLIZ	Victor CARTELLE	X
VLIZ	Felipe BARRADAS	X
VLIZ	Jan VERMAUT	X
VLIZ	Wouter BLOMME	X
UGent	Morgan VERVOORT	X
Total number of participants:		7

(*) Chief Scientist

3. SCIENTIFIC OBJECTIVES

The ultimate goal of the Deep History project is to reconstruct the late Quaternary submerged buried palaeolandscape in the southern North Sea (palaeo-fluvial systems, proglacial lake, Holocene inundation) and its link to possible prehistoric human occupation. In 2018 and 2019, three seismic surveys (two onboard RV Belgica and one onboard RV Simon Stevin) were carried out in the larger Brown Bank area, which resulted in a unique dataset of unprecedented quality. Targeted sampling in May 2019 resulted in the discovery of prehistoric landsurfaces, amongst which a peat surface, as well as several pieces wood and flint. In September 2019, a successful vibrocore survey was completed onboard the RV Simon Stevin targeting specific locations. As a consequence of Covid-19 measures, all planned surveys in 2020 were cancelled. In 2021, the Simon Stevin survey was twofold: (1) to reconstruct a (trans-boundary) regional stratigraphy by linking existing datasets located in Dutch and UK waters, through the use of high resolution Sparker and SES Quattro data; (2) extend some of the areas that were already surveyed at a greater resolution (i.e. narrow line spacing). Further seismic surveying and vibrocoring was performed in 2022. These data are collectively used to ground-truth specific seismic features during the 2023 survey (reported in this cruise report). Two areas were specifically surveyed (Sparker) for colleagues from TNO (Hollandse Kust Zuid and BBQ), while one area was surveyed for Bradford University (PES, vibrocoring and Van Veen sampling; VC45 extended)

During the first 36 hours of the planned survey time, the weather was unfavourable throughout the entire Southern North Sea. It was therefore decided to delay the departure time until Friday 9th June 2023, 20:00 UTC.

4. OPERATIONAL COURSE

All times are given in UTC. All coordinates in WGS84.

Wednesday 07/06/2023
Mobilisation

Friday 09/06/2023

Weather: Clear, quite windy (6Bft from NE), wavy
16:00: Scientists join vessel
19:50: Departure and transit to area TNO_HKZ

Saturday 10/06/2023

Weather: clear and dry, 5Bft from E, 1m waves from NNE, occasional white caps, but improving towards the evening

04:14: Deployment PES pole and Sparker in the water
04:14-06:00: problems to start the Sparker acquisition; Hypack did not want to start acquisition; in the end, the problem was with the laptop – the laptop was swapped, and software running normally
06:02: Start PES and Sparker survey @3.5kn in area HKZ
06:02-23:59: TNO-HKZ-04, TNO-HKZ-03, TNO-HKZ-02, TNO-HKZ-01
07:47: no navigation, Hypack stopped, PES stopped; restarted at 07:49
18:44-19:39: Sparker removed from water to cut the tips

Sunday 11/06/2023

Weather: Clear, dry and sunny; wind 3-4Bft from ENE; waves 0.3-0.5m from NE; calm

00:00-07:17: Continue survey TNO-HKZ; lines TNO-HKZ-01, TNO-HKZ-05
07:17: PES and Sparker removed from water
07:30-10:37: transit to VC45_extended area
10:37: arrive at station VC20a and start vibrocoring
10:37-17:20: vibrocoring and Van Veen grabs: VC20->VC28; VV01->VV14. All went to plan.
17:25: PES pole in water
17:35: Start PES survey in area VC45_extended. Start with grid B2N
17:35-23:59: B2N_08, 11, 14, 17, 20, 21, 19, 18, 16, 15, 13, 12, 10, 09

Monday 13/06/2022

Weather: Clear and dry; a little hazy in morning; 4Bft from E; 0.7m waves from NE

00:00-02:41: continue grid B2N: B2N_01, 02, 03, 04, 05, 06, 07
02:41: transit to grid B2S
03:10-07:37: Grid B2S: B2S_08, 11, 14, 17, 05, 03
07:40: PES out of the water
07:47-10:00: transit to HKW
10:00: arrive at station VC34
10:00-16:02: coring VC34, 35, 36, 33, 32, 31, 30, 37, 38,
16:02: end of coring
16:0: transit to TNO_BBQ
17:20: arrive at TNO_BBQ: Sparker and PES in the water
17:50 – 23:59: start survey @3.5kn: TNO_BBQ_06, 01

Tuesday 13/06/2023

Weather: clear and dry, AM: 0.7-0.8m waves from the NE, 4Bft from E; PM: 1m from NE, 5Bft from NE; from 14o'clock some white caps

00:00-14:00: continue TNO_BBQ survey; TNO_BBQ_01, 03, 04, 05, 07, 02, 08
08:14: sparker out of the water to cut tips
08:22: sparker back in the water
14:00: end of survey TNO_BBQ
14:10: sparker and PES out of the water
14:20: start transit to Axial Channel Central
17:30: Arrive at Axial Channel Central; stand-by due to poor weather – waves > 1.2m
22:24: PES + Sparker in the water
22:49-23:59: start survey Axial Channel: AX_Central_03

Wednesday 14/06/2023

Weather: clear, dry, 4Bft from E;
AM: 1m waves from NE; AM: quite some roll/pitch
PM: 0.8m waves, quite some swell but improving during the afternoon

00:00-10:30: continue PES and Sparker survey Axial Channel Central: AX_Central_03, 04, 09, 02, 01, 07, 06, 08
10:35: PES and Sparker removed from water
11:00: Prior to start of vibrocoring, contact was made with UK guardvessel (guarding the cables in the area). The coring sites are located near two (new) communication cables. A few core positions were within 250-300m of the cables, others between 300-500m of the cables. We were given assurance by the guardvessel that it was OK to take the cores and that the 500m buffer area was for fishing activity. The skipper mentioned that we would be on DP, and the guardvessel confirmed that all was OK
11:20: start vibrocoring: VC04->15
Mid-afternoon, the skipper was contacted by the guardvessel again. They reported that they had contacted the owners of the cables and that they had received the message that we needed to stay outside the 500m buffer zone. Although they earlier had given us verbal permission that it was OK to proceed prior to coring, we were subsequently told that permission from the owners was needed. We were asked to provide our details (VLIZ was put forward). As a result, we promptly decided to move all remaining core locations to outside the buffer area; cores VC01-VC03 were not cored. This change was relayed to the guardvessel, who acknowledged our change of plans.
16:37: end vibrocoring
17:39: transit to start of survey line AX_Channel_05
17:40: PES + Sparker in the water
18:10: Start Sparker + PES AX_Channel_05
18:47: End survey AX_Channel. Sparker + PES out of water
18:50: Transit to survey line SB_09
21:48: Sparker + PES in the water
22:02: Start Sparker and PES survey SB_09

Thursday 15/06/2023

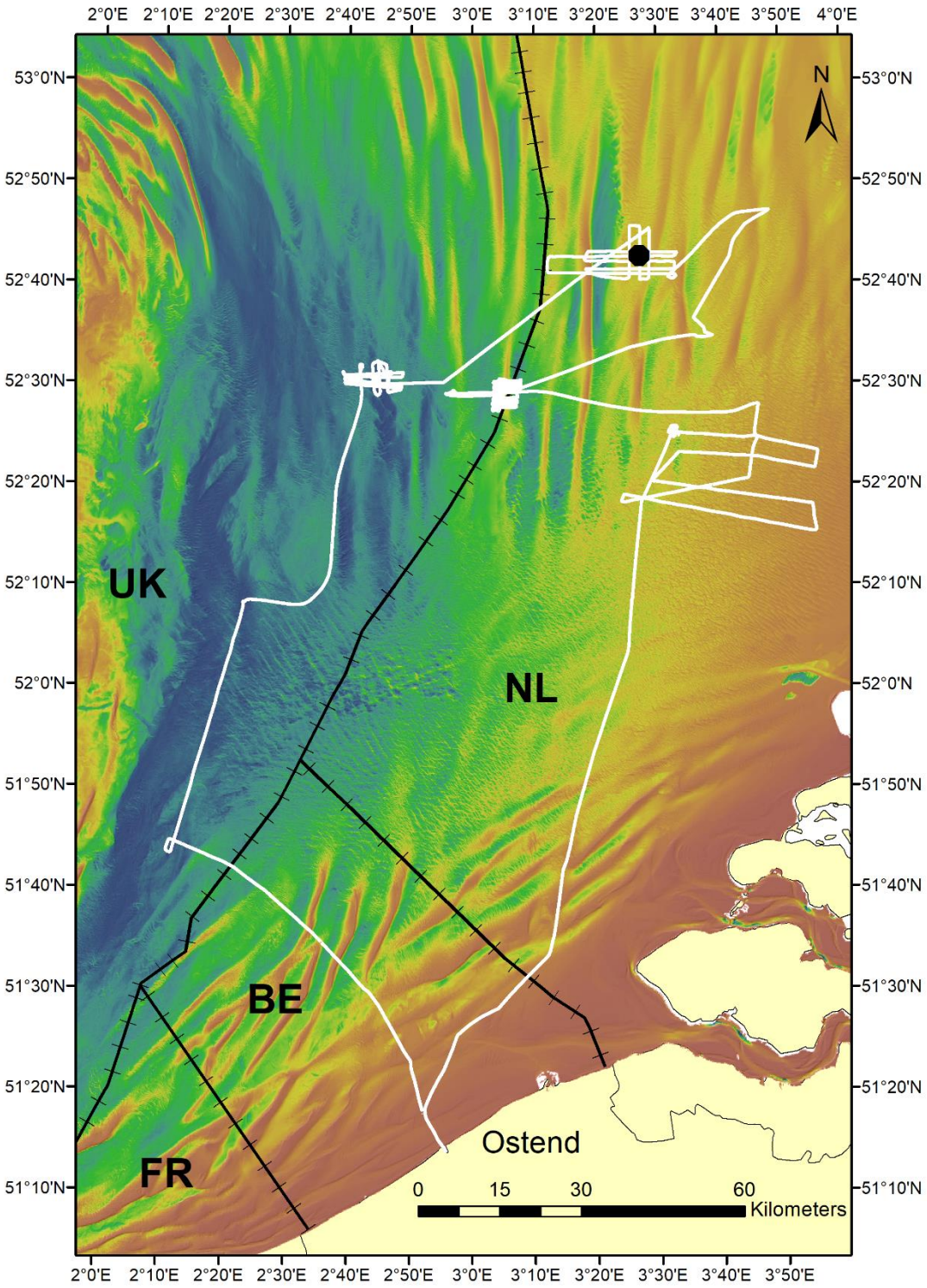
Weather: calm, dry, warm; 3Bft from E, 0.6m from NE

00:00-08:35: Continue survey SB_09 and SB_01
08:35: end of survey; Sparker and PES out of the water
08.45: transit to Ostend
12.39: Arrive at Ostend
12.45-14.15: demobilisation

- End of survey 23-490 -

5. TRACKPLOT

Overview map of surveyed area – full and annotated trackplot (referring to names and areas used throughout the cruise report)



Overview of the entire survey track

6. MEASUREMENTS AND SAMPLING

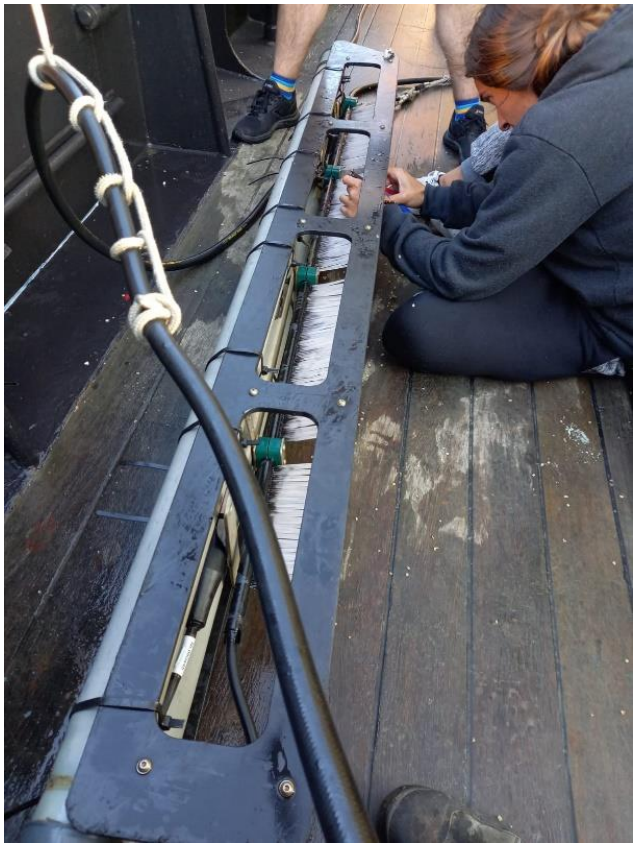
6.1. DATA ACQUISITION

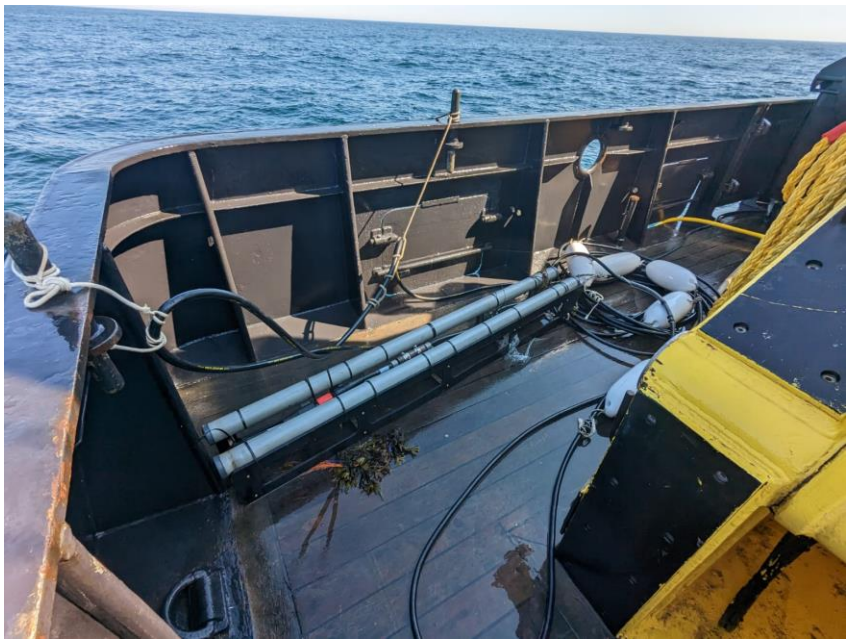
All data were acquired at a speed of 3.5 knots.

Unless stated otherwise, the following settings were used for the acoustic/seismic acquisition:

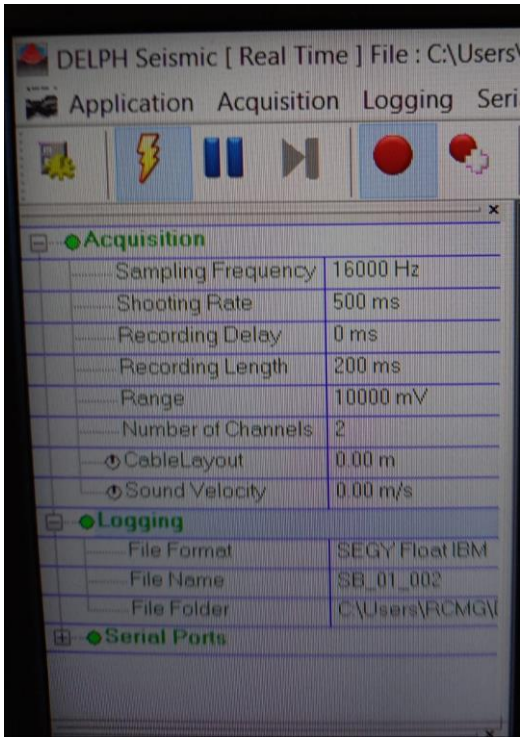
SPARKER – Centipede + dual SIG streamer

Setup



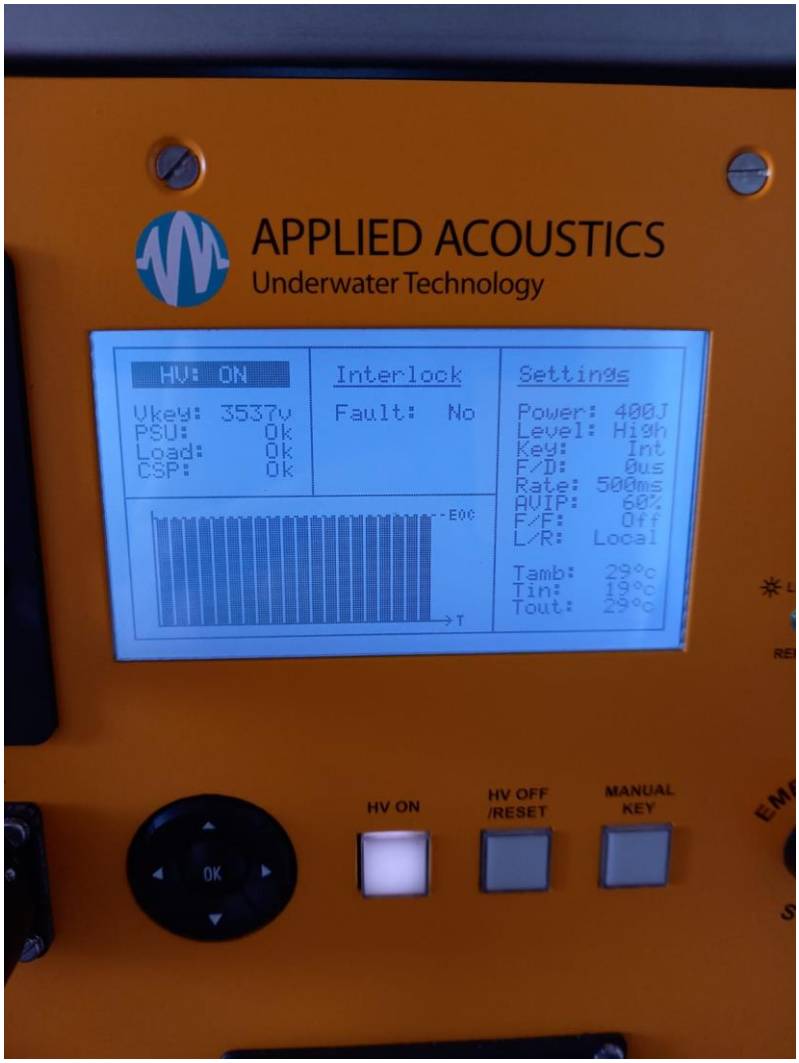


Settings



HKW - settings

Settings all locations except HKW

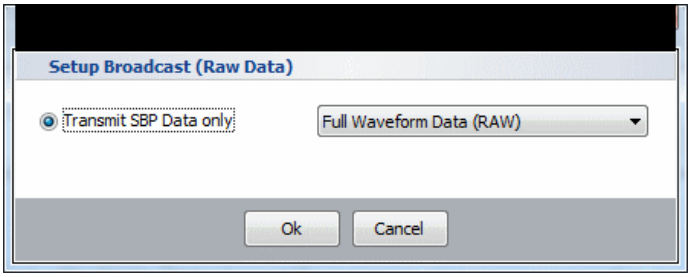


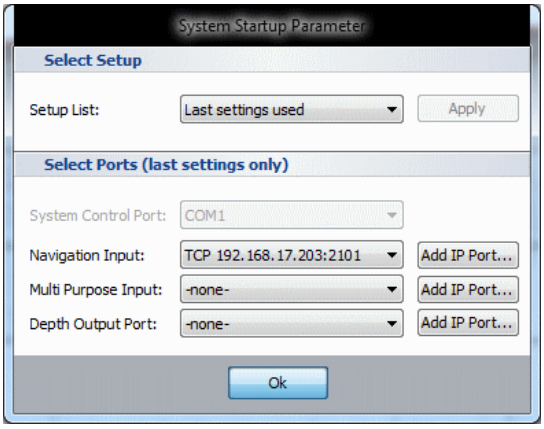
PES – INNOMAR

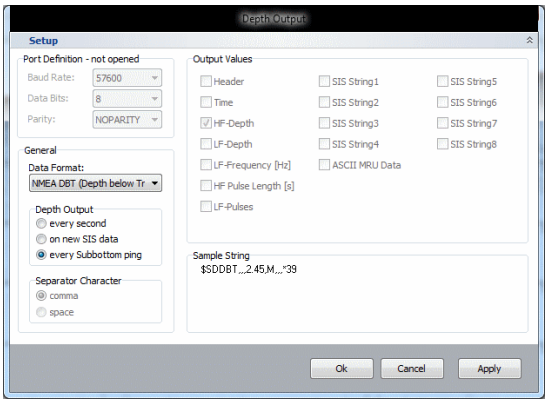
SESQUATTRO

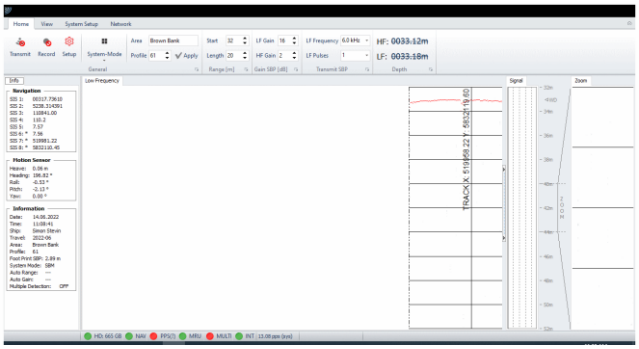
Setup

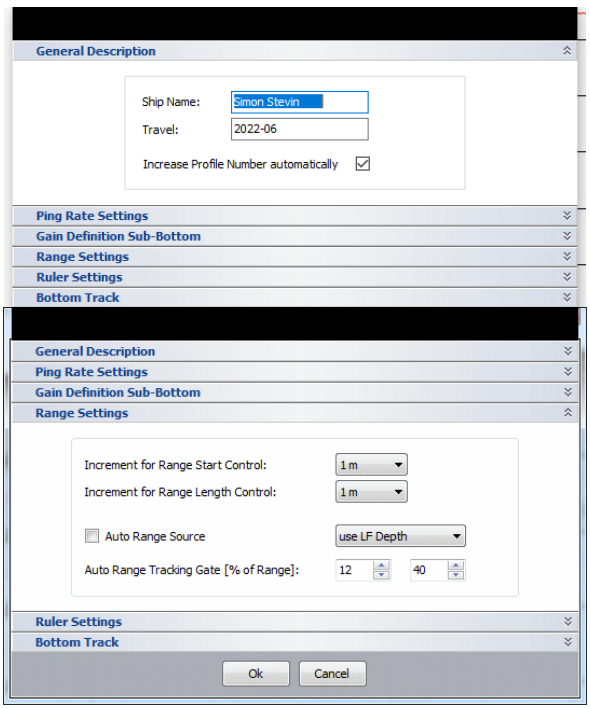
Settings SESQUATTRO

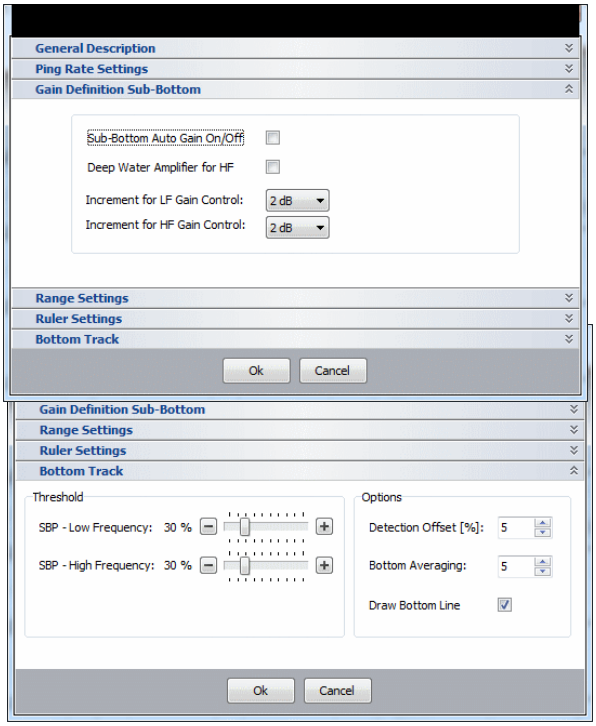


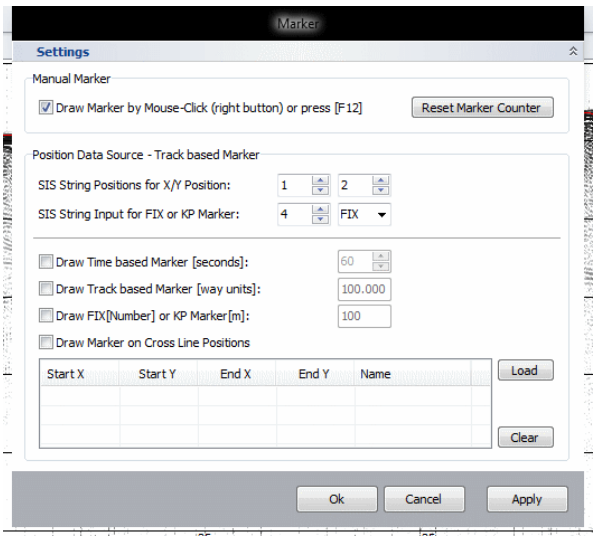


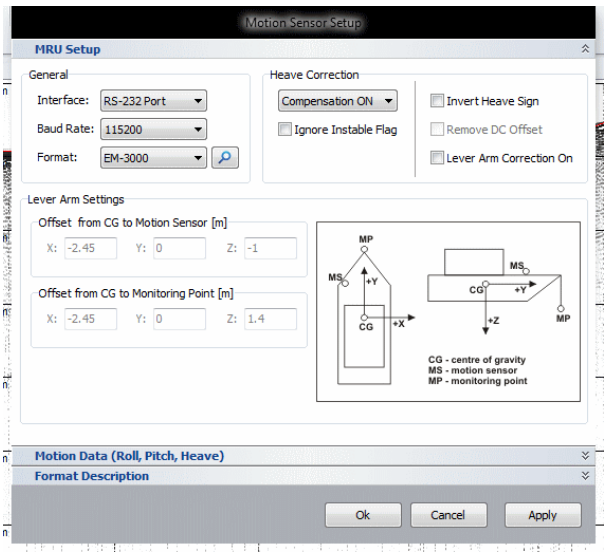


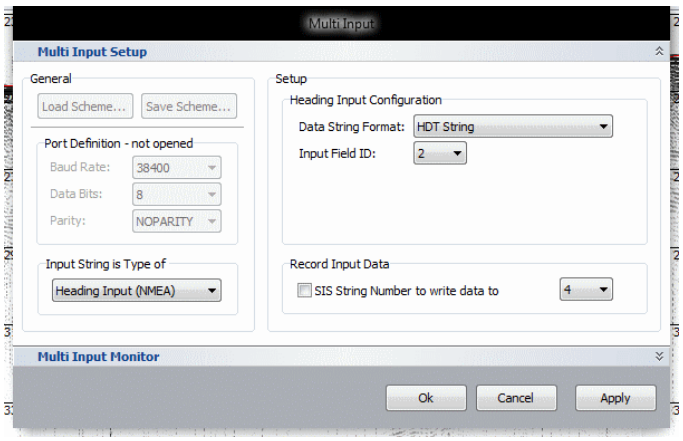


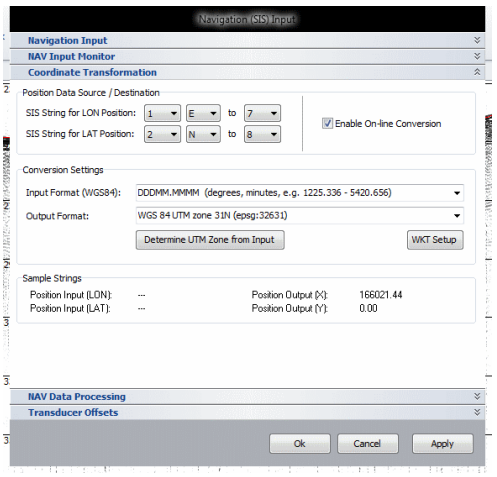


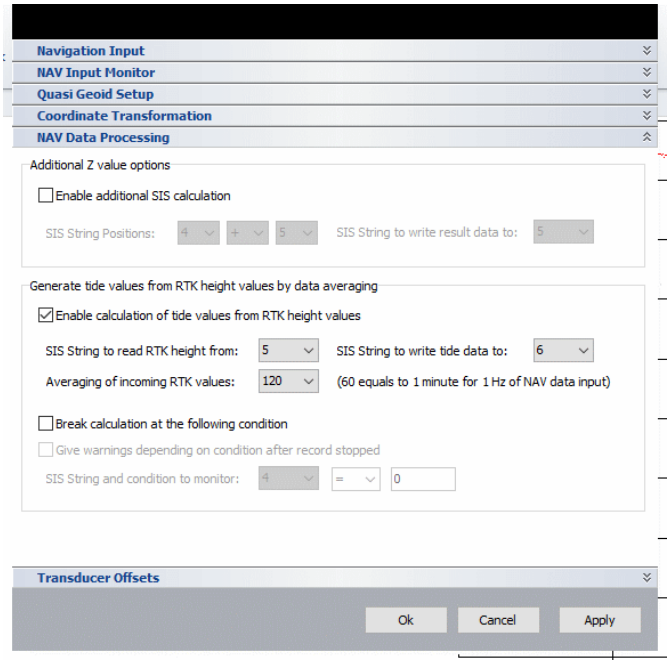


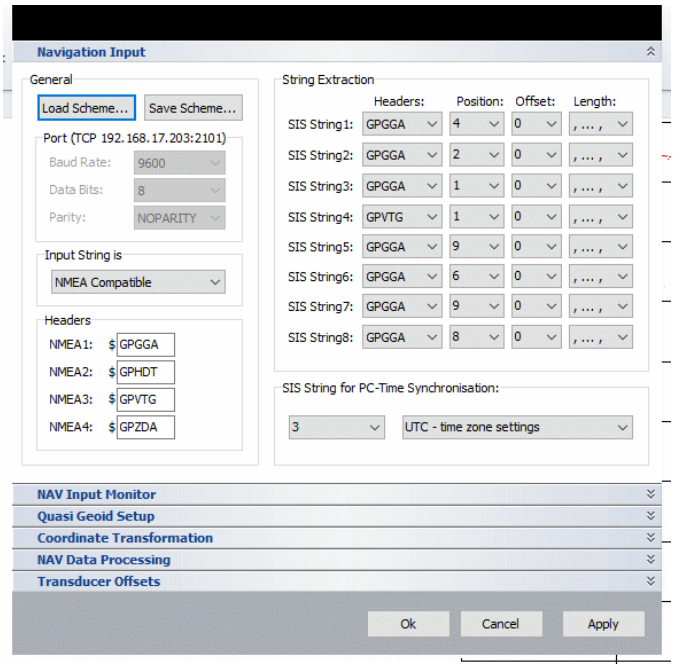

Marker
Settings
Manual Marker
Draw Marker by Mouse-Click (right button) or press [F12]
Reset Marker Counter
Position Data Source - Track based Marker
SIS String Positions for X/Y Position:
SIS String Input for FIX or KP Marker:
Draw Time based Marker [seconds]:
Draw Track based Marker [way units]:
Draw FIX[Number] or KP Marker[m]:
Draw Marker on Cross Line Positions
Start X
Start Y
End X
End Y
Name
Load
Clear
Ok
Cancel
Apply

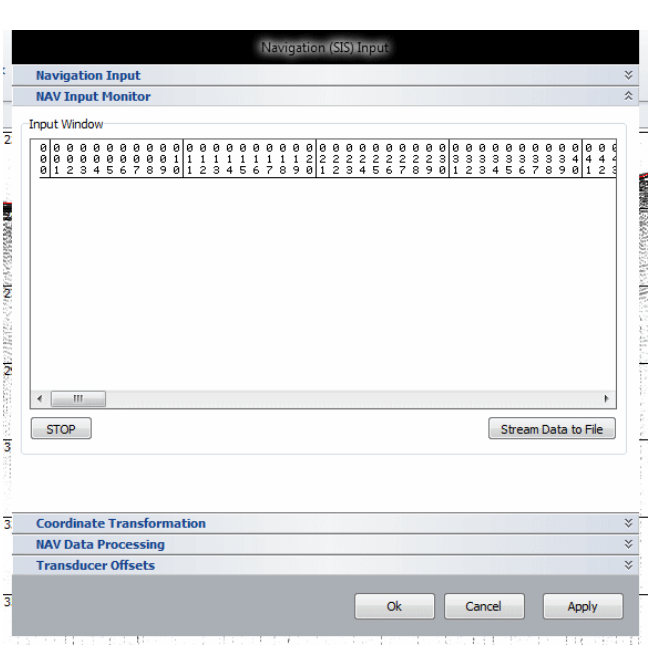

Motion Sensor Setup
MRU Setup
General
Interface:
RS-232 Port
Baud Rate:
115200
Format:
EM-3000
Heave Correction
Compensation ON
Ignore Instable Flag
Invert Heave Sign
Remove DC Offset
Lever Arm Correction On
Lever Arm Settings
Offset from CG to Motion Sensor [m]
Offset from CG to Monitoring Point [m]
CG - centre of gravity
MS - motion sensor
MP - monitoring point
Motion Data (Roll, Pitch, Heave)
Format Description
Ok
Cancel
Apply

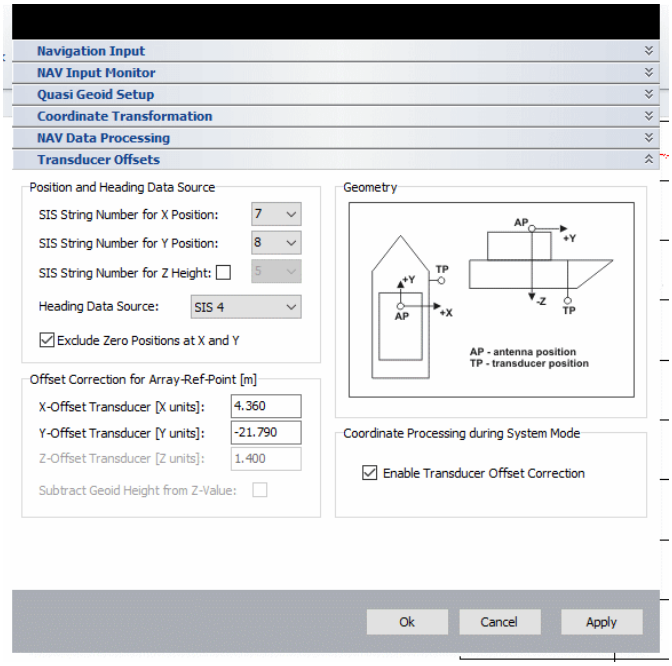

Multi Input
Multi Input Setup
General
Load Scheme...
Save Scheme...
Port Definition - not opened
Baud Rate:
38400
Data Bits:
8
Parity:
NOPARITY
Input String is Type of
Heading Input (NMEA)
Setup
Heading Input Configuration
Data String Format:
HDT String
Input Field ID:
Record Input Data
SIS String Number to write data to
Multi Input Monitor
Ok
Cancel
Apply

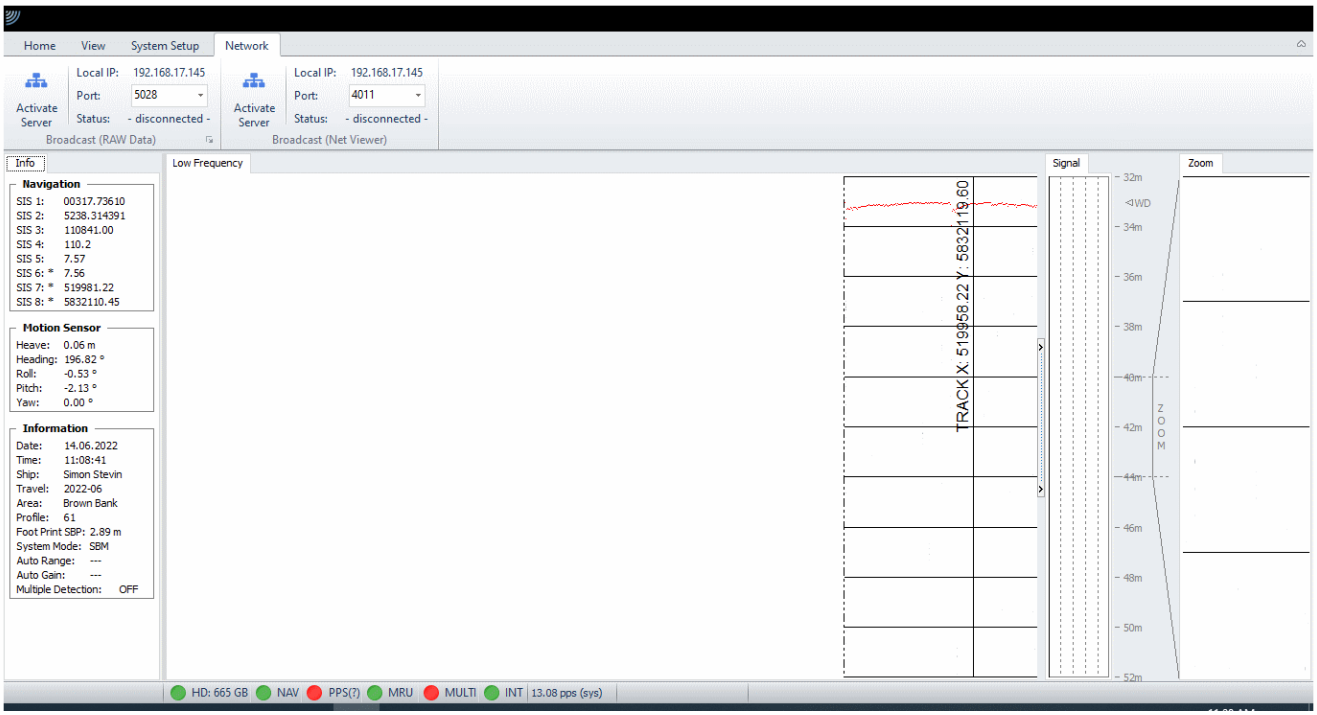

Navigation (SIS) Input
Navigation Input
NAV Input Monitor
Coordinate Transformation
Position Data Source / Destination
SIS String for LON Position:
SIS String for LAT Position:
Enable On-line Conversion
Conversion Settings
Input Format (WGS84):
DDDMM.MMMM (degrees, minutes, e.g. 1225.336 - 5420.656)
Output Format:
WGS 84 UTM zone 31N (epsg:32631)
Determine UTM Zone from Input
WKT Setup
Sample Strings
Position Input (LON):
Position Input (LAT):
Position Output (X):
166021.44
Position Output (Y):
0.00
NAV Data Processing
Transducer Offsets
Ok
Cancel
Apply

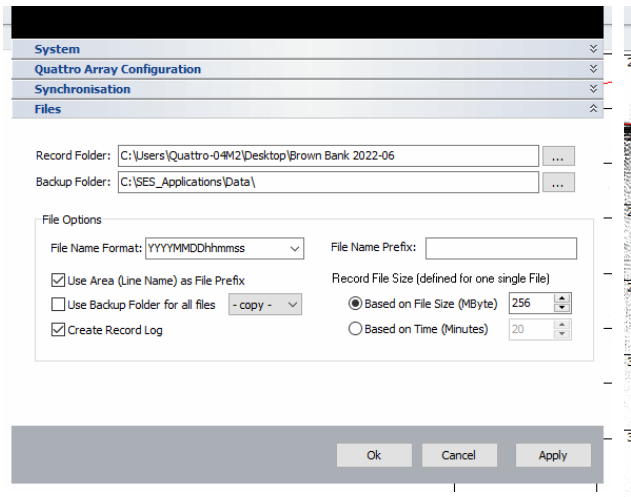

Navigation Input
NAV Input Monitor
Quasi Geoid Setup
Coordinate Transformation
NAV Data Processing
Additional Z value options
Enable additional SIS calculation
SIS String Positions:
SIS String to write result data to:
Generate tide values from RTK height values by data averaging
Enable calculation of tide values from RTK height values
SIS String to read RTK height from:
SIS String to write tide data to:
Averaging of incoming RTK values:
(60 equals to 1 minute for 1 Hz of NAV data input)
Break calculation at the following condition
Give warnings depending on condition after record stopped
SIS String and condition to monitor:
Transducer Offsets
Ok
Cancel
Apply

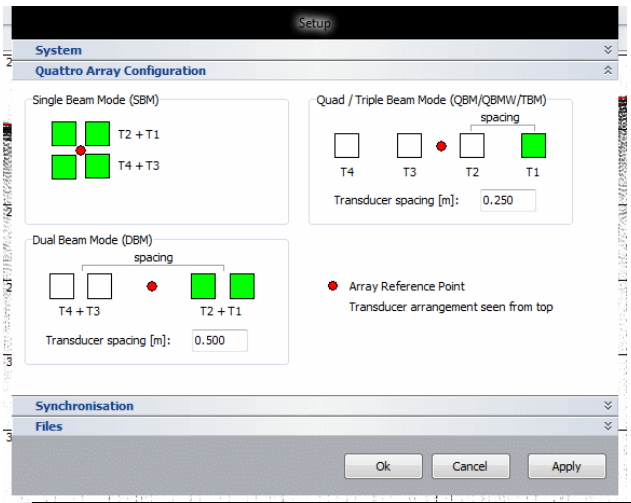

Navigation Input
General
Load Scheme...
Save Scheme...
Port (TCP 192.168.17.203:2101)
Baud Rate:
9600
Data Bits:
8
Parity:
NOPARITY
Input String is
NMEA Compatible
Headers
NMEA1: $GPGGA
NMEA2: $GPHDT
NMEA3: $GPVTG
NMEA4: $GPZDA
String Extraction
Headers:
Position:
Offset:
Length:
SIS String1: GPGGA 4 0
SIS String2: GPGGA 2 0
SIS String3: GPGGA 1 0
SIS String4: GPVTG 1 0
SIS String5: GPGGA 9 0
SIS String6: GPGGA 6 0
SIS String7: GPGGA 9 0
SIS String8: GPGGA 8 0
SIS String for PC-Time Synchronisation:
UTC - time zone settings
NAV Input Monitor
Quasi Geoid Setup
Coordinate Transformation
NAV Data Processing
Transducer Offsets
Ok
Cancel
Apply

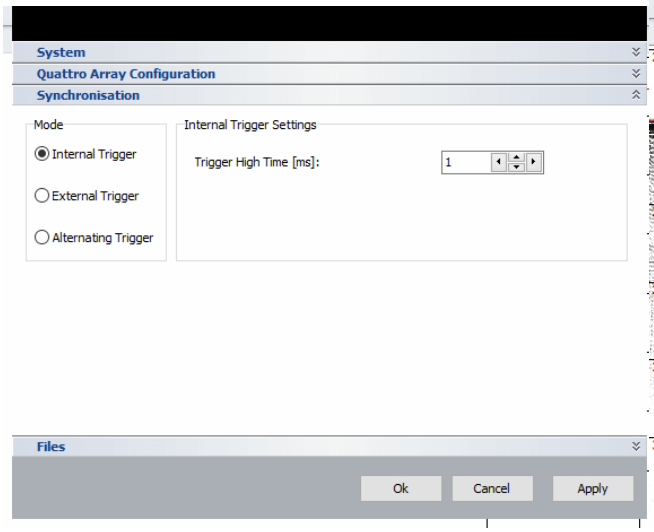

Navigation (SIS) Input
Navigation Input
NAV Input Monitor
Input Window
STOP
Stream Data to File
Coordinate Transformation
NAV Data Processing
Transducer Offsets
Ok
Cancel
Apply

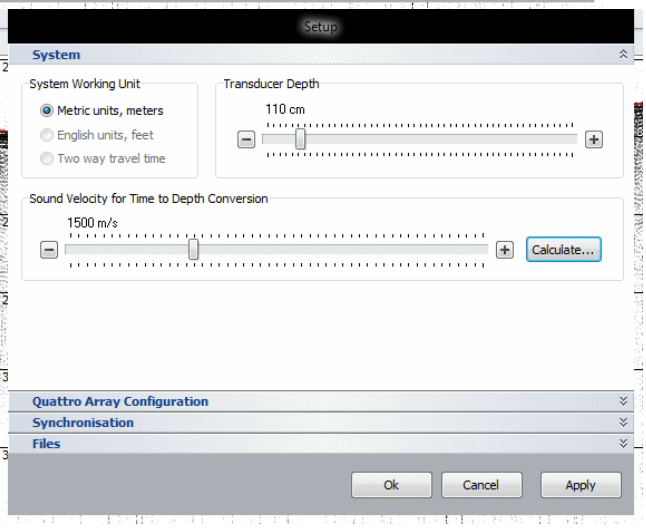

Navigation Input
NAV Input Monitor
Quasi Geoid Setup
Coordinate Transformation
NAV Data Processing
Transducer Offsets
Position and Heading Data Source
SIS String Number for X Position: 7
SIS String Number for Y Position: 8
SIS String Number for Z Height: 5
Heading Data Source: SIS 4
Exclude Zero Positions at X and Y
Offset Correction for Array-Ref-Point [m]
X-Offset Transducer [X units]: 4.360
Y-Offset Transducer [Y units]: -21.790
Z-Offset Transducer [Z units]: 1.400
Subtract Geoid Height from Z-Value:
Geometry
AP
TP
+Y
+X
-Z
AP - antenna position
TP - transducer position
Coordinate Processing during System Mode
Enable Transducer Offset Correction
Ok
Cancel
Apply

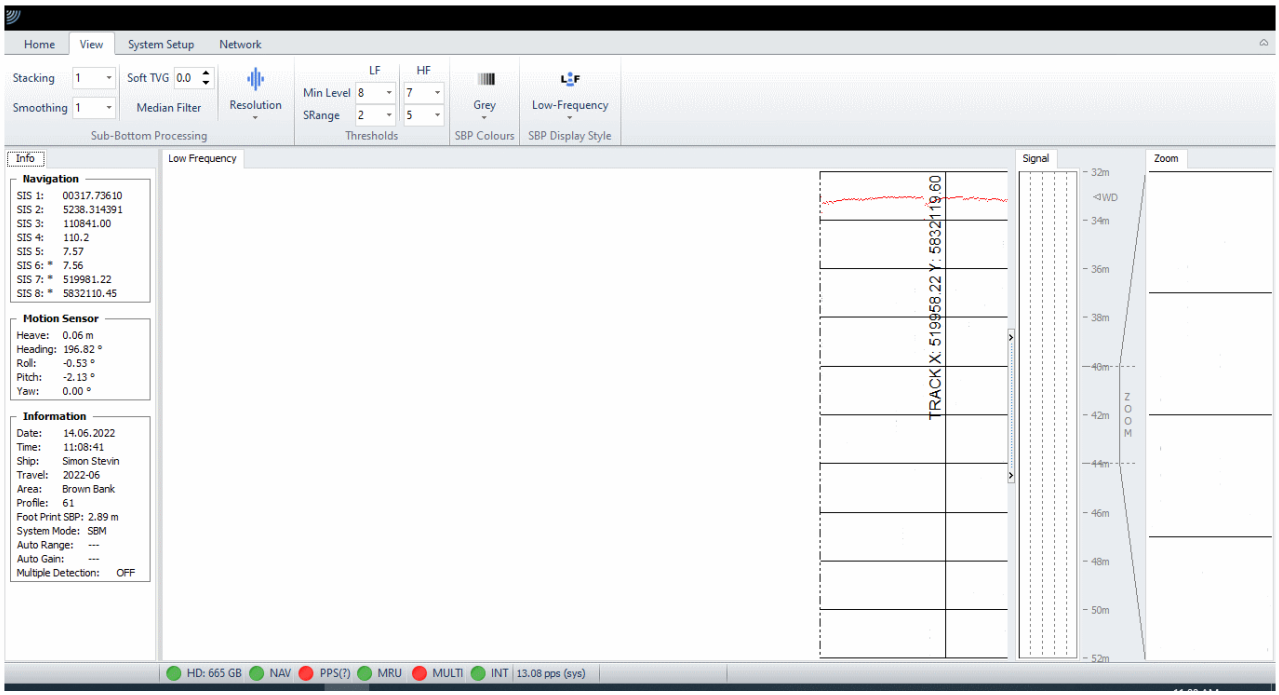

Home
View
System Setup
Network
Activate Server
Local IP: 192.168.17.145
Port: 5028
Status: - disconnected -
Broadcast (RAW Data)
Activate Server
Local IP: 192.168.17.145
Port: 4011
Status: - disconnected -
Broadcast (Net Viewer)
Info
Navigation
SIS 1: 00317.73610
SIS 2: 5238.314391
SIS 3: 110841.00
SIS 4: 110.2
SIS 5: 7.57
SIS 6: * 7.56
SIS 7: * 519981.22
SIS 8: * 5832110.45
Motion Sensor
Heave: 0.06 m
Heading: 196.82 °
Roll: -0.53 °
Pitch: -2.13 °
Yaw: 0.00 °
Information
Date: 14.06.2022
Time: 11:08:41
Ship: Simon Stevin
Travel: 2022-06
Area: Brown Bank
Profile: 61
Foot Print SBP: 2.89 m
System Mode: SBM
Auto Range: ---
Auto Gain: ---
Multiple Detection: OFF
Low Frequency
TRACK X: 519958.22 Y: 5832119.60
Signal
Zoom
32m
34m
36m
38m
40m
42m
44m
46m
48m
50m
52m
HD: 665 GB
NAV
PPS(?)
MRU
MULTI
INT
13.08 pps (sys)


System
Quattro Array Configuration
Synchronisation
Files
Record Folder: C:\Users\Quattro-04M2\Desktop\Brown Bank 2022-06
Backup Folder: C:\SES_Applications\Data\
File Options
File Name Format: YYYYMMDDhhmmss
File Name Prefix:
Use Area (Line Name) as File Prefix
Use Backup Folder for all files - copy -
Create Record Log
Record File Size (defined for one single File)
Based on File Size (MByte) 256
Based on Time (Minutes) 20
Ok
Cancel
Apply


Setup
System
Quattro Array Configuration
Single Beam Mode (SBM)
T2 + T1
T4 + T3
Quad / Triple Beam Mode (QBM/QBMW/TBM)
spacing
T4 T3 T2 T1
Transducer spacing [m]: 0.250
Dual Beam Mode (DBM)
spacing
T4 + T3 T2 + T1
Transducer spacing [m]: 0.500
Array Reference Point
Transducer arrangement seen from top
Synchronisation
Files
Ok
Cancel
Apply

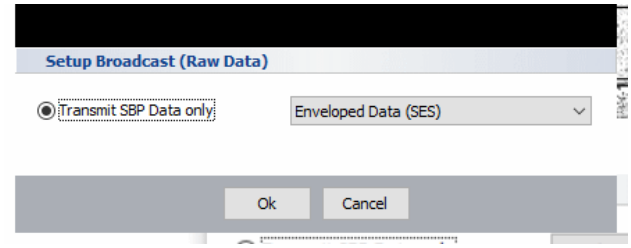

System
Quattro Array Configuration
Synchronisation
Mode
Internal Trigger
External Trigger
Alternating Trigger
Internal Trigger Settings
Trigger High Time [ms]: 1
Files
Ok
Cancel
Apply

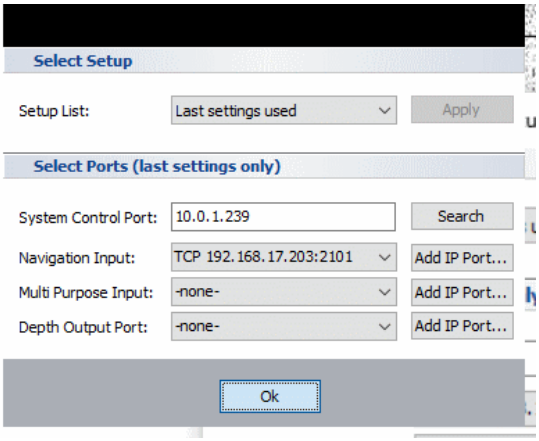

Setup
System
System Working Unit
Metric units, meters
English units, feet
Two way travel time
Transducer Depth
110 cm
Sound Velocity for Time to Depth Conversion
1500 m/s
Calculate...
Quattro Array Configuration
Synchronisation
Files
Ok
Cancel
Apply

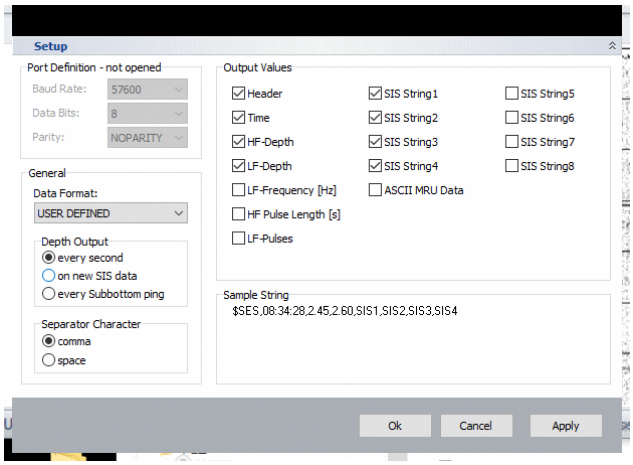

Home
View
System Setup
Network
Stacking 1
Smoothing 1
Soft TVG 0.0
Median Filter
Resolution
Sub-Bottom Processing
LF HF
Min Level 8 7
SRange 2 5
Thresholds
Grey
SBP Colours
Low-Frequency
SBP Display Style
Info
Navigation
SIS 1: 00317.73610
SIS 2: 5238.31439 1
SIS 3: 110841.00
SIS 4: 110.2
SIS 5: 7.57
SIS 6: * 7.56
SIS 7: * 519981.22
SIS 8: * 5832110.45
Motion Sensor
Heave: 0.06 m
Heading: 196.82 °
Roll: -0.53 °
Pitch: -2.13 °
Yaw: 0.00 °
Information
Date: 14.06.2022
Time: 11:08:41
Ship: Simon Stevin
Travel: 2022-06
Area: Brown Bank
Profile: 61
Foot Print SBP: 2.89 m
System Mode: SBM
Auto Range: ---
Auto Gain: ---
Multiple Detection: OFF
Low Frequency
TRACK X: 519958.22 Y: 5832119.60
Signal
Zoom
32m
34m
36m
38m
40m
42m
44m
46m
48m
50m
52m
ZOOM
HD: 665 GB
NAV
PPS(?)
MRU
MULTI
INT
13.08 pps (sys)

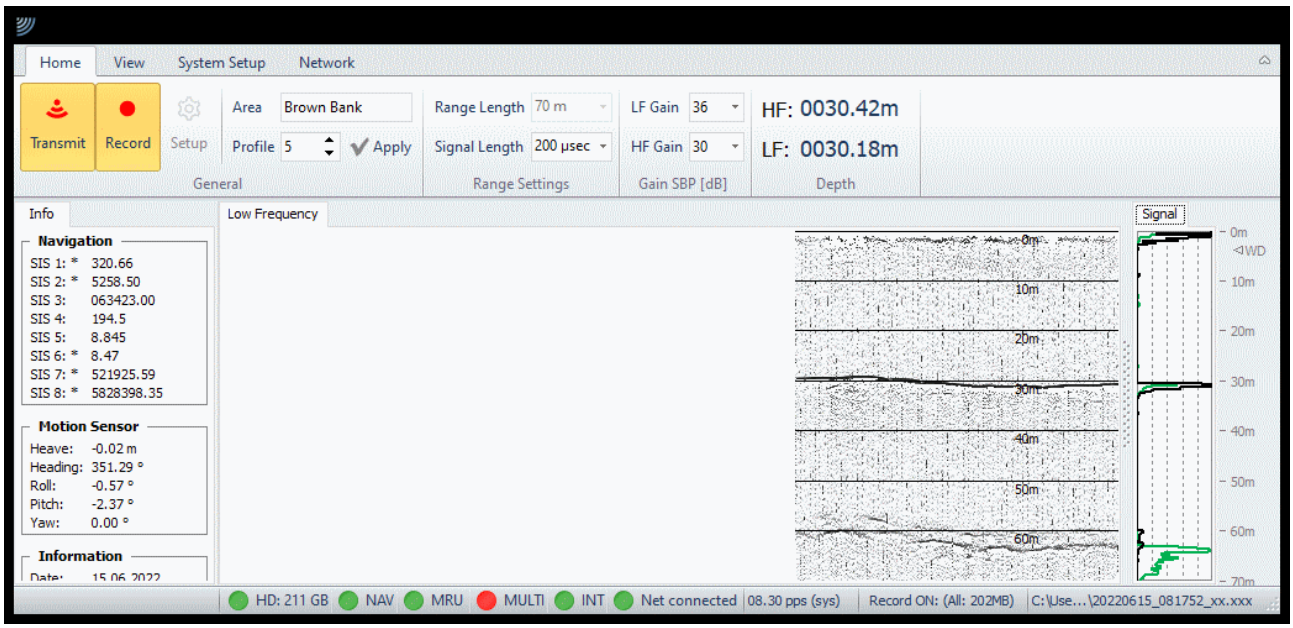
INNOMAR SES-SMART

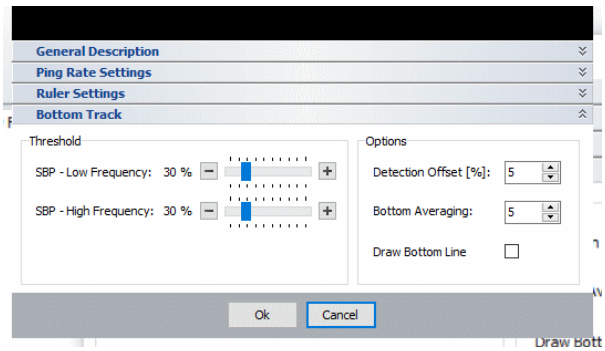
Settings:

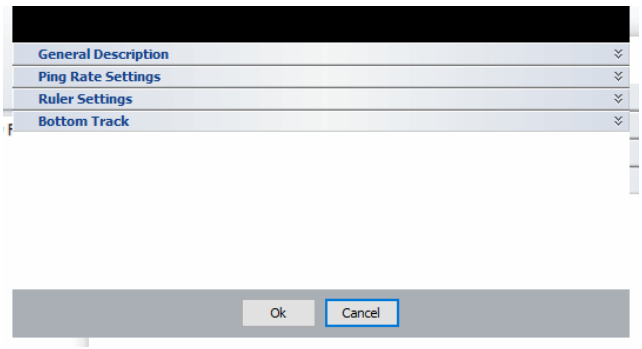


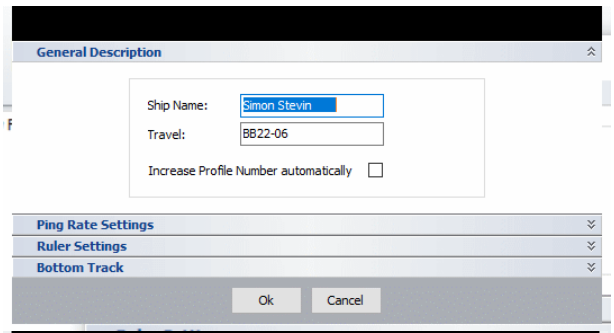


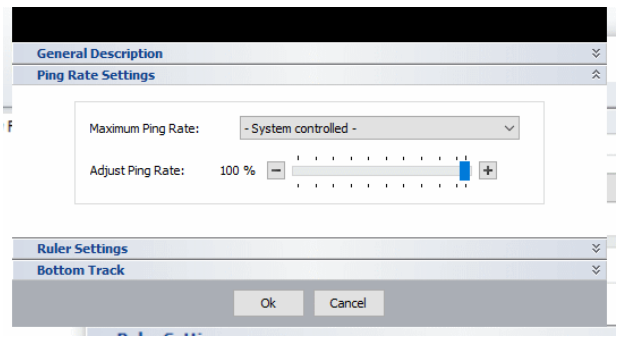


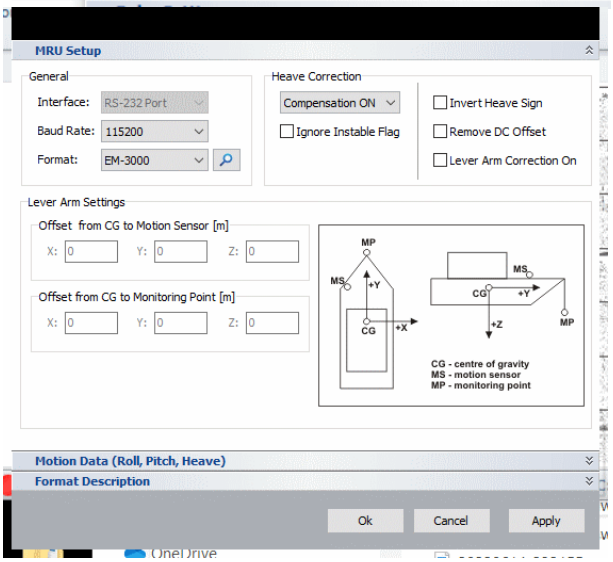


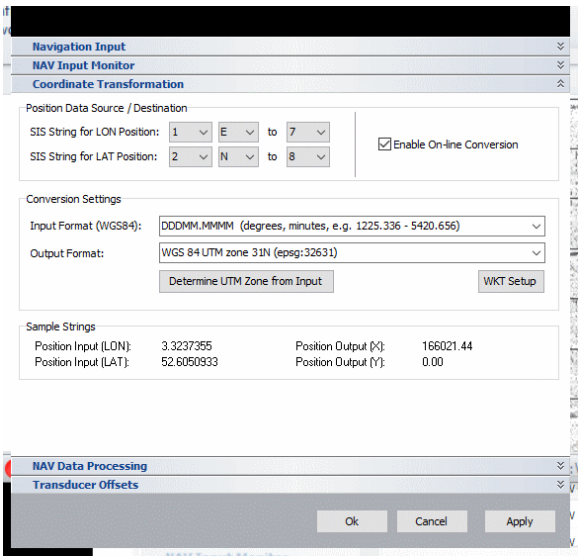

General Description
Ping Rate Settings
Ruler Settings
Bottom Track
Threshold
SBP - Low Frequency: 30 %
SBP - High Frequency: 30 %
Options
Detection Offset [%]: 5
Bottom Averaging: 5
Draw Bottom Line
Ok
Cancel

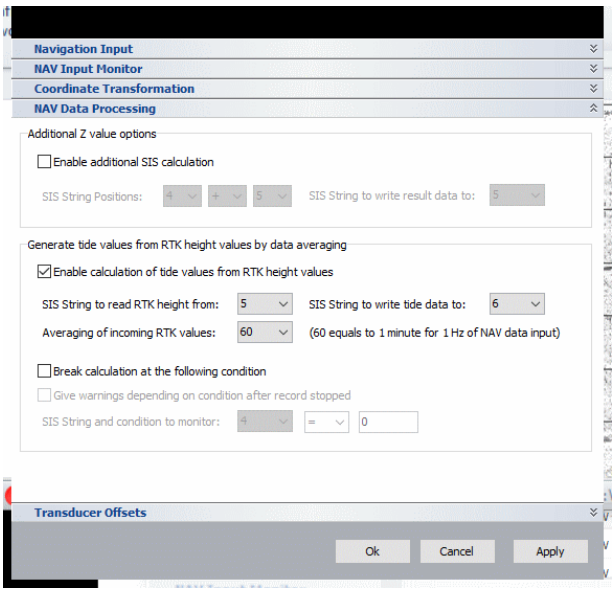

General Description
Ping Rate Settings
Ruler Settings
Bottom Track
Ok
Cancel

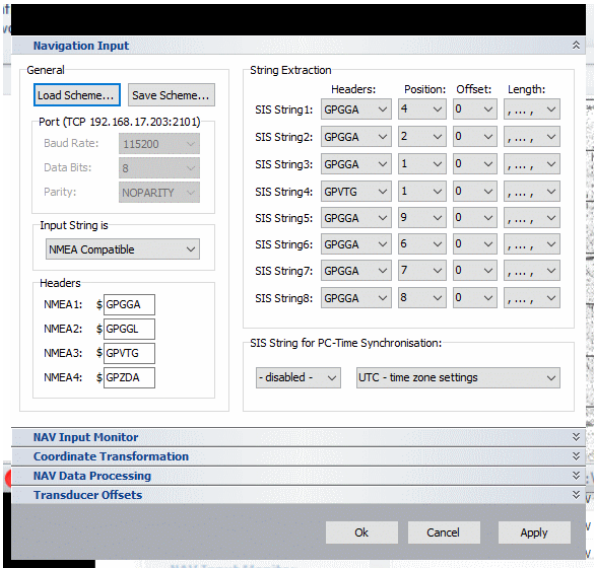

General Description
Ship Name: Simon Stevin
Travel: BB22-06
Increase Profile Number automatically
Ping Rate Settings
Ruler Settings
Bottom Track
Ok
Cancel

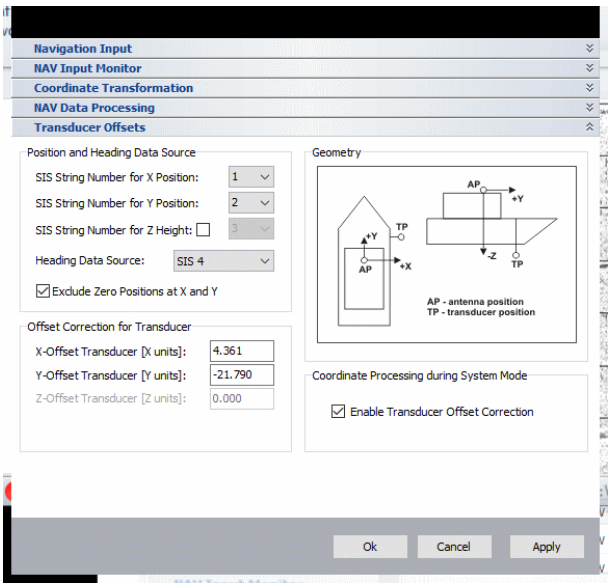

General Description
Ping Rate Settings
Maximum Ping Rate: - System controlled -
Adjust Ping Rate: 100 %
Ruler Settings
Bottom Track
Ok
Cancel

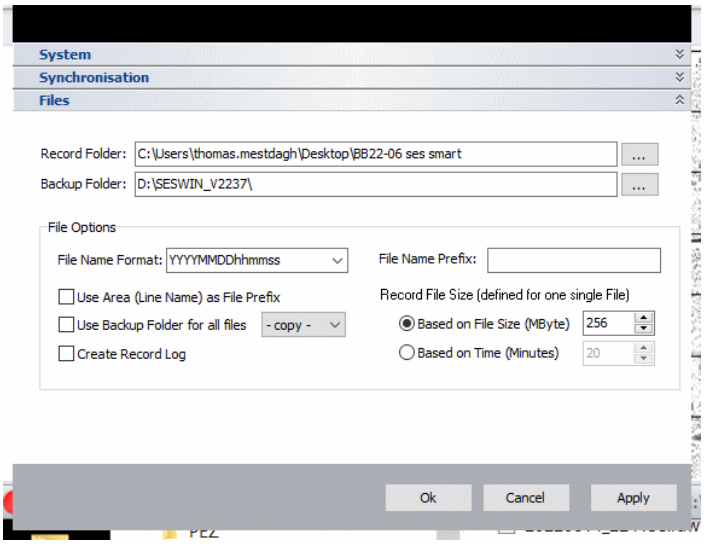

MRU Setup
General
Interface: RS-232 Port
Baud Rate: 115200
Format: EM-3000
Heave Correction
Compensation ON
Ignore Instable Flag
Invert Heave Sign
Remove DC Offset
Lever Arm Correction On
Lever Arm Settings
Offset from CG to Motion Sensor [m]
Offset from CG to Monitoring Point [m]
CG - centre of gravity
MS - motion sensor
MP - monitoring point
Motion Data (Roll, Pitch, Heave)
Format Description
Ok
Cancel
Apply

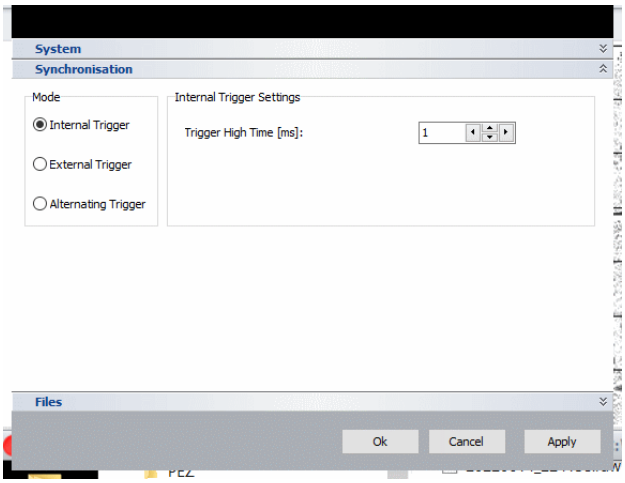

Navigation Input
NAV Input Monitor
Coordinate Transformation
Position Data Source / Destination
SIS String for LON Position:
SIS String for LAT Position:
Enable On-line Conversion
Conversion Settings
Input Format (WGS84): DDDMM.MMMM (degrees, minutes, e.g. 1225.336 - 5420.656)
Output Format: WGS 84 UTM zone 31N (epsg:32631)
Determine UTM Zone from Input
WKT Setup
Sample Strings
Position Input (LON): 3.3237355
Position Input (LAT): 52.6050933
Position Output (X): 166021.44
Position Output (Y): 0.00
NAV Data Processing
Transducer Offsets
Ok
Cancel
Apply

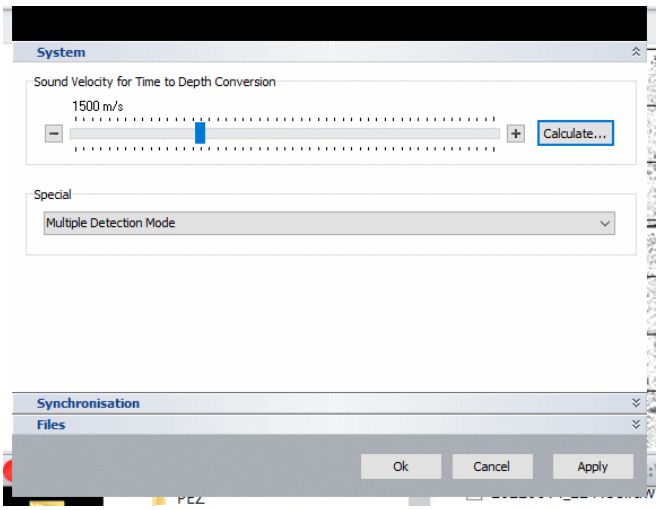

Navigation Input
NAV Input Monitor
Coordinate Transformation
NAV Data Processing
Additional Z value options
Enable additional SIS calculation
Generate tide values from RTK height values by data averaging
Enable calculation of tide values from RTK height values
SIS String to read RTK height from: 5
SIS String to write tide data to: 6
Averaging of incoming RTK values: 60
(60 equals to 1 minute for 1 Hz of NAV data input)
Break calculation at the following condition
Transducer Offsets
Ok
Cancel
Apply

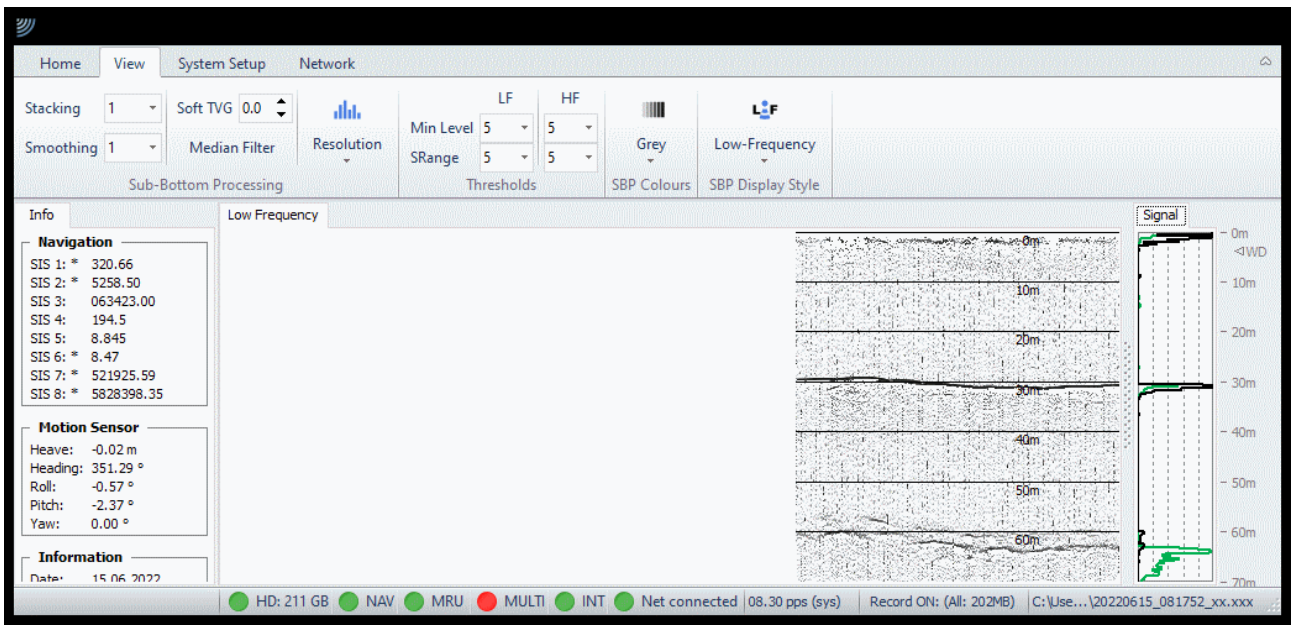

Navigation Input
General
Load Scheme...
Save Scheme...
Port (TCP 192.168.17.203:2101)
Baud Rate: 115200
Data Bits: 8
Parity: NOPARITY
Input String is
NMEA Compatible
Headers
NMEA1: $GPGGA
NMEA2: $GPGGL
NMEA3: $GPVTG
NMEA4: $GPZDA
String Extraction
SIS String1: GPGGA
SIS String2: GPGGA
SIS String3: GPGGA
SIS String4: GPVTG
SIS String5: GPGGA
SIS String6: GPGGA
SIS String7: GPGGA
SIS String8: GPGGA
SIS String for PC-Time Synchronisation:
- disabled -
UTC - time zone settings
NAV Input Monitor
Coordinate Transformation
NAV Data Processing
Transducer Offsets
Ok
Cancel
Apply


Navigation Input
NAV Input Monitor
Coordinate Transformation
NAV Data Processing
Transducer Offsets
Position and Heading Data Source
SIS String Number for X Position:
SIS String Number for Y Position:
SIS String Number for Z Height:
Heading Data Source:
SIS 4
Exclude Zero Positions at X and Y
Offset Correction for Transducer
X-Offset Transducer [X units]:
4.361
Y-Offset Transducer [Y units]:
-21.790
Z-Offset Transducer [Z units]:
0.000
Geometry
AP - antenna position
TP - transducer position
Coordinate Processing during System Mode
Enable Transducer Offset Correction
Ok
Cancel
Apply


System
Synchronisation
Files
Record Folder:
C:\Users\thomas.mestdagh\Desktop\BB22-06 ses smart
Backup Folder:
D:\SESWIN_V2237\
File Options
File Name Format:
YYYYMMDDhhmmss
File Name Prefix:
Use Area (Line Name) as File Prefix
Use Backup Folder for all files
- copy -
Create Record Log
Record File Size (defined for one single File)
Based on File Size (MByte)
256
Based on Time (Minutes)
20
Ok
Cancel
Apply

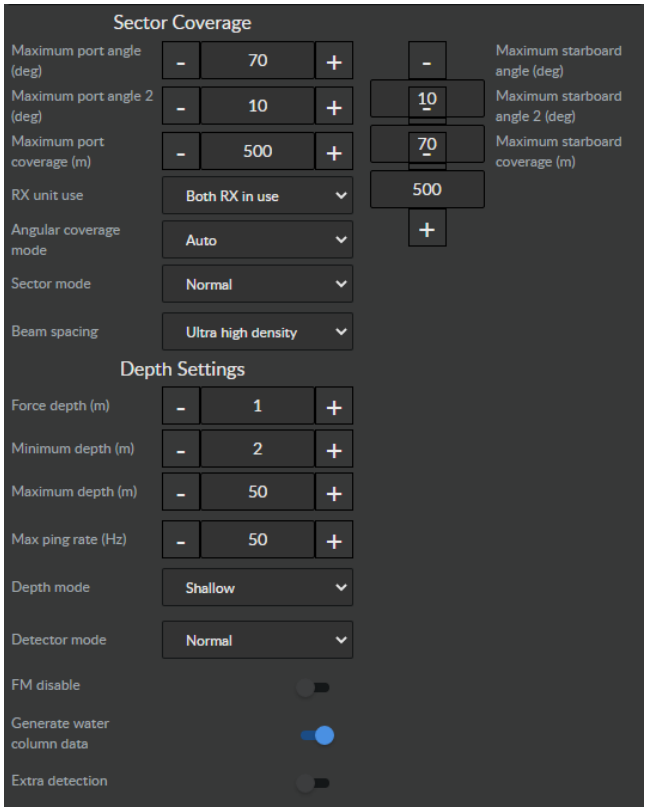

System
Synchronisation
Mode
Internal Trigger
External Trigger
Alternating Trigger
Internal Trigger Settings
Trigger High Time [ms]:
1
Files
Ok
Cancel
Apply

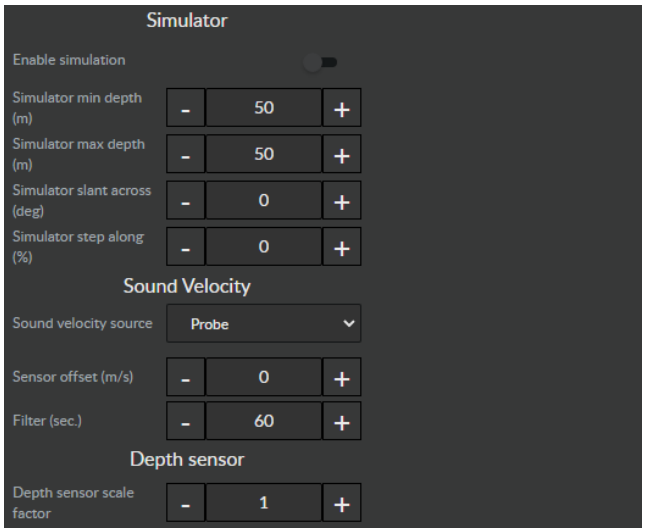

System
Sound Velocity for Time to Depth Conversion
1500 m/s
Calculate...
Special
Multiple Detection Mode
Synchronisation
Files
Ok
Cancel
Apply

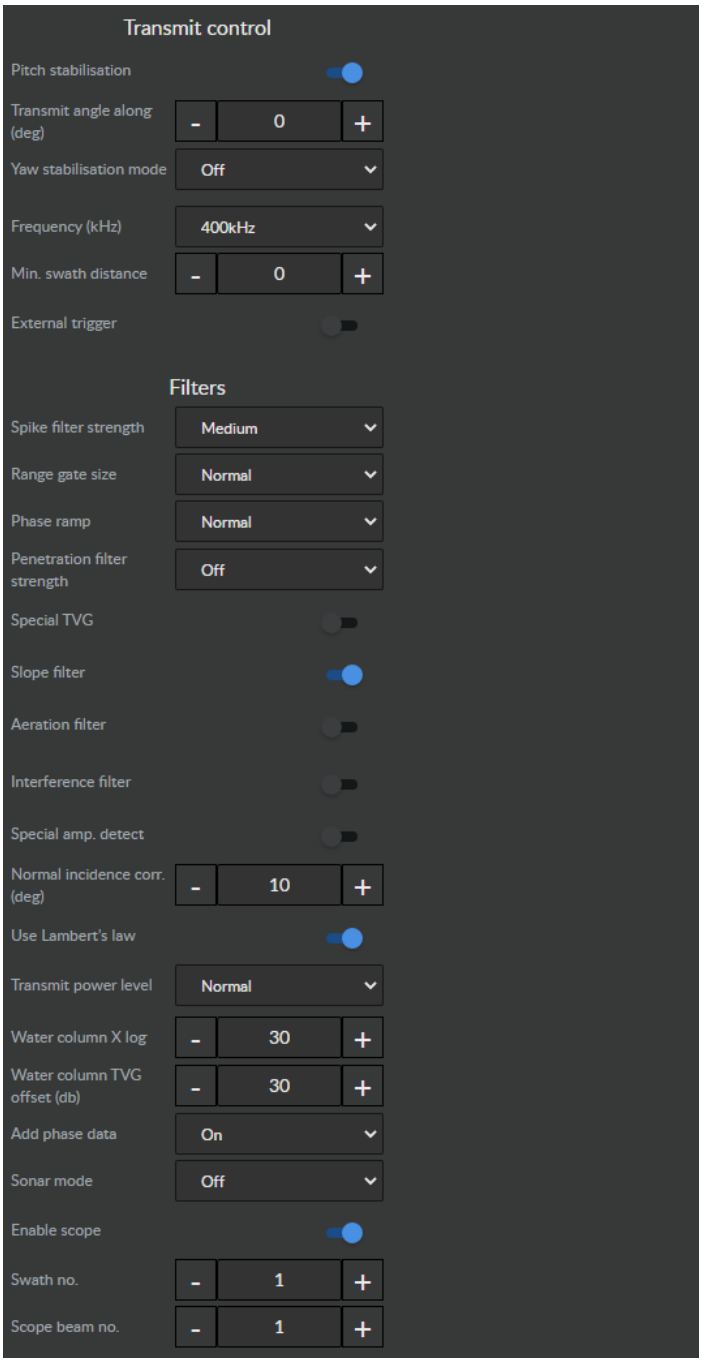

Home
View
System Setup
Network
Stacking
1
Soft TVG
0.0
Smoothing
1
Median Filter
Resolution
Sub-Bottom Processing
LF
HF
Min Level
5
5
SRange
5
5
Thresholds
Grey
SBP Colours
Low-Frequency
SBP Display Style
Info
Low Frequency
Signal
Navigation
SIS 1: * 320.66
SIS 2: * 5258.50
SIS 3: 063423.00
SIS 4: 194.5
SIS 5: 8.845
SIS 6: * 8.47
SIS 7: * 521925.59
SIS 8: * 5828398.35
Motion Sensor
Heave: -0.02 m
Heading: 351.29 °
Roll: -0.57 °
Pitch: -2.37 °
Yaw: 0.00 °
Information
Date: 15.06.2022
0m
10m
20m
30m
40m
50m
60m
70m
HD: 211 GB
NAV
MRU
MULTI
INT
Net connected
08.30 pps (sys)
Record ON: (All: 202MB)
C:\Use...\20220615_081752_xx.xxx

MBES – EM2040

Settings:







Vibrocorer – 3m OSIL vibrocorer

Vibrocoring

Below the table of cores and Van Veens taken on a daily basis. The location is that recorded from MIDAS – the actual position needs to be corrected for layback).

Sunday 11/06/2023

Core name	Lat	Long	Heading	Number of sections	Total length (cm)	Notes
SS23_490_VC20A	52.48327N	3.075473E	208.4	2	200	
SS23_490_VC20B	52.48326N	3.075471E	208.8	1	190	
SS23_490_VC28	52.48243	2.956377	366.2	2	143	
SS23_490_VC27	52.485	2.951324	180.97	2	189	
SS23_490_VC26	52.48707	2.948081	321.92	2	215	
SS23_490_VC24	52.48212	2.948285	344.05	2	200	
SS23_490_VC23	52.48216	2.939069	357.5	2	205	
SS23_490_VC22	52.48219	2.937976	18.96	2	210	Core catcher; stiff clay at the bottom; stored in bag
SS23_490_VC21	52.48229	2.927339	28.48	2	210	
SS23_490_VC25	52.48740	2.947667	24.17	2	157	First four attempts failed as vibrocorer kept falling over; for the fifth attempt, ship was positioned 30m away from original point
SS23_490_VV12	52.48704	2.948584	22.36			Small peat fragment
SS23_490_VV13	52.48618	2.949326	288.5			
SS23_490_VV14	52.48535	2.951145	308.04			
SS23_490_VV11	52.48121	2.948168	287.76			
SS23_490_VV10	52.48194	2.944286	283.51			
SS23_490_VV09	52.48173	2.938443	273.68			
SS23_490_VV01	52.48379	3.0756491	264.13			
SS23_490_VV02	52.48391	3.074469	8.93			
SS23_490_VV03	52.48346	3.0741766	383.1			
SS23_490_VV04	52.48385	3.072861	327.34			
SS23_490_VV05	52.48239	3.072474	292.13			
SS23_490_VV06	52.4825	3.07388	340.82			
SS23_490_VV07	52.48261	3.074384	352			
SS23_490_VV08	52.48277	3.07554	283.47			

Monday 12/06/2023

Core name	Lat	Long	Heading	Number of sections	Total length (cm)	Notes
SS23_490_VC34_001	52.57573	3.606861	209.3	2	152	Core catcher broken and bagged
SS23_490_VC34_002	52.57574	3.606864	209.34	2	165	Core catcher broken and bagged
SS23_490_VC35	52.57517	3.61849	209.2	3	230	2 core catchers used, one broken and bagged
SS23_490_VC36	52.57523	3.625391	208.8	3	230	Sediment from core catcher bagged
SS23_490_VC33_001	52.57797	3.649369	213.58	2	130	
SS23_490_VC33_002	52.57795	3.649402	212.5	2	191	
SS23_490_VC32	52.58225	3.629897	203.04	3	231	At base of section 2/3, visible shell
SS23_490_VC31_001	52.59176	3.624917	202.5			FAILED; plastic release valve at top broken (maybe hit something hard?)
SS23_490_VC31_002	52.59180	3.624972	201.9	3	232	
SS23_490_VC30	52.60720	3.598929	29.2	3	245	
SS23_490_VC37_001	52.70837	3.697213	18.73	2	180	
SS23_490_VC37_002	52.70836	3.697217	18.71	3	228	
SS23_490_VC38	52.78472	3.804831	31.4			FAILED
SS23_490_VC38_001	52.78473	3.804840	30.49	3	236	We say clay lump fall out of the core cutter
SS23_490_VC38_002	52.78471	3.804811	31.7	3	236	Sediment from core catcher bagged

Wednesday 14/06/2023

Core name	Lat	Long	Heading	Number of sections	Total length (cm)	Notes
SS23_490_VC06	52.509326	2.767234	153.2	3	237	Top 1m disturbed
SS23_490_VC05	52.50946	2.746910	168.7	3	267	Core catcher broken
SS23_490_VC04	52.50962	2.742675	169.4	3	217	
SS23_490_VC15	52.50957	2.730897	167.8	2	182	First two attempts failed; second attempt: wood fragment and bone fragment was found on deck
SS23_490_VC14	52.50651	2.731742	173.5	3	232	
SS23_490_VC13	52.50977	2.723555	184.3	1	100	First attempt failed
SS23_490_VC12	52.51097	2.719284	26.17	3	287	
SS23_490_VC10	52.51169	2.712291	34.9	2	172	First attempt failed
SS23_490_VC09	52.51037	2.708140	33.5	1	100	Top 10cm brown shelly sand discarded
SS23_490_VC08	52.51023	2.697461	19.8	1	100	First attempt failed
SS23_490_VC07	52.51021	2.695111	24.25			Failed; liner got stuck in barrel

Seismic data acquisition

The following lines were acquired on a day-to-day basis. Start and end positions are approximate and may differ from the actual positions as acquired in the header of the seismic and acoustic data.

Saturday 10/06/2023 – all times are UTC (local time – 2h)

Line Name	Acquisition system	Direction	Start Time	End Time	Start		End		Notes
					Lat	Long	Lat	Long	
TNO_HKZ_04	PES+Sparker	W->E	06:02	09:59	52° 25' 07'' N	3° 32' 43'' E	52° 23' 14'' N	3° 55' 50'' E	Navigation failed at 07:47 - restarted
TNO_HKZ_03t		N->S	10:00	10:30	52° 23' 14'' N	3° 55' 50'' E	52° 21' 37'' N	3° 55' 10'' E	
TNO_HKZ_03		E->W	10:30	13:54	52° 21' 37'' N	3° 55' 10'' E	52° 23' 02'' N	3° 33' 15'' E	
TNO_HKZ_02t		N->S	13:54	14:39	52° 23' 02'' N	3° 33' 15'' E	52° 20' 14'' N	3° 29' 19'' E	
TNO_HKZ_02		W->E	14:39	18:44	52° 20' 14'' N	3° 29' 19'' E	52° 17' 56'' N	3° 54' 55'' E	
TNO_HKZ_01t	PES	N->S	18:44	19:39	52° 17' 56'' N	3° 54' 55'' E	52° 15' 16'' N	3° 55' 26'' E	Sparker removed to cut tips
TNO_HKZ_01t	Sparker	N->S	18:49	19:39	52° 16' 51'' N	3° 55' 09'' E	52° 15' 16'' N	3° 55' 26'' E	
TNO_HKZ_01	PES+Sparker	E->W	19:39	02:59	52° 15' 16'' N	3° 55' 26'' E	52° 18' 55'' N	3° 24' 32'' E	

Sunday 11/06/2023

Line Name	Acquisition system	Direction	Start Time	End Time	Start		End		Notes
					Lat	Long	Lat	Long	
TNO_HKZ_05t	PES+Sparker	N->S	02:59	03:09	52° 18' 55'' N	3° 24' 32'' E	52° 18' 15'' N	3° 24' 08'' E	
TNO_HKZ_05a	PES+Sparker	SW->NE	03:09	07:27	52° 18' 15'' N	3° 24' 08'' E	52° 20' 32'' N	3° 44' 48'' E	
TNO_HKZ_05b	PES+Sparker	S->N	07:27	09:17	52° 20' 32'' N	3° 44' 48'' E	52° 27' 40'' N	3° 46' 16'' E	
B2N_08	PES+MB	W->E	17:35	18:13	52° 29' 03'' N	3° 03' 33'' E	52° 29' 09'' N	3° 07' 22'' E	MB only has RTK float
B2N_11		E->W	18:20	18:53	52° 29' 24'' N	3° 07' 25'' E	52° 29' 25'' N	3° 03' 29'' E	
B2N_14		W->E	18:58	19:34	52° 29' 39'' N	3° 03' 37'' E	52° 29' 39'' N	3° 07' 41'' E	
B2N_17		E->W	19:42	20:19	52° 29' 56'' N	3° 07' 39'' E	52° 30' 02'' N	3° 03' 23'' E	
B2N_20		W->E	20:24	21:02	52° 30' 11'' N	3° 03' 39'' E	52° 30' 19'' N	3° 07' 47'' E	
B2N_21		E->W	21:09	21:41	52° 30' 13'' N	3° 07' 17'' E	52° 30' 12'' N	3° 04' 04'' E	21:23 Nav lost in SESwin – restarted

B2N_19		W->E	21:45	21:57	52° 30’ 03’’ N	3° 04’ 09’’ E	52° 30’ 03’’ N	3° 05’ 32’’ E	
B2N_18		E->W	22:02	22:14	52° 29’ 59’’ N	3° 05’ 25’’ E	52° 29’ 59’’ N	3° 04’ 09’’ E	
B2N_16		W->E	22:20	22:31	52° 29’ 49’’ N	3° 04’ 09’’ E	52° 29’ 48’’ N	3° 05’ 24’’ E	
B2N_15		E->W	22:36	22:46	52° 29’ 43’’ N	3° 05’ 21’’ E	52° 29’ 43’’ N	3° 05’ 22’’ E	
B2N_13		W->E	22:53	23:03	52° 29’ 34’’ N	3° 04’ 07’’ E	52° 29’ 34’’ N	3° 05’ 21’’ E	
B2N_12		E->W	23:08	23:19	52° 29’ 29’’ N	3° 05’ 20’’ E	52° 29’ 29’’ N	3° 04’ 05’’ E	
B2N_10		W->E	23:26	23:36	52° 29’ 20’’ N	3° 04’ 05’’ E	52° 29’ 19’’ N	3° 05’ 20’’ E	
B2N_09		E->W	23:43	23:53	52° 29’ 15’’ N	3° 05’ 18’’ E	52° 29’ 15’’ N	3° 04’ 04’’ E	

Monday 12/06/2023

Line Name	Acquisition system	Direction	Start Time	End Time	Start		End		Notes
					Lat	Long	Lat	Long	
B2N_01	PES+MB	S->N	00:00	00:15	52° 29’ 10’’ N	3° 04’ 09’’ E	52° 30’ 19’’ N	3° 04’ 17’’ E	00:08-00:14 MB not responding
B2N_02		N->S	00:21	00:38	52° 30’ 17’’ N	3° 04’ 28’’ E	52° 29’ 08’’ N	3° 04’ 19’’ E	
B2N_03		S->N	00:44	01:01	52° 29’ 10’’ N	3° 04’ 30’’ E	52° 30’ 18’’ N	3° 04’ 38’’ E	
B2N_04		N->S	01:06	01:22	52° 30’ 17’’ N	3° 04’ 48’’ E	52° 29’ 09’’ N	3° 04’ 40’’ E	
B2N_05		S->N	01:30	01:49	52° 29’ 09’’ N	3° 04’ 51’’ E	52° 30’ 17’’ N	3° 04’ 59’’ E	
B2N_06		N->S	01:54	02:11	52° 30’ 15’’ N	3° 05’ 11’’ E	52° 29’ 08’’ N	3° 05’ 03’’ E	
B2N_07		S->N	02:20	02:41	52° 29’ 08’’ N	3° 05’ 12’’ E	52° 30’ 16’’ N	3° 05’ 21’’ E	
B2N_B2St		NW->SE	02:41	03:10	52° 30’ 16’’ N	3° 05’ 21’’ E	52° 28’ 34’’ N	3° 06’ 59’’ E	
B2S_08		E->S	03:10	03:35	52° 28’ 34’’ N	3° 06’ 59’’ E	52° 28’ 34’’ N	3° 03’ 33’’ E	
B2S_11		W->E	03:42	04:20	52° 28’ 19’’ N	3° 03’ 32’’ E	52° 28’ 18’’ N	3° 06’ 50’’ E	
B2S_14		E->W	04:26	04:57	52° 28’ 03’’ N	3° 07’ 10’’ E	52° 28’ 05’’ N	3° 03’ 23’’ E	
B2S_17		W->E	05:03	05:43	52° 27’ 50’’ N	3° 03’ 18’’ E	52° 27’ 49’’ N	3° 06’ 58’’ E	
B2S_20		E->W	05:46	06:15	52° 27’ 34’’ N	3° 06’ 56’’ E	52° 27’ 36’’ N	3° 03’ 17’’ E	
B2S_07		S->N	06:24	06:45	52° 27’ 19’’ N	3° 03’ 35’’ E	52° 28’ 46’’ N	3° 04’ 01’’ E	
B2S_05		N->S	06:51	07:12	52° 28’ 40’’ N	3° 04’ 19’’ E	52° 27’ 17’’ N	3° 03’ 59’’ E	
B2S_03		S->N	07:16	07:37	52° 27’ 18’’ N	3° 04’ 19’’ E	52° 28’ 47’’ N	3° 04’ 43’’ E	
TNO_BBQ_06	PES+sparker	E->W	17:50	21:03	52° 40’ 46’’ N	3° 32’ 48’’ E	52° 40’ 54’’ N	3° 12’ 33’’ E	

TNO_BBQ_01		W->E	21:33	00:54	52° 42’ 32’’ N	3° 12’ 40’’ E	52° 42’ 32’’ N	3° 32’ 38’’ E	

Tuesday 13/06/2023

Line Name	Acquisition system	Direction	Start Time	End Time	Start		End		Notes
					Lat	Long	Lat	Long	
TNO_BBQ_03	PES+Sparker	E->W	01:07	03:16	52° 42’ 56’’ N	3° 32’ 50’’ E	52° 43’ 03’’ N	3° 19’ 10’’ E	
TNO_BBQ_04		W->E	03:39	05:51	52° 42’ 04’’ N	3° 19’ 10’’ E	52° 41’ 59’’ N	3° 32’ 47’’ E	
TNO_BBQ_04t		N->S	05:51	06:00	52° 41’ 59’’ N	3° 32’ 47’’ E	52° 41’ 16’’ N	3° 32’ 42’’ E	
TNO_BBQ_05		E->W	06:00	08:14	52° 41’ 16’’ N	3° 32’ 42’’ E	52° 41’ 18’’ N	3° 18’ 50’’ E	
TNO_BBQ_05t		NW->SE	08:14	09:32	52° 41’ 18’’ N	3° 18’ 50’’ E	52° 40’ 52’’ N	3° 19’ 20’’ E	
TNO_BBQ_05t		NW->SE	08:32	09:32	52° 40’ 52’’ N	3° 19’ 20’’ E	52° 40’ 23’’ N	3° 25’ 26’’ E	Sparker removed out of water to cut tips
TNO_BBQ_07		S->N	09:32	10:49	52° 40’ 23’’ N	3° 25’ 26’’ E	52° 45’ 24’’ N	3° 25’ 37’’ E	
TNO_BBQ_02		N->S	11:10	12:30	52° 45’ 21’’ N	3° 27’ 12’’ E	52° 40’ 17’’ N	3° 27’ 14’’ E	
TNO_BBQ_08		S->N	12:46	14:04	52° 40’ 28’’ N	3° 28’ 40’’ E	52° 45’ 13’’ N	3° 28’ 44’’ E	
AX_Central_03		W->E	22:56	00:28	52° 30’ 39’’ N	2° 39’ 36’’ E	52° 30’ 33’’ N	2° 48’ 16’’ E	

Wednesday 14/06/2023

Line Name	Acquisition system	Direction	Start Time	End Time	Start		End		Notes
					Lat	Long	Lat	Long	
AX_Central_04	PES+Sparker	E->W	00:39	02:00	52° 31’ 02’’ N	2° 48’ 25’’ E	52° 30’ 48’’ N	2° 39’ 39’’ E	
AX_Central_09		W->E	02:15	03:47	52° 30’ 06’’ N	2° 39’ 29’’ E	52° 29’ 38’’ N	2° 48’ 17’’ E	Extra line in between the telecom cables
AX_Central_02		E->W	03:55	05:32	52° 29’ 50’’ N	2° 48’ 20’’ E	52° 30’ 10’’ N	2° 39’ 28’’ E	
AX_Central_01		W->E	05:36	07:11	52° 29’ 55’’ N	2° 39’ 25’’ E	52° 29’ 27’’ N	2° 48’ 18’’ E	
AX_Central_01t		NE->SW	07:12	07:28	52° 29’ 28’’ N	2° 48’ 18’’ E	52° 29’ 06’’ N	2° 46’ 17’’ E	
AX_Central_07		S->N	07:29	08:18	52° 29’ 06’’ N	2° 46’ 14’’ E	52° 31’ 40’’ N	2° 46’ 01’’ E	
AX_Central_07t		E->W	08:18	08:42	52° 31’ 40’’ N	2° 46’ 01’’ E	52° 31’ 46’’ N	2° 43’ 45’’ E	
AX_Central_06		N->S	08:42	09:27	52° 31’ 46’’ N	2° 43’ 45’’ E	52° 29’ 12’’ N	2° 44’ 05’’ E	

AX_Central_06t		W->E	09:27	09:43	52° 29’ 12’’ N	2° 44’ 05’’ E	52° 29’ 01’’ N	2° 45’ 02’’ E	
AX_Central_08		S->N	09:43	10:29	52° 29’ 01’’ N	2° 45’ 02’’ E	52° 31’ 44’’ N	2° 44’ 44’’ E	
AX_Central_05		N->S	18:10	18:46	52° 31’ 20’’ N	2° 41’ 43’’ E	52° 29’ 07’’ N	2° 42’ 01’’ E	
SB_09		NE->SW	22:02	00:48	52° 07’ 57’’ N	2° 23’ 01’’ E	52° 00’ 52’’ N	2° 19’ 49’’ E	

Thursday 15/06/2023

Line Name	Acquisition system	Direction	Start Time	End Time	Start		End		Notes
					Lat	Long	Lat	Long	
SB_09b		NE->SW	00:48	03:36	52° 00’ 52’’ N	2° 19 49’’ E	51° 52’ 38’’ N	2° 15’ 56’’ E	
SB_09c		NE->SW	03:36	05:50	52° 52’ 38’’ N	2° 15 56’’ E	51° 43’ 25’’ N	2° 11’ 49’’ E	
SB_09c_t		SE->NW	05:50	06:27	51° 43’ 24’’ N	2° 11’ 42’’ E	51° 44’ 39’’ N	2° 11’ 32’’ E	
SB_01		W->E	06:27	08:35	51° 44’ 39’’ N	2° 11’ 31’’ E	51° 42’ 04’’ N	2° 21’ 24’’ E	Navigation failed at 06:52

7. REMARKS

We would like to thank the Simon Stevin captain and crew for their efforts and cooperation. Their skilfulness on-board contributed greatly to the success of this survey.

From left to right: Front: Felipe, Victor, Morgan, Sam, Wouter, Ruth, Jan, Matthieu, Mark. Back: Thomas, David, Tibo, Norman, Gaillen, Stijn, Jamie.

8. DATA STORAGE

Seismic data were saved in SES-2000 Quattro echosounder format and were converted to SEGY; Sparker data were recorded in SEGY; the MBES data were acquired in .all. All MBES data are stored on the VLIZ servers. During the survey, a back-up of all data was saved on an external hard drive. These data will be copied onto the VLIZ seismic archive server.

Contact people:

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