
General Area	Irish Sea
Name of Survey	SEA6
Area/Block number	Cruise B
Unit Name	S/V Meridian
Company	OSAE
Charge Surveyor	Kebbel Marc
Start Date of Survey	24.08.2004
End Date of Survey	09.09.2004
Scale (if applicable)	Numerous
Recommended survey category	None
HQAs	
Report version	1.1

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1. INTRODUCTION

OSAE Offshore Survey and Engineering Gesellschaft für Seevermessung mbH have been contracted to perform offshore survey operations in connection with the SEA-6 Project in the Irish Sea. The SEA-6 survey should review and update previous surveys which were 30 to 40 years old.

The actual database was mainly acquired with nowadays-outdated equipment and the data sets of poorer quality and resolution. Some areas were completely unknown and the survey should provide the base for a better understanding of the sedimentary processes and sediment architecture in this area.

The survey provides information for use in geological, geophysical, marine biological, marine chemical, installation and subsequently for the offshore industry. The survey was planned in three legs.

Leg one (Cruise A) included SSS (Side Scan Sonar), SBP (Sub Bottom Profiler) and Swath Bathymetry survey mainly in the central region between the Isle of Man and Cumbrian coast.

Leg two (**Cruise B**) included SSS (Side Scan Sonar), SBP (Sub Bottom Profiler), Swath Bathymetry survey and CTD measurements and was carried out between Ireland and the Isle of Man and at the north of Wales.

Onboard charting was used to guide the sampling and photographic work on the third leg (Cruise C).

This report presents the results of leg one and **two**. The third leg will focus on benthos investigations and does not form part of this report.

The geophysical survey was carried out using the 35m *SV Meridian* as a survey platform. The survey operations were carried out 24h a day within the time period 24.08.2004 – 09.09.2004.

OSAE's *Meridian* is fully geared to accommodate a wide range of survey requirements and due to its draught ideal but not limited for shallow water work.

All settings and line planning's were carried out jointly by the Client and the OSAE Party Chief in order to optimise data quality in all areas.

2. Weather Statement

Please refer to detailed Area description for more details and for the weather impacts on the data.

Weather Log						
Vessel:	<i>Meridan</i>					
Job No:	<i>216/04/803</i>					
Client:	<i>Geotek</i>		Area :	<i>Irish Sea</i>		
Date:	Time Lt :	Wind in Bft:	Sea :	Air Temp °C:	Sea Temp °C:	Pressure hPa:
24.08.2004	2:00	S 3	1	15	n/a	1007
	4:00	SW 3	1	15	n/a	1007
	6:00	SW 3	1	15	n/a	1007
	8:00	SW 3	1	15	n/a	1005
	10:00	n/a	n/a	n/a	n/a	n/a
	12:00	n/a	n/a	n/a	n/a	n/a
	14:00	n/a	n/a	n/a	n/a	n/a
	16:00	n/a	n/a	n/a	n/a	n/a
	18:00	W 4-5	3	15	n/a	1006
	20:00	W 5	3	15	n/a	1007
	22:00	W 6	3	15	n/a	1007

	24:00:00	WNW 5	3	15	n/a	1007
25.08.2004	2:00	W 5	3	14	n/a	1007
	4:00	W 5	3	15	n/a	1007
	6:00	W 6	3	15	n/a	1007
	8:00	NW 6	3	15	n/a	1007
	10:00	NW 5	3	15	n/a	1009
	12:00	NW 6	3	15	n/a	1010
	14:00	NW 6	4	17	n/a	1011
	16:00	NW 5-6	3 to 4	17	n/a	1012
	18:00	NW 6-7	3 to 4	17	n/a	1011
	20:00	NW 5-6	3	16	n/a	1013
	22:00	NW 6-7	3 to 4	16	n/a	1014
	24:00:00	NW 6	3	16	n/a	1016
26.08.2004	2:00	NW 6	3	14	n/a	1017
	4:00	NW 6	3	14	n/a	1017
	6:00	NW 6	2	14	n/a	1018
	8:00	NW 4	1	15	n/a	1018
	10:00	W 4	1	15	n/a	1018
	12:00	W 4	1	15	n/a	1017
	14:00	SW 5	2	14	n/a	1012
	16:00	SW 5	2	14	n/a	1012
	18:00	SW 6	3	14	n/a	1010
	20:00	SW 6-7	3	14	n/a	1008
	22:00	SW 7-8	4	14	n/a	1007
	24:00:00	SW 7-8	4	14	n/a	1007
27.08.2004	2:00	SW 7	4	15	n/a	1005
	4:00	W 6	3	15	n/a	1006
	6:00	WNW 6	3	13	n/a	1007
	8:00	NW 7	3	16	n/a	1007
	10:00	WNW 7	3	18	n/a	1008
	12:00	WNW 6	3	17	n/a	1008
	14:00	NW 7-8	3 to 4	16	n/a	1009
	16:00	WNW 7	3	16	n/a	1011
	18:00	NW 6-7	3	16	n/a	1012
	20:00	WNW 5	2	13	n/a	1011
	22:00	WNW 4-5	2	13	n/a	1012
	24:00:00	WNW 5	2	13	n/a	1012
28.08.2004	2:00	WNW 5	2	13	n/a	1013
	4:00	WNW 5	2	13	n/a	1014
	6:00	W 4	2	13	n/a	1014
	8:00	W 3	2	14	n/a	1014
	10:00	SW 4	2	14	n/a	1014
	12:00	W 4	2	13	n/a	1014
	14:00	SW 4	2	15	n/a	1013
	16:00	SW 4	2	15	n/a	1013
	18:00	WSW 5	2	14	n/a	1012
	20:00	SW 5	2	13	n/a	1012
	22:00	WSW 4	2	13	n/a	1010
	24:00:00	WSW 6	2 to 3	13	n/a	1012
29.08.2004	2:00	WSW 7	3	13	n/a	1010
	4:00	SW 7	3	13	n/a	1009
	6:00	SW 6	3	13	n/a	1009
	8:00	WSW 7	4	13	n/a	1007

	10:00	W 6-7	4	15	n/a	1008
	12:00	SW 6-7	4	16	n/a	1008
	14:00	SW 7-8	4 to 5	15	n/a	1013
	16:00	WSW 7-8	4 to 5	15	n/a	1013
	18:00	WSW 7	4 to 5	14	n/a	1012
	20:00	n/a	n/a	n/a	n/a	n/a
	22:00	n/a	n/a	n/a	n/a	n/a
	24:00:00	N/a	n/a	n/a	n/a	n/a
30.08.2004	2:00	N/a	n/a	n/a	n/a	n/a
	4:00	W 6	n/a	12	n/a	1012
	6:00	W 6	n/a	12	n/a	1012
	8:00	W 6	n/a	12	n/a	1014
	10:00	WNW 6-7	n/a	14	n/a	1015
	12:00	WNW 6-7	n/a	16	n/a	1016
	14:00	WNW 7-8	n/a	18	n/a	1018
	16:00	WNW 7-8	n/a	18	n/a	1018
	18:00	WNW 7-8	n/a	18	n/a	1020
	20:00	n/a	n/a	n/a	n/a	n/a
	22:00	n/a	n/a	n/a	n/a	n/a
	24:00:00	n/a	n/a	n/a	n/a	n/a
31.08.2004	2:00	n/a	n/a	n/a	n/a	n/a
	4:00	WNW 6	n/a	12	n/a	1023
	6:00	NW 6	n/a	15	n/a	1023
	8:00	NW 5	1	13	n/a	1023
	10:00	NW 5	2	13	n/a	1023
	12:00	NW 4	1	16	n/a	1023
	14:00	Var	1	17	n/a	1022
	16:00	SSW 3	2	16	n/a	1022
	18:00	SSW 4	2	16	n/a	1021
	20:00	SSW 4	2	15	n/a	1020
	22:00	SSW 4	2	15	n/a	1020
	24:00:00	SSW 4	2	14	n/a	1020
01.09.2004	2:00	SW 4	2	14	n/a	n/a
	4:00	S 4	2	14	n/a	1023
	6:00	S 3	1	15	n/a	1023
	8:00	SSW 3	1	15	n/a	1023
	10:00	SSW 4	1	15	n/a	1023
	12:00	S 3	1	15	n/a	1023
	14:00	SSW 5	2	16	n/a	1022
	16:00	SSW 5	2 to 3	15	n/a	1022
	18:00	S 4	2 to 3	15	n/a	1021
	20:00	S 5	2 to 3	15	n/a	1020
	22:00	S 5	2 to 3	15	n/a	1020
	24:00:00	SSW 5	2 to 3	15	n/a	1020
02.09.2004	2:00	S 4	2	15	n/a	1016
	4:00	S 4	2	15	n/a	1017
	6:00	S 3	1	16	n/a	1017
	8:00	S 3	1	15	n/a	1016
	10:00	S 4	2	16	n/a	1016
	12:00	S 3	1	17	n/a	1016
	14:00	S 4	1	17	n/a	1017
	16:00	SSW 3	2	16	n/a	1018
	18:00	SSW 3	2	15	n/a	1018

	20:00	SSW 4	2	15	n/a	1019
	22:00	SE 3	2	15	n/a	1020
	24:00:00	SSW 4	2	15	n/a	1020
03.09.2004	2:00	SSW 3	2	14	n/a	1019
	4:00	SSW 5	2	14	n/a	1020
	6:00	SW 6-7	3 to 4	14	n/a	1020
	8:00	SSW 7-8	4	15	n/a	1021
	10:00	SSW 8	4	16	n/a	1021
	12:00	SSW 7-8	4	16	n/a	1021
	14:00	SW 7	4 to 5	17	n/a	1021
	16:00	SSW 7-8	4 to 5	16	n/a	1023
	18:00	SSW 6-7	4 to 5	16	n/a	1023
	20:00	SSW 6-7	4	16	n/a	1024
	22:00	SSW 5	3 to 4	16	n/a	1024
	24:00:00	SSW 5	3 to 4	16	n/a	1024
04.09.2004	2:00	SW 6-7	4	15	n/a	1026
	4:00	SW 6-7	4	15	n/a	1026
	6:00	SSW 5	3 to 4	15	n/a	1026
	8:00	SW 6	3 to 4	16	n/a	1026
	10:00	SSW 5	3	17	n/a	1027
	12:00	SSW 5	3	18	n/a	1028
	14:00	SSW 5	3	17	n/a	1029
	16:00	SSW 4	2 to 3	17	n/a	1030
	18:00	SSW 4	2	16	n/a	1031
	20:00	SSW 4	2	15	n/a	1031
	22:00	SSW 5	2 to 3	15	n/a	1032
	24:00:00	SSW 5	2 to 3	15	n/a	1033
05.09.2004	2:00	S 4	2	14	n/a	1032
	4:00	S 3	2	15	n/a	1033
	6:00	S 3	2	15	n/a	1033
	8:00	S 1	1 to 2	14	n/a	1033
	10:00	SE 2	2	16	n/a	1033
	12:00	S 1	1	19	n/a	1033
	14:00	Var	1	19	n/a	1034
	16:00	NE 1-2	1	15	n/a	1033
	18:00	NE 3-4	2	15	n/a	1033
	20:00	NE 3-4	2	15	n/a	1033
	22:00	NE 3-4	2	15	n/a	1033
	24:00:00	NE 3-4	2	15	n/a	1034
06.09.2004	2:00	N 3	0	14	n/a	1035
	4:00	N 3	0	15	n/a	1034
	6:00	NNE 4	2	15	n/a	1035
	8:00	NE 4	3	14	n/a	1035
	10:00	NNE 4	2	16	n/a	1034
	12:00	NE 5	3	19	n/a	1035
	14:00	NE 5	3	19	n/a	1035
	16:00	NE 5	3	15	n/a	1036
	18:00	NE 5	3	15	n/a	1036
	20:00	NE 5-6	3	15	n/a	1037
	22:00	NE 5	3	15	n/a	1037
	24:00:00	NE 5	3	15	n/a	1038
07.09.2004	2:00	ENE 4	3	15	n/a	1039
	4:00	E 4	3	14	n/a	1039

	6:00	E 4	3 to 4	15	n/a	1040
	8:00	E 4	4	15	n/a	1040
	10:00	E 7-8	4	15	n/a	1040
	12:00	E 6-7	4	17	n/a	1040
	14:00	E 6-7	4	15	n/a	1040
	16:00	ENE 6	4	16	n/a	1040
	18:00	ENE 5	4	16	n/a	1039
	20:00	E 5-6	4	17	n/a	1039
	22:00	E 5-6	4	15	n/a	1039
	24:00:00	E 5	4	16	n/a	1040
08.09.2004	2:00	E 6-7	4	15	n/a	1040
	4:00	E 6	4	15	n/a	1040
	6:00	E 6	3 to 4	15	n/a	1040
	8:00	E 6-7	4	15	n/a	1040
	10:00	E 6-7	4	16	n/a	1039
	12:00	E 7-8	5	16	n/a	1039
	14:00	SE 4-5	3	17	n/a	1039
	16:00	ESE 4-5	2	16	n/a	1038
	18:00	ESE 4-5	2	15	n/a	1039
	20:00	ESE 4	2	15	n/a	1038
	22:00	ESE 5-6	2	14	n/a	1038
	24:00:00	ESE 5	2	13	n/a	1038
08.09.2004	2:00	E 3	1	12	n/a	1036
	4:00	E 3	1	12	n/a	1034
	6:00	E 3	1	13	n/a	1034
	8:00	E 3	1	15	n/a	1034

3. Extraneous activities

Non encountered

4. Survey Data and vessel details

DP Survey Vessel *Meridian*



Class	GL +100 A5 K(50) (+)M.C.aut.
Flag / Port of Registry	Germany / Bremen
Gross Tonnage	299 GRT
Dimensions	35.16m x 10.2 (1.3-1.6m draft)
Propulsion	2 X Schottel STP 200 azimuth thrusters
Power	2 X 375kW MAN 2876 LE 402
Bow Thruster	1 X 50 kW electrical
Speed	15.4 kts max / 14 kts cruise economy
Generator Output	2 x 120 kVA, 400/240V~ 50kC Stamford / MAN2866E 1 X 30 kVA / 240V~ 50kC Stamford / Hatz 4L41C/30
Deck Equipment	1 x Palfinger PK 14080MA knuckleboom 1.34 m @ 8.4m 1 X A-Frame 6 m @ height 5m /width 4.2m + winch 6m Hydraulic sonar pole 20ft / 10ft / 8ft 'Twistlock' facilities 0.6m Moonpool
Bridge Equipment	GMDSS A2, Radar Simrad RA73, Gyro Anschütz Std 20, Simrad GN333 DGPS, DP Kongsberg SDP10 / Autopilot, Echo Sounder Atlas Deso 25, ENC -C- Map
Communication	Voice / Fax / E-mail: GSM , Iridium Satphone, Inmarsat

Vessel offsets SV Meridian

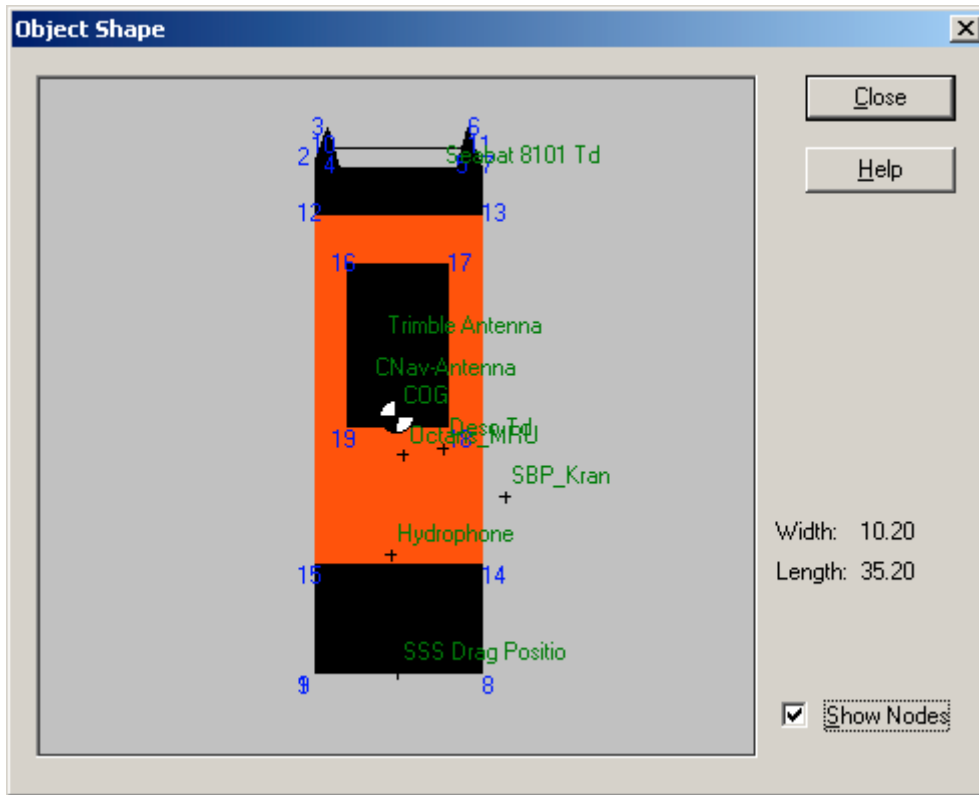


Figure 4-1 Vessel diagram M/V Meridian

Table 4-1 shows the vessel offsets applicable onboard the *Meridian* in the course of the current project. Dimensions provided in metres from the common vessel reference point (Centre of Gravity COG).

The following equipment was used onboard the *SV Meridian*

Equipment:

- DGPS Trimble 4000ssi / Inmarsat RTCM Corrections
- DGPS C-Nav / Starfire Sat Corrections
- Atlas Deso 25 SBES
- Datasonics Chirp II Cap 6600 sub-bottom profiler
- IXSEA Octans motion sensor
- IXSEA Fibre optical gyro
- Nautronix ATS II
- EG&G DF 1000 digital side scan sonar
- EPC Analog SBP paper recorder
- Ultra 120 Analog SSS paper recorder later replaced by second EPC recorder
- AMD SVP
- EIVA CTD

Software:

- QINSy Data Acquisition Software
 - QINSy Data Processing Software
 - Triton Delph Seismic and Chirp II Sub-bottom Data Acquisition Software
 - Tritin Isis Side Scan Sonar Data Acquisition Software
 - HIPS (Hydrographic Information Processing System) incl.
 - HDCS (Hydrographic Data Cleaning System)
 - Autodesk Map Autochart
 - SIPS (Sonar Processing Information System)
 - OSAE tide modelling
- Various other standard software packages

Surface positioning / navigation

Onboard the Meridian, the primary navigation system was based on C-Nav for differential yielding positional accuracy's of better $\pm 0.5m$, while the secondary system a TRIMBLE 4000ssi corrected with pseudo range corrections transmitted in a RTCM code via Sat link.

C-NAV system corrections are not based on traditional pseudo range DGPS. The new methodology is a further enhancement of the WADGPS technique. C-NAV GcGPS operates in real time, providing seamless global coverage and decimetre capable positioning in the marine environment, between the Latitudes of 75 Deg. North and 75 Deg South.

A Geodetic Dual Frequency receiver is embedded in the antenna to correct for the user's local ionosphere range errors. To access the C-NAV global broadcast subscription correction signal service, an integrated L-Band decoder is embedded within the C-NAV receiver.

A global network of reference stations is utilized to track the entire constellation of GPS satellites, which measure the RAW GPS signal observations. These observations are then transmitted via the Internet back to the NetworkControl Center(NCC).

The NCC then calculates and models, in 'real-time' (RTG), all the GPS constellation satellite orbital corrections and also individual delta clock offset values. These orbit and clock correctors are then transmitted to the mobile

user, via geostationary INMARSAT communications satellites.

Typical accuracy:

C-Nav : 2 Sigma +/-0,25m

Trimble : 2 Sigma +/-2.00m

Performance:

No problems encountered.

Sub-surface positioning

For sub-sea positioning of the towed equipment onboard *Meridian*, OSAE used the Nautronix ATS II sub-sea positioning system in conjunction with some Mini Beacons, enabling tracking of towed or lowered equipment in both shallow and deep water.

Nautronix pioneered the development and application of chirp signalling technology in underwater acoustics.

The chirp replaces the normal sinusoidal burst signal with a train of chirps, each sweeping through a range of frequencies. This provides a significant reduction in the effect of multi-pathing, reflection and refraction. It results in the superior performance achieved by the ATS II in the demanding acoustic environments of shallow water, close proximity to structures and towing applications.

The ATS II is an Ultra Short Base Line (USBL) system. The ATS is integrated with the online computer system to provide an accurate and reliable absolute position of transponders and responders mounted on subsurface equipment

Raw data were sent to the navigational computer and corrected within QINSy for heading and attitude .

Typical accuracy:

ATS II : 0,25% of the slant range

Performance:

No problems encountered .

Vessel Motion Compensation

The system used was the iXSEA Octans Motion Sensor. Octans provided true heading, heave , roll , pitch sway ,surge and rates of accelerations even in highly volatile environment.. The Octans measures vertical displacement and vessel attitude. The sensor includes an array of sensitive accelerometers and angular rate sensors measuring the forces of gravity and acceleration acting on the sensor. These signals are converted into measurements of motion and attitude.

Typical accuracy:

Roll / Pitch / Yaw : 0.01°

Range : No limitations

Follow up speed: up to 500°/s

Heave: 5cm or 5% whichever is highest

Resolution: 1cm

Performance:

No problems encountered.

Primary Gyro Compass

The primary gyro installed onboard the *Meridian* was a fibre optical gyro. It's heart consists of a small strap down Inertial Measurement Unit (IMU) which contains three accelerometers, three fibre optical gyro meters and a real time computer. Octans features the benefits of fibre-optic gyro meter technology and therefore shares the advantages of not requiring maintenance and re-calibration. Strap down equation processing enables the

system to find north in less than 5 min whatever the sea conditions may be. To optimise the computation results the sensor was fed by GPS providing correct latitude and speed information.

The gyrocompass was calibrated prior to the survey operation.

Typical accuracy:

Gyro: +/- 0.2° Secant Lat

Resolution: 0.01°

Performance:

No problems encountered.

Secondary Gyro Compass

For this purpose an ANSCHÜTZ Standard 20 Survey Gyro compass was used.

In contrast to north seeking compasses gyro-systems are not corrected for compass deviations. These systems show true values relative to the geographic North Pole. The gyrocompass uses the specific properties of the gyroscope in combination with the rotation of the earth and the effects of gravity.

The gyrocompass was calibrated prior to the survey operation.

After calibration the compass dependably puts out the true heading. This data is directly fed into the QINSy navigation software.

Typical accuracy:

Resolution: higher 0.1°

Performance:

No problems encountered.

Single Beam Echosounder (SBES)

An Atlas Deso 25 EA hydrographic echosounder is permanently installed onboard the *Meridian*. The operating frequencies used by this system are 33 kHz and 200 kHz.

Depths were corrected within the system for S/V and draft (optional)

Performance:

During the mobilisation it was investigated that the paper gear drive was not alive.

Spares were sent to Workington and installed during the port call.

No other problems encountered.

Multibeam Echosounder (MBES)

The *Meridian* was fitted with a Reson 8101 High Resolution MBES where the transducer head contains all electronics required to transmit and receive sonar signals, digitise the returns and transmit them to the surface processor. On the Reson 8101 the seafloor is ensonified by a 150° swath consisting of 101 individual 1,5° x 1,5° beams.

Sonar operating frequency is 240kHz.

The system is designed to International Hydrographic Organisation (IHO) standards to measure the seafloor at a maximum range of 320m.

With an across track subtended angle of 150° the standard Reson 8101 measures a swath width that is 7.4 times the measured water depth, in water depth from 1 to 70 m. Beyond 70 meters water depth the ratio of depth and swath coverage decreases down to 3.2 times depth at 150m.

Data acquisition and real-time data visualisation are realised on a QINSy Win 2002 workstation.

Performance:

No problems encountered.

Side Scan Sonar (SSS)

OSAE used an EG&G DF-1000 Digital Side Scan Sonar together with 500m 11mm coaxial tow cable. The DF-1000 tow fish is a hydro dynamically stable towed body, which contains the transducers, and electronics necessary to generate and receive the side scan sonar signals. And communicate with the surface unit. Where the number of conductors limits the number of data channels in conventional analog systems, this is not the case with the DF-1000. The digital communication link enables both the standard 100kHz side-scan frequency as well as the high-resolution 500kHz frequency data to be simultaneously transmitted to the surface data acquisition SW.

Typical Setup :

Frequency : 100kHz Range 100m-150m

Frequency : 500kHz Range 75m

Performance:

No problems encountered.

Sub-bottom profiler (SBP)

For sub-bottom profiling onboard the *Meridian*, OSAE utilised the Datasonics CAP 6600 Chirp II Acoustic Profiling System. This system uses the advanced chirp technology to produce high-resolution sub-bottom profiles of both the shallow and the deep sub-bottom layers. Chirp sonar technology employs swept FM transmitted signals and digital signal processing and features a greater dynamic range over conventional sub-bottom profiling as well as enhanced resolution. The sub-bottom sonar data are stored digitally in SEG-Y format on hard disk and CD's.

As contractual obligation the data were not processed.

The system operates within the frequency band 2-7 kHz. The transducer array (AT-471 low frequency transducers) is mounted on a TTV 190 tow vehicle. The onboard work unit consists of the DSP 662 transceiver (high power transmitter and receiver) coupled with the PC-based Triton Elics Delph – seismic software suite including display of sub-bottom data and monitoring and control tools for system performance. All relevant settings such as trig rate, hardware gain, power control and chirp length as well as bottom tracking / TVG are software-driven.

Performance:

No problems encountered.

Sound Speed / CTD Profiling

An Applied Microsystem sound velocity probe was carried onboard the Meridian as well as an EIVA CTD probe for determination of sound velocity and salinity within the water column.

The profiles were fed subsequently into the echo sounder systems and the USBL .

The following probes were launched during the survey

Performance:

No problems encountered

Geotek 216/04/803 Sea6_Meridian					
Cruise B					
Date:	Time UTC:	Lat:	Lon:	Depth:	Area:
24.08.04	19:08	53°58'47'' N	003°00'47'' W	25 m	2
25.08.04	00:23	53°40' 08''N	003°22' 00''W	25 m	2
25.08.04	11:54	53°54'25''N	003°12'26'' W	25 m	2
27.08.04	19:36	54°41'59''N	004°17'10'' W	45 m	3
28.08.04	22:57	54°08'40'' N	005°14'21''W	70 m	4
31.08.04	11:30	54°00'05'' N	005°25'07''W	75 m	5
01.09.04	15:01	53°51'27'' N	005°32'11''W	70 m	6
02.09.04	13:39	53°29'43''N	005°15'57''W	70 m	7
02.09.04	20:43	53°26'59''N	005°12'54''W	70 m	7
03.09.04	03:47	53°22'48''N	005°11'09''W	71 m	9
04.09.04	11:55	53°09'33''N	005°19'08''W	70 m	10
05.09.04	14:20	53°17'39''N	005°02'37''W	71 m	10
06.09.04	12:38	53°17'51''N	005°05'31''W	72 m	9
06.09.04	14:43	53°08.58''N	004°57'37'' W	50 m	11
07.09.04	15:08	53°23'22''N	004°45'25''W	65 m	13
08.09.04	17:54	53°54'34''N	003°12'58''W	25 m	2
09.09.04	05:30	53°57'34''N	003°05'14''W	25 m	2

Vertical Control

Vertical control of bathymetric data was archived by a method which was agreed with the UK Maritime and Coastguard agency (MCA) .

During the data acquisition OSAE used a predicted tide file for the actual area generated by OSAE's own SW using harmonic constants and weighted solutions for multiple stations

For the final tide processing Proudman Oceanographic Laboratory (POL) data, were sent upon request to the vessel . POL data contain date, time and correction values for significant positions in the different survey areas . POL data were fed into Caris .

Performance:

During the post processing it was investigated that even the tide-model was not accurate enough. The different data sets were corrected for absolute height with different parameters according to the swath-model. This was done manually and a harmonic seafloor model was archived for the surveyed areas.

Data acquisition and processing system

QINSy Data Acquisition Software

The QINSy real-time integrated navigation and data acquisition software system from QPS (USA) is permanently installed on *SV Meridan*. This software package was used for on-line data acquisition and processing.

The system is characterised by a wide range of sensor inputs, such as navigation, gyrocompass, heave, pitch and roll, echosounder, etc. Navigation parameters are displayed to the helmsman on a monitor and can comprise representations of the selected runline and outline of the vessel, as well as the line bearing, ship's speed and heading, course made good, distance along line, distance off line, standard deviation and ship's position in UTM projection and or WGS 84.

In addition, positional fix data are displayed to the surveyor on a separate monitor, which comprise the ship and offset positions. Fix marks and annotation are sent to such devices as the echosounders, sub-bottom profiler, side scan sonar, etc. All positional and depth data is logged on the internal hard disk every computer cycle, typically once per second.

All raw sensor data is logged and permanently stored in a fast relational database to which the entire survey configuration is copied from the template. Data stored in the database were converted into XTF – Files and transmitted via LAN to HIPS.

The timing in QINSy is based on the PPS option. All incoming and outgoing data were accurately time stamped with an UTC time label. The integrated ring buffer interpolates raw data to the exact moment of ping or event. Using advanced gridding methods a real time sounding grid was available to optimise the survey strategy and open a wide range of QC possibilities such as average standard deviation per cell or hit count per cell.

The sounding grid was generated with a grid cell size of 2m.

Performance:

No problems were encountered apart some minor PC clitches .

ISIS - Delph Seismic Data Acquisition Software

The sub-bottom profiling onboard work unit consisted of the DSP 622 transceiver (high power transmitter and receiver) coupled with the PC-based Triton ISIS Delph-Seismic software suite including display of sub bottom data and monitoring and control tools for system performance. All relevant settings such as trig rate, hardware gain, power control and chirp length as well as bottom tracking / TVG are software-driven.

Performance:

At the first two days of the survey there were major problems with the hard and software.

A service engineer was necessary to solve the problems and set up the SW suite from the scratch. Even the specialised engineer couldn't explain the investigated faults. New software updates were installed to solve the problem

Apart from that – no problems encountered.

HIPS (Hydrographic Information Processing System)

Multibeam bathymetry data were edited using a PC-based version of the well-established Hydrographic Information Processing System incl. Hydrographic Data Cleaning System (HDGS, V5.4)

by Caris-Universal Systems Ltd. Data sets were edited / processed for navigation, motion sensor data (gyro heading, roll, heave and pitch), tide, sound velocity and noise / spikes in the depth values.

The Reson xtf raw data from the Seabat 8101 are converted into HDGS, split into different projects, vessel configurations and days. First, navigation data area edited for possible spikes using self definable filter or

manually. Due to the accurate and stable navigation from C-Nav Starfire DGPS, only a few spikes were found during the whole survey.

The following step is a quick control of gyro heading, roll, heave and pitch for not detected problems during survey operations.

This is followed by swath editing, whereby the depth information of one survey line is filtered for spurious values and not to use data. Flagged as rejected data by this filtering method are all values outside a defined depth range, the 5 outer beams of each ping and all data, which does not meet the internal Reson Brightness and Colinearity quality.

Predicted tides were calculated for each survey area using Proudman Oceanographic Laboratory (POL) data, reduced to LAT. The tide tables contain date, time and correction values and it is applied to each survey line.

The Reson xtf raw data are not corrected for any sound velocity so far. This has to be done inside HDCS using SVP data from the Microsystem sound velocity probe. If the sound velocity correction has been insufficient, the swath editor offers the possibility to insert an artificial additional layer boundary into the water column, where an artificial change of sound velocity (relative to the existing one in m/s) can be added manually. This may be done for files which show obviously wrong sound velocity values. The user can decide what change value has to be added in order to achieve a most probable horizontal profile. A QC check on correct offline adjustment may be carried out later within the subset editor.

Next step is to merge all survey lines so that each single depth value is calculated in respect to vessel offsets (settings found inside the vessel configuration file), motion data, sound velocity and tide data. During this computation each single depth value is supplied with a position, using vessel offsets, gyro heading, motion values and beam angle information.

Within the HDCS subset mode the complete survey area can be covered with a number of squared areas (subsets). This offers the opportunity of surface cleaning with overlapping data from several survey lines.

After cleaning the complete survey area, charting grids of different extension and grid cell sizes were calculated and exported as gridded ascii data and geotiff images for further processing and charting.

Performance:

No problems were encountered.

Caris GIS

Caris GIS a PC-based version was utilised onboard the *Meridian* for final data inspection and to calculate regular DTM's. Caris GIS offers the possibility to calculate DTM's in various methods and generate contours in user defined intervals. Data passed the QC were exported to DXF and further on to the charting utility Autochart.

Performance:

No problems were encountered.

Autodesk Autochart

Autodesk Autochart was utilised onboard the *Meridian* for chart layout and file conversion into PDF.

Performance:

No problems were encountered.

SIPS (Sonar Processing Information System)

Side scan sonar files were processed within the side scan imagery processing software SIPS by Caris Universal Systems. SIPS offers powerful tools for navigation editing, slant range correction, geo-referenced mosaicing of seafloor imagery, identification and measurement of sonar targets, etc. The produced mosaics of different resolutions were subsequently exported as geotif image files to be imported into Autochart.

Performance:

No problems were encountered.

Various other software packages

This included standard PC office software, such as Word, Excel, Powerpoint.

Performance:

No problems were encountered.

5 Geodetic Data

Survey Parameters:

Ellipsoid: WGS 84
Inv. flat.: 298.2572235630
Semi major: 6378137.0000
Projection: UTM (north)
Zone: 30
Org. scale: 0.999600000000
Longitude: -3°00'00.0000"
Latitude: 00'00.0000"
Easting: 500000.0000
Northing: 0.0000
UTM zones: 30 /31

Datum Shift: None

Method: None

Tx : 0.000000 m

Ty : 0.000000 m

Tz : 0.000000 m

Rx : 0.0000000000 °

Ry : 0.0000000000 °

Rz : 0.0000000000 °

PPM : 0.000000

Navigation Systems:

1: GPS1 (NMEA): C-Nav Starfire DGPS

2: GPS2 (NMEA): Trimble 4000ssi RTCM DGPS

6. Tidal Data

Please refer to section no4 “Vertical Control”

7. Environmental Data

Please refer to section no4 “Sound Velocity Profiling”

8. Seabed Features and Contacts

Area 1e Solway Firth :
Fast moving sandbanks due to tidal influences in the surveyed area.
Detailed Comparison with database recommended

9. Coastal Topography

Not observed

10. Geophysical Data

Please refer to section no4

11. Comments

No comment

12. Opinion

Due to the survey strategy on Cruise B it is recommended to use all data. Data at area3 Wigtown Bay were surveyed in rough weather conditions. Line spacing and data density were in some areas less than required for a full IHO survey Order I!

Especially SSS was affected by the poor conditions and it is not recommended to use the SSS data and if so it will be necessary to reprocess SSS Files and interpret them. General SSS and SBP Files are not processed as per contractual obligation.

Weather influences made it difficult to optimise the vertical control. The POL tide model didn't fit in some areas, which means that there is no absolute control possible. This is clearly mentioned in the area reports!

13. Recommendation

None

A General Data

Summary of survey activity:

Overall Progress Cruise B include 09.09.2004

Type	Today (h)	Accum (h)	Remarks
Mob/Demob	5	5	
Operation	5,75	204,75	
Equipment/Downtime	0	1	
Ship/Plant Downtime	0	0	
WOW	0	87	
Transit	1,5	74,5	
Total:	12,25	372,25	

B. Daily Narrative

Contractor: OSAE Client: Geotek (Ltd)

Vessel: SV Meridian Data comm: osae.meridian@skyfile.com Inmarsat C /Telex: 421140860	Project: SEA6_Meridian Bridge Phone GSM : 00 49 172 43 39 150 Bridge Phone Iridium Sat : 0088 162 1420156
Daily Progress Report No.21	Location at 2400 Lat: 53°40'08" N Lon: 003°22'02" W
Date: 24.08.2004	

To Company:	Attention:	E-mail:
OSAE	B. Jeuken / M. Stender	info@osae.de
Geotek	Tim Francis	Tim@Geotek.co.uk
Geotek	Quentin Huggett	Quentin@Geotek.co.uk

Safety

	Today	To Date
Accidents/Incidents	0	0
Near Misses	0	0
Safety Drills	0	2

Surveyed area for the last 24 hours

Area 3	Constable Bank
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Summary of operations 0000-2400

Time UTC	Type	Comments
0000 – 0030	Operation	Survey L64 Constable Bank windfarm ; Hdg N include SSS & SBP
0030 – 0700	Transit	Transit to Heysham for crew change
0700		Alongside Heysham – Sven Christen and Alexandra Frahm disembarking
1000		Alan Judd; Client's Rep for Cruise B embarking
1400		Richard Holmes and Neil Kenyon disembarking
1700		Vessel familiarisation tour for Alan Judd
1830 - 1900	Transit	Transit to SOL for survey at Lune Deep / start of SEA_6 CruiseB
1900 – 1954	Operation	Perform S/V Dip at Lune Deep and deploy SBP / SSS
1954 – 2030	Operation	Survey transit line 1a to Area 1; Hdg SW
2030 – 2130	Downtime	Short circuit in antenna cable of the secondary pos – system Problem temporary fixed !
2130 – 2330	Operation	Survey transit line 1b to Area 1; Hdg SW
2330 – 2400	Operation	Survey transit line 1c to Area 1; Hdg SW

Weather

Weather/sea state conditions	0000-0600	0600-1200	1200-1800	1800-2400	Remarks
	S 2 1	SSW 2 1	N/a N/a	SW 5 3	

Overall Progress

Type	Today (h)	Accum (h)	Remarks
Mob/Demob	0	12,5	
Operation	4,5	346	
Equipment/Downtime	1	29,25	
Ship/Plant Downtime	11,5	22,75	Chargeable
WOW	0	41,75	
Transit	7	46,75	Chargeable
Total:	24	499	

Planned operation for the next 24 hours

Survey Area 1 – survey Lune Deep – proceed to Area 2

OSAE comments

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Purchaser's Representative Comments

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OSAE Party Chief
Marc Kebbel

Geotek Representative
Alan Judd

Contractor: OSAE **Client: Geotek (Ltd)**

Vessel: SV Meridian Data comm: osae.meridian@skyfile.com Inmarsat C /Telex: 421140860	Project: SEA6_Meridian Bridge Phone GSM : 00 49 172 43 39 150 Bridge Phone Iridium Sat : 0088 162 1420156
Daily Progress Report No.22	Location at 2400 Lat: 54°24'18" N Lon: 003°41'06" W
Date: 25.08.2004	

To Company:

Attention:

E-mail:

OSAE	B. Jeuken / M. Stender	info@osae.de
Geotek	Tim Francis	Tim@Geotek.co.uk
Geotek	Quentin Huggett	Quentin@Geotek.co.uk

Safety

	Today	To Date
Accidents/Incidents	0	0
Near Misses	0	0
Safety Drills	1	3

Surveyed area for the last 24 hours

Area 1	Cruise B
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Summary of operations 0000-2400

Time UTC	Type	Comments
0000 – 0135	Operation	Survey transit line 1c to Area 1; Hdg SW
0135 – 0150	Operation	Survey Area 1 L1 ; Hdg N ; Start of survey Area 1
0150 – 0202	Operation	Survey Area 1 L2 –90; Hdg S
0202 – 0216	Operation	Survey Area 1 L3 –170;Hdg N
0216 – 0230	Operation	Survey Area 1 L4 –250; Hdg S
0230 – 0245	Operation	Survey Area 1 L5 –320; Hdg N
0245 – 0301	Operation	Survey Area 1 L6 –400; Hdg S
0301 – 0324	Operation	Survey Area 1 L7 –475; Hdg N
0324 – 0338	Operation	Survey Area 1 L8 –560 ; Hdg S
0338 – 0348	Operation	Survey Area 1 L9 –620 ; Hdg N
0348 – 0358	Operation	Survey Area 1 L10 –720; Hdg S
0358 – 0410	Operation	Survey Area 1 L11 –820; Hdg N
0410 – 0429	Operation	Survey Area 1 L12 –930; Hdg S
0429 – 0453	Operation	Survey Area 1 L13 –1000; Hdg N
0453 – 0505	Operation	Survey Area 1 L14 –1000; Hdg S ; End of survey Area 1
0505 - 0855	Operation	Survey transit line to Area 2 at Lune Deep ; Hdg NE
0855 – 0919	Operation	Survey Area 2 L1 ; Hdg NE ; Start of survey Area 2 at Lune Deep
0919 – 0928	Operation	Survey Area 2 L2 +110; Hdg NE
0928 - 0951	Operation	Survey Area 2 L3 +110; Hdg SW
0951 – 1019	Operation	Survey Area 2 L4 +210; Hdg NE
1019 – 1047	Operation	Survey Area 2 L5 +300; Hdg SW
1047 – 1117	Operation	Survey Area 2 L6 +390; Hdg NE
1117 – 1145	Operation	Survey Area 2 L7 +480; Hdg SW
1145 – 1200	Operation	Recover SSS , perform S/V dip at Lat 53°54'25''N ; Lon 003°12'26''W
1200 -1223	Operation	Safety Drill -> perform fire fighting exercise
1223 - 1247	Operation	Survey Area 2 L8 +570; Hdg NE

1247 – 1314	Operation	Survey Area 2 L9 +640; Hdg SW
1314 – 1341	Operation	Survey Area 2 L10 +710; Hdg NE
1341 –1408	Operation	Survey Area 2 L11 +780; Hdg SW
1408 – 1435	Operation	Survey Area 2 L12 +850; Hdg SW ; End of survey Area 2 due to bad weather
1435 – 2400	Transit	Transit to Survey Area 3 into sheltered water

Weather

Weather/sea state conditions	0000-0600	0600-1200	1200-1800	1800-2400	Remarks
	W 5-6 3-4	NW 6 4	NW 6-7 4	NW 7 4	

Overall Progress

Type	Today (h)	Accum (h)	Remarks
Mob/Demob	0	12,5	
Operation	14,5	360,5	
Equipment/Downtime	0	29,25	
Ship/Plant Downtime	0	22,75	
WOW	0	41,75	
Transit	9,5	56,25	Chargeable
Total:	24	523	

Planned operation for the next 24 hours

Survey Area 3

OSAE comments

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Purchaser's Representative Comments

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OSAE Party Chief
Marc Kebbel

Geotek Representative
Alan Judd

Contractor: OSAE**Client: Geotek (Ltd)**

Vessel: SV Meridian Data comm: osae.meridian@skyfile.com Inmarsat C /Telex: 421140860	Project: SEA6_Meridian Bridge Phone GSM : 00 49 172 43 39 150 Bridge Phone Iridium Sat : 0088 162 1420156
Daily Progress Report No.23	Location at 2400 Lat: 54°47'49" N Lon: 004°17'07" W
Date: 26.08.2004	

To Company:**Attention:****E-mail:**

OSAE	B. Jeuken / M. Stender	info@osae.de
Geotek	Tim Francis	Tim@Geotek.co.uk
Geotek	Quentin Huggett	Quentin@Geotek.co.uk

Safety

	<u>Today</u>	<u>To Date</u>
Accidents/Incidents	0	0
Near Misses	0	0
Safety Drills	0	3

Surveyed area for the last 24 hours

Area 3	Cruise B
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Summary of operations 0000-2400

Time UTC	Type	Comments
0000 – 0445	Transit	Transit to Survey Area 3 into sheltered water
0445 – 0500	Operation	Perform S/V-Dip at Lat 54°42'22"N and Lon 004°17'01"W
0500 – 0535	Operation	Deploy SSS, SBP and lower the ATS hydrophone
0535 – 0639	Operation	Survey Area 3 L1; Hdg N
0639 – 0746	Operation	Survey Area 3 L2; Hdg S
0746 – 0852	Operation	Survey Area 3 L3; Hdg N
0852 – 0929	Operation	Survey Area 3 L4; Hdg S
0929 – 1014	Operation	Survey Area 3 L4; Hdg S
1014 – 1121	Operation	Survey Area 3 L5; Hdg N
1121 – 1225	Operation	Survey Area 3 L6; Hdg S
1225 – 1327	Operation	Survey Area 3 L7; Hdg N
1327 – 1431	Operation	Survey Area 3 L8; Hdg S
1431 – 1536	Operation	Survey Area 3 L9; Hdg N
1536 – 1643	Operation	Survey Area 3 L10; Hdg S
1643 – 1746	Operation	Survey Area 3 L11; Hdg N
1746 – 1854	Operation	Survey Area 3 L12; Hdg S
1854 – 1941	Operation	Survey Area 3 crossline1; Hdg E
1941 - 2055	Operation	Survey Area 3 L13; Hdg N
2055 – 2130	Operation	Survey Area 3 crossline2; Hdg W
2130 – 2400	WOW	Stdby in Area 3 at Lat: 54°47'49" N Lon: 004°17'07" W and waiting on weather

Weather

Weather/sea state conditions	0000-0600	0600-1200	1200-1800	1800-2400	Remarks
	NW 4-5 3	W 5 2	SSW 7-8 4-5	SSW 8-9 5	

Overall Progress

Type	Today (h)	Accum (h)	Remarks
Mob/Demob	0	12,5	
Operation	16,75	377,25	
Equipment/Downtime	0	29,25	
Ship/Plant Downtime	0	22,75	
WOW	2,5	44,25	
Transit	4,75	61	Chargeable
Total:	24	547	

Planned operation for the next 24 hours

Survey Area 3

OSAE comments

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Purchaser's Representative Comments

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OSAE Party Chief
Marc Kebbel

Geotek Representative
Alan Judd

Contractor: OSAE**Client: Geotek (Ltd)**

Vessel: SV Meridian Data comm: osae.meridian@skyfile.com Inmarsat C /Telex: 421140860	Project: SEA6_Meridian Bridge Phone GSM : 00 49 172 43 39 150 Bridge Phone Iridium Sat : 0088 162 1420156
Daily Progress Report No.23	Location at 2400 Lat: 54°47'49" N Lon: 004°17'07" W
Date: 26.08.2004	

To Company:**Attention:****E-mail:**

OSAE	B. Jeuken / M. Stender	info@osae.de
Geotek	Tim Francis	Tim@Geotek.co.uk
Geotek	Quentin Huggett	Quentin@Geotek.co.uk

Safety

	<u>Today</u>	<u>To Date</u>
Accidents/Incidents	0	0
Near Misses	0	0
Safety Drills	0	3

Surveyed area for the last 24 hours

Area 3	Cruise B
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Summary of operations 0000-2400

Time UTC	Type	Comments
0000 – 0445	Transit	Transit to Survey Area 3 into sheltered water
0445 – 0500	Operation	Perform S/V-Dip at Lat 54°42'22"N and Lon 004°17'01"W
0500 – 0535	Operation	Deploy SSS, SBP and lower the ATS hydrophone
0535 – 0639	Operation	Survey Area 3 L1; Hdg N
0639 – 0746	Operation	Survey Area 3 L2; Hdg S
0746 – 0852	Operation	Survey Area 3 L3; Hdg N
0852 – 0929	Operation	Survey Area 3 L4; Hdg S
0929 – 1014	Operation	Survey Area 3 L4; Hdg S
1014 – 1121	Operation	Survey Area 3 L5; Hdg N
1121 – 1225	Operation	Survey Area 3 L6; Hdg S
1225 – 1327	Operation	Survey Area 3 L7; Hdg N
1327 – 1431	Operation	Survey Area 3 L8; Hdg S
1431 – 1536	Operation	Survey Area 3 L9; Hdg N
1536 – 1643	Operation	Survey Area 3 L10; Hdg S
1643 – 1746	Operation	Survey Area 3 L11; Hdg N
1746 – 1854	Operation	Survey Area 3 L12; Hdg S
1854 – 1941	Operation	Survey Area 3 crossline1; Hdg E
1941 - 2055	Operation	Survey Area 3 L13; Hdg N
2055 – 2130	Operation	Survey Area 3 crossline2; Hdg W
2130 – 2400	WOW	Stdby in Area 3 at Lat: 54°47'49" N Lon: 004°17'07" W and waiting on weather

Weather

Weather/sea state conditions	0000-0600	0600-1200	1200-1800	1800-2400	Remarks
	NW 4-5 3	W 5 2	SSW 7-8 4-5	SSW 8-9 5	

Overall Progress

Type	Today (h)	Accum (h)	Remarks
Mob/Demob	0	12,5	
Operation	16,75	377,25	
Equipment/Downtime	0	29,25	
Ship/Plant Downtime	0	22,75	
WOW	2,5	44,25	
Transit	4,75	61	Chargeable
Total:	24	547	

Planned operation for the next 24 hours

Survey Area 3

OSAE comments

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Purchaser's Representative Comments

--

OSAE Party Chief
Marc Kebbel

Geotek Representative
Alan Judd

Contractor: OSAE

Client: Geotek (Ltd)

Vessel: SV Meridian Data comm: osae.meridian@skyfile.com Inmarsat C /Telex: 421140860	Project: SEA6_Meridian Bridge Phone GSM : 00 49 172 43 39 150 Bridge Phone Iridium Sat : 0088 162 1420156
Daily Progress Report No.24	Location at 2400 Lat: 54°32'54" N Lon: 004°32'02" W
Date: 27.08.2004	

To Company:**Attention:****E-mail:**

OSAE	B. Jeuken / M. Stender	info@osae.de
Geotek	Tim Francis	Tim@Geotek.co.uk
Geotek	Quentin Huggett	Quentin@Geotek.co.uk

Safety

	<u>Today</u>	<u>To Date</u>
Accidents/Incidents	0	0
Near Misses	0	0
Safety Drills	0	3

Surveyed area for the last 24 hours

Area 3	Cruise B
--------	----------

Summary of operations 0000-2400

Time UTC	Type	Comments
0000 – 0230	WOW	Stdby in Area 3 at Lat: 54°47'49" N Lon: 004°17'07" W and waiting on weather
0230 – 0332	Operation	Survey Area 3 L14; Hdg S
0332 – 0356	Operation	Survey Area 3 L15; Hdg N
0356 – 0500	Operation	Survey Area 3 L15; Hdg N
0500 – 0600	Operation	Survey Area 3 L16; Hdg S
0600 – 0706	Operation	Survey Area 3 L17; Hdg N
0706 – 0807	Operation	Survey Area 3 L18; Hdg S
0807 – 0827	Operation	Survey Area 3 L19; Hdg N
0827 – 0855	Operation	Survey Area 3 L20; Hdg S
0855 – 1013	Operation	Survey Area 3 L21; Hdg N
1013 – 1034	Operation	Survey Area 3 L22; Hdg S
1034 – 1118	Operation	Survey Area 3 L23; Hdg S
1118 – 1308	Operation	Survey Area 3 crosslines on area of special interest 1; SSS range 50m
1308 – 1453	Operation	Survey Area 3 crosslines on area of special interest 2; SSS range 50m
1453 – 1550	Operation	Survey Area 3 crosslines on area of special interest 3; SSS range 50m
1550 – 1612	Operation	Survey Area 3 L24; Hdg S
1612 – 1658	Operation	Survey Area 3 L25; Hdg S
1658 - 1747	Operation	Survey Area 3 L26; Hdg N
1747 – 1805	Operation	Survey Area 3 L27; Hdg N
1805 – 1839	Operation	Survey Area 3 L28; Hdg S
1839 – 1854	Operation	Survey Area 3 L24; Hdg S
1854 –1927	Operation	Survey Area 3 L24; Hdg S
1927 – 2000	Operation	Perform S/V-Dip at Lat 54°41'54"N and Lon 004°17'10"W Recover SSS and SBP
2000 – 2400	Transit	Proceed to next survey location Area 4 (Pisces)

Weather

Weather/sea state conditions	0000-0230	0230-1200	1200-1800	1800-2400	Remarks
	SSW 8 5	WNW 7 3	WNW 6-7 3	WNW 5 3	

Overall Progress

Type	Today (h)	Accum (h)	Remarks
Mob/Demob	0	12,5	
Operation	17,5	394,75	
Equipment/Downtime	0	29,25	
Ship/Plant Downtime	0	22,75	
WOW	2,5	46,75	
Transit	4	65	Chargeable
Total:	24	571	

Planned operation for the next 24 hours

Survey Area 4 and start with area 5

OSAE comments

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Purchaser's Representative Comments

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OSAE Party Chief
Marc Kebbel

Geotek Representative
Alan Judd

Contractor: OSAE**Client: Geotek (Ltd)**

Vessel: SV Meridian Data comm: osae.meridian@skyfile.com Inmarsat C /Telex: 421140860	Project: SEA6_Meridian Bridge Phone GSM : 00 49 172 43 39 150 Bridge Phone Iridium Sat : 0088 162 1420156
Daily Progress Report No.25	Location at 2400 Lat: 54°07'07" N Lon: 005°16'59" W
Date: 28.08.2004	

To Company:**Attention:****E-mail:**

OSAE	B. Jeuken / M. Stender	info@osae.de
Geotek	Tim Francis	Tim@Geotek.co.uk
Geotek	Quentin Huggett	Quentin@Geotek.co.uk

Safety

	Today	To Date
Accidents/Incidents	0	0
Near Misses	0	0
Safety Drills	0	3

Surveyed area for the last 24 hours

Area 4	Cruise B
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Summary of operations 0000-2400

Time UTC	Type	Comments
0000 – 0400	Transit	Proceed to next survey location Area 4 (Pisces)
0400 – 0435	Operation	Deploy SBP and SSS
0435 – 0453	Operation	Perform S/V Dip at Area 4
0453 – 0516	Operation	Survey Area 4 L01; Hdg W
0516 – 0616	Downtime	Fix problem on SBES paper drive
0616 – 0652	Operation	Survey Area 4 L02; Hdg E
0652 – 0730	Operation	Survey Area 4 L03; Hdg W
0730 – 0801	Operation	Survey Area 4 L04; Hdg E
0801 – 0905	Operation	Survey Area 4 L05; Hdg W
0905 – 0929	Operation	Survey Area 4 L06; Hdg E
0929 – 1001	Operation	Survey Area 4 L07; Hdg W
1001 – 1059	Operation	Survey crossline Area 4 L08; Hdg S
1059 – 1142	Operation	Survey Area 4 L09; Hdg W
1142 – 1238	Operation	Survey Area 4 L10; Hdg E
1238 – 1307	Operation	Survey Area 4 L11; Hdg W
1307 – 1337	Operation	Survey Area 4 L12; Hdg E
1337 – 1408	Operation	Survey Area 4 L13; Hdg W
1408 – 1439	Operation	Survey Area 4 L14; Hdg E
1439 – 1510	Operation	Survey Area 4 L15; Hdg W
1510 – 1540	Operation	Survey Area 4 L16; Hdg E
1540 – 1610	Operation	Survey Area 4 L17; Hdg W
1610 – 1642	Operation	Survey Area 4 L18; Hdg E
1642 – 1710	Operation	Survey Area 4 L19; Hdg W
1710 – 1740	Operation	Survey Area 4 L20; Hdg E
1740 – 1811	Operation	Survey Area 4 L21; Hdg W
1811 – 1843	Operation	Survey Area 4 L22; Hdg E

1843 – 1913	Operation	Survey Area 4 L23; Hdg W
1913 – 1943	Operation	Survey Area 4 L24; Hdg E
1943 – 2015	Operation	Survey Area 4 L25; Hdg W
2015 – 2044	Operation	Survey Area 4 L26; Hdg E
2044 – 2112	Operation	Survey Area 4 L27; Hdg W
2112 – 2144	Operation	Survey Area 4 L28; Hdg E
2144 – 2237	Operation	Survey Area 4 L29; Hdg W
2237 – 2253	Operation	Survey Area 4 L30 cross line; Hdg S
2253 – 2315	Operation	Perform S/V dip at 54°08'04''N and 005°14'21''W
2315 - 2400	Transit	Proceed to next survey location Area5 “Yuan’s Pockmarks”

Weather

Weather/sea state conditions	0000-0230	0230-1200	1200-1800	1800-2400	Remarks
	SW 4 3	W 4 2	SW 5 3	SW 5-6 3	

Overall Progress

Type	Today (h)	Accum (h)	Remarks
Mob/Demob	0	12,5	
Operation	18,25	413	
Equipment/Downtime	1	30,25	
Ship/Plant Downtime	0	22,75	
WOW	0	46,75	
Transit	4,75	69,75	Chargeable
Total:	24	595	

Planned operation for the next 24 hours

Survey Area 5 – port call Isle of Man for crew change

OSAE comments

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Purchaser's Representative Comments

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OSAE Party Chief
Marc Kebbel

Geotek Representative
Alan Judd

Contractor: OSAE

Client: Geotek (Ltd)

Vessel: SV Meridian Data comm: osae.meridian@skyfile.com Inmarsat C /Telex: 421140860	Project: SEA6_Meridian Bridge Phone GSM : 00 49 172 43 39 150 Bridge Phone Iridium Sat : 0088 162 1420156
Daily Progress Report No.26	Location at 2400: Alongside Douglas "Isle of Man"
Date: 29.08.2004	

To Company:**Attention:****E-mail:**

OSAE	B. Jeuken / M. Stender	info@osae.de
Geotek	Tim Francis	Tim@Geotek.co.uk
Geotek	Quentin Huggett	Quentin@Geotek.co.uk

Safety

	Today	To Date
Accidents/Incidents	0	0
Near Misses	0	0
Safety Drills	0	3

Surveyed area for the last 24 hours

Area 4	Cruise B
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Summary of operations 0000-2400

Time UTC	Type	Comments
0000 – 0330	Transit	Proceed to next survey location Area 5 Yuan's Pockmarks
0330 – 0400	Transit	Run several lines in several headings to find a possibility to start the survey area 5:
0400 – 0800	WOW	Stdby in the survey area – waiting on weather
0800 – 1430	Transit	Proceed to Isle of Man into sheltered water and for crew change
1430 – 2400 1830	WOW	Waiting on weather Embarking: Alexandra Frahm (Cad)

Weather

Weather/sea state conditions	0000-0600	0600-1200	1200-1800	1800-2400	Remarks
	SW 7 4-5	SW 6-7 5	SW 7 5	SW 7 5	

Overall Progress

Type	Today (h)	Accum (h)	Remarks
Mob/Demob	0	12,5	
Operation	0	413	
Equipment/Downtime	0	30,25	
Ship/Plant Downtime	0	22,75	
WOW	12,5	59,25	
Transit	11,5	81,25	Chargeable
Total:	24	619	

Planned operation for the next 24 hours

WOW and transit to survey area 5

OSAE comments

Due to rough sea states we had to leave the survey area earlier than planned.
Crew Change was planned for Port St Mary, Isle of Man but due to the weather conditions there was no free slot in the port so we had to sail further north to Douglas, Isle of Man.
WOW in Douglas till the sea state is suitable for our way to area5.

Purchaser's Representative Comments

There has been a debate about whether the transit to the Isle of Man should be chargeable (as we were seeking shelter) or not (as it facilitated a planned crew change).

OSAE Party Chief
Marc Kebbel

Geotek Representative
Alan Judd

Weather

Weather/sea state conditions	0000-0600	0600-1200	1200-1800	1800-2400	Remarks
	SW 7 4-5	SW 6-7 5	W 7 5	WSW 5 4	According W-forecast

Overall Progress

Type	Today (h)	Accum (h)	Remarks
Mob/Demob	0	12,5	
Operation	0	413	
Equipment/Downtime	0	30,25	
Ship/Plant Downtime	0	22,75	
WOW	24	83,25	
Transit	0	81,25	
Total:	24	643	

Planned operation for the next 24 hours

WOW and transit to survey area 5

OSAE comments

Weather observations transmitted by incoming or outgoing sea ferries.

Purchaser's Representative Comments

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OSAE Party Chief
Marc Kebbel

Geotek Representative
Alan Judd

Weather

Weather/sea state conditions	0000-0600	0600-1200	1200-1800	1800-2400	Remarks
	SSW 3	SSW 3	S 4	S 4-5	
	4	2	1	2	

Overall Progress

Type	Today (h)	Accum (h)	Remarks
Mob/Demob	0	12,5	
Operation	12,5	425,5	
Equipment/Downtime	0	30,25	
Ship/Plant Downtime	0	22,75	
WOW	7	90,25	
Transit	4,5	85,75	Chargeable
Total:	24	667	

Planned operation for the next 24 hours

Finish survey Area5 and start survey Area6
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OSAE comments

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Purchaser's Representative Comments

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OSAE Party Chief
Marc Kebbel

Geotek Representative
Alan Judd

Contractor: OSAE

Client: Geotek (Ltd)

Vessel: SV Meridian Data comm: osae.meridian@skyfile.com Inmarsat C /Telex: 421140860	Project: SEA6_Meridian Bridge Phone GSM : 00 49 172 43 39 150 Bridge Phone Iridium Sat : 0088 162 1420156
Daily Progress Report No.29	Location at 2400: Lat: 53°50'48,5"N Lon: 005°31'41,4"W
Date: 01.09.2004	

To Company:**Attention:****E-mail:**

OSAE	B. Jeuken / M. Stender	info@osae.de
Geotek	Tim Francis	Tim@Geotek.co.uk
Geotek	Quentin Huggett	Quentin@Geotek.co.uk

Safety

	Today	To Date
Accidents/Incidents	0	0
Near Misses	0	0
Safety Drills	1	4

Surveyed area for the last 24 hours

Area 4 /5	Yuan's Pockmarks/Peel Bassin
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Summary of operations 0000-2400

Time UTC	Type	Comments
0000 – 0029	Operation	Survey Area5 L09; Hdg W
0029 – 0141	Operation	Survey Area5 L10; Hdg E
0141 – 0257	Operation	Survey Area5 L11; Hdg W
0257 – 0410	Operation	Survey Area5 L12; Hdg E
0410 – 0526	Operation	Survey Area5 L13; Hdg W
0526 – 0653	Operation	Survey Area5 L14; Hdg E
0653 – 0753	Operation	Survey cross line2; Hdg S
0753 – 0820	Operation	Survey cross line3; Hdg N
0820 – 0918	Operation	Survey cross line4; Hdg S
0918 – 1008	Operation	Survey cross line5; Hdg N
1008 - 1209	Operation	Survey reconnaissance line1
1145 – 1210	Operation	Safety drill: perform fire drill and abandon ship exercise – survey ongoing
1210 - 1410	Operation	Survey reconnaissance line2
1410 – 1541	Operation	Survey reconnaissance line3; recover SSS due to weak beacon signal at EOL
1541 – 1632	Operation	Survey Area6 L01; Hdg S; SSS navigation via manual layback due to insufficient beacon signal on both beacons
1632 – 1724	Operation	Survey Area6 L02; Hdg N
1724 – 1818	Operation	Survey Area6 L03; Hdg S
1818 – 1908	Operation	Survey Area6 L04; Hdg N
1908 – 1957	Operation	Survey Area6 L05; Hdg S
1957 – 2046	Operation	Survey Area6 L06; Hdg N
2046 – 2138	Operation	Survey Area6 L07; Hdg S
2138 – 2229	Operation	Survey Area6 L08; Hdg N
2229 – 2315	Operation	Survey Area6 L09; Hdg S
2315 – 2400	Operation	Survey Area6 L10; Hdg N

Weather

Weather/sea state conditions	0000-0600	0600-1200	1200-1800	1800-2400	Remarks
	S 4 2-3	S 4 2-3	S 4 2	S 4-5 2-3	

Overall Progress

Type	Today (h)	Accum (h)	Remarks
Mob/Demob	0	12,5	
Operation	24	449,5	
Equipment/Downtime	0	30,25	
Ship/Plant Downtime	0	22,75	
WOW	0	90,25	
Transit	0	85,75	
Total:	24	691	

Planned operation for the next 24 hours

Finish survey Area6 and start survey Area7
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OSAE comments

Weak signals on the ATS beacon observed. OSAE will send a replacement to Holyhead. Equipment will be picked up during next port call. It was agreed with the client to carry on with manual layback.
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Purchaser's Representative Comments

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OSAE Party Chief
Marc Kebbel

Geotek Representative
Alan Judd

Contractor: OSAE Client: Geotek (Ltd)

Vessel: SV Meridian Data comm: osae.meridian@skyfile.com Inmarsat C /Telex: 421140860	Project: SEA6_Meridian Bridge Phone GSM : 00 49 172 43 39 150 Bridge Phone Iridium Sat : 0088 162 1420156
Daily Progress Report No.30	Location at 2400: Lat: 53°26'06,7"N Lon: 005°13'21,1"W
Date: 02.09.2004	

To Company:	Attention:	E-mail:
OSAE	B. Jeuken / M. Stender	info@osae.de
Geotek	Tim Francis	Tim@Geotek.co.uk
Geotek	Quentin Huggett	Quentin@Geotek.co.uk

Safety

	<u>Today</u>	<u>To Date</u>
Accidents/Incidents	0	0
Near Misses	0	0
Safety Drills	0	4

Surveyed area for the last 24 hours

Area 6/7	Peel Basin / Texel 10/11
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Summary of operations 0000-2400

Time UTC	Type	Comments
0000 – 0110	Operation	Survey Area6 L11; Hdg S
0110 – 0205	Operation	Survey Area6 L12; Hdg N
0205 – 0302	Operation	Survey Area6 L13; Hdg S
0302 – 0401	Operation	Survey Area6 L14; Hdg N
0401 – 0457	Operation	Survey Area6 L15; Hdg S
0457 – 0551	Operation	Survey Area6 L16; Hdg N
0551 – 0621	Operation	Survey Area6 cross line6; Hdg W
0621 – 0730	Operation	Survey Area6 L17; Hdg S
0730 – 0758	Operation	Survey Area6 cross line7; Hdg W
0758 – 0903	Operation	Survey Area6; Hdg N
0903 - 1003	Operation	Survey Area6; Hdg S
1003 – 1030	Operation	Recover SSS and perform final S/V dip
1030 - 1345	Transit	Transit to next survey site – Area7 Texel11
1345 – 1400	Operation	Deploy SSS and perform S/V – dip at Lat 53°29'43"N and Lon 005°15'57"W
1400 – 1439	Operation	Survey Area7 L01; Hdg SE;
1439 – 1541	Operation	Survey Area7 L02; Hdg N
1541 – 1636	Operation	Survey Area7 L03; Hdg S
1636 – 1716	Operation	Survey Area7 L04; Hdg N
1716 – 1754	Operation	Survey Area7 L05; Hdg S
1754 – 1905	Operation	Survey Area7 L06; Hdg N
1905 – 1928	Operation	Survey Area7 L07; Hdg S
1928 – 2020	Operation	Survey Area7 L08; Hdg N
2020 – 2120	Transit	Transit to next survey site – Area8 Texel10
2120 – 2154	Operation	Survey Area8 L01; Hdg SE
2154 – 2231	Operation	Survey Area8 L02; Hdg NW

2231 – 2320	Operation	Survey Area8 L03; Hdg SE
2320 – 2400	Operation	Survey Area8 L04; Hdg NW

Weather

Weather/sea state conditions	0000-0600	0600-1200	1200-1800	1800-2400	Remarks
	SW 3	SW 3	S W4	SW 4-5	
	2	2	2	2-3	

Overall Progress

Type	Today (h)	Accum (h)	Remarks
Mob/Demob	0	12,5	
Operation	19,75	469,25	
Equipment/Downtime	0	30,25	
Ship/Plant Downtime	0	22,75	
WOW	0	90,25	
Transit	4,25	90	
Total:	24	715	

Planned operation for the next 24 hours

Finish survey Area 8 & 9

OSAE comments

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Purchaser's Representative Comments

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OSAE Party Chief
Marc Kebbel

Geotek Representative
Alan Judd

Weather

Weather/sea state conditions	0000-0600	0600-1200	1200-1800	1800-2400	Remarks
	SW 6-7 3	SW 7 3-4	S W7 4	SW 6-7 3	

Overall Progress

Type	Today (h)	Accum (h)	Remarks
Mob/Demob	0	12,5	
Operation	7,5	476,75	
Equipment/Downtime	0	30,25	
Ship/Plant Downtime	0	22,75	
WOW	11,5	101,75	
Transit	5	95	Chargeable
Total:	24	739	

Planned operation for the next 24 hours

Finish survey Area 9 and start survey Area10
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OSAE comments

<p>Poor weather conditions at Area9 let us abandon the survey area and steam to Holyhead. Max. depth of approx. 180m at Harvey's Trench will probably cause difficulties in flying the SSS fish in appropriate height due to the limited wire capacity on the survey winch. Amount of wire on the winch was designed for approx. max depth of 130m.</p>

Purchaser's Representative Comments

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OSAE Party Chief
Marc Kebbel

Geotek Representative
Alan Judd

Weather

Weather/sea state conditions	0000-0600	0600-1200	1200-1800	1800-2400	Remarks
	SSW 6-7 4	SSW 6 3-4	SW 5 2-3	SSW 6 3	

Overall Progress

Type	Today (h)	Accum (h)	Remarks
Mob/Demob	0	12,5	
Operation	11,5	488,25	
Equipment/Downtime	0	30,25	
Ship/Plant Downtime	0	22,75	
WOW	8,5	110,25	
Transit	4	99	Chargeable
Total:	24	763	

Planned operation for the next 24 hours

Finish survey Area10 and start survey Area9

OSAE comments

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Purchaser's Representative Comments

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OSAE Party Chief
Marc Kebbel

Geotek Representative
Alan Judd

Contractor: OSAE Client: Geotek (Ltd)

Vessel: SV Meridian Data comm: osae.meridian@skyfile.com Inmarsat C /Telex: 421140860	Project: SEA6_Meridian Bridge Phone GSM : 00 49 172 43 39 150 Bridge Phone Iridium Sat : 0088 162 1420156
Daily Progress Report No.34	Location at 2400: Lat: 53°07'45"N Lon: 004°55'39"W
Date: 06.09.2004	

To Company:	Attention:	E-mail:
OSAE	B. Jeuken / M. Stender	info@osae.de
Geotek	Tim Francis	Tim@Geotek.co.uk
Geotek	Quentin Huggett	Quentin@Geotek.co.uk

Safety

	<u>Today</u>	<u>To Date</u>
Accidents/Incidents	0	0
Near Misses	0	0
Safety Drills	0	4

Surveyed area for the last 24 hours

Area 10 / 11	Harvey's Trench / Whittington's Domes
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Summary of operations 0000-2400

Time UTC	Type	Comments
0002 – 0054	Operation	Survey Area10 L05; Hdg S
0016 – 0206	Operation	Survey Area10 L06; Hdg N
0206 – 0400	Operation	Survey Area10 L07; Hdg S
0400 – 0614	Operation	Survey Area10 L08; Hdg S
0614 – 0724	Operation	Survey Area10 cross line01; Hdg W
0724 – 0914	Operation	Survey Area10 L09; Hdg S
0914 – 0951	Operation	Survey Area10 cross line02; Hdg W
0951 – 1139	Operation	Survey Area10 L10; Hdg N
1139 – 1208	Operation	Survey Area10 L11; Hdg N
1208 – 1230	Operation	Perform final S/V Dip and recover SSS
1230 – 1430	Transit	Transit to survey Area 9 – Harvey's Trench
1430 – 1445	Operation	Perform S/V Dip at Lat 53°17'39''N and Lon 005°02'37''W and deploy SSS
1445 - 1548	Operation	Survey Area09 L01; Hdg NW
1548 – 1700	Operation	Survey Area09 L02; Hdg SE
1700 – 1817	Operation	Survey Area09 L03; Hdg NW
1817 – 1924	Operation	Survey Area09 L04; Hdg SE
1924 – 2002	Operation	Survey Area09 L05; Hdg NW
2002 – 2116	Operation	Survey Area09 L06; Hdg SE
2116 – 2146	Operation	Survey Area09 L07; Hdg NW
2146 – 2307	Operation	Survey Area09 L08; Hdg SE
2307 - 0002	Operation	Survey Area09 L09; Hdg NW

Weather

Weather/sea state conditions	0000-0600	0600-1200	1200-1800	1800-2400	Remarks
	SSW 6 3	S3 2	Var 1 1	NE 3 1-2	

Overall Progress

Type	Today (h)	Accum (h)	Remarks
Mob/Demob	0	12,5	
Operation	22	510,25	
Equipment/Downtime	0	30,25	
Ship/Plant Downtime	0	22,75	
WOW	0	110,25	
Transit	2	101	Chargeable
Total:	24	787	

Planned operation for the next 24 hours

Finish survey Area9 and start survey Area11

OSAE comments

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Purchaser's Representative Comments

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OSAE Party Chief
Marc Kebbel

Geotek Representative
Alan Judd

Contractor: OSAE

Client: Geotek (Ltd)

Vessel: SV Meridian Data comm: osae.meridian@skyfile.com Inmarsat C /Telex: 421140860	Project: SEA6_Meridian Bridge Phone GSM : 00 49 172 43 39 150 Bridge Phone Iridium Sat : 0088 162 1420156
Daily Progress Report No.34	Location at 2400: Lat: 53°07'45"N Lon: 004°55'39"W
Date: 06.09.2004	

To Company:**Attention:****E-mail:**

OSAE	B. Jeuken / M. Stender	info@osae.de
Geotek	Tim Francis	Tim@Geotek.co.uk
Geotek	Quentin Huggett	Quentin@Geotek.co.uk

Safety

	Today	To Date
Accidents/Incidents	0	0
Near Misses	0	0
Safety Drills	0	4

Surveyed area for the last 24 hours

Area 10 / 11	Harvey's Trench / Whittington's Domes
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Summary of operations 0000-2400

Time UTC	Type	Comments
0002 – 0054	Operation	Survey Area09 L10; Hdg NE
0054 – 0154	Operation	Survey Area09 L11; Hdg SW
0154 – 0228	Operation	Survey Area09 L12; Hdg NE
0228 – 0311	Operation	Survey Area09 L13; Hdg SW
0311 – 0353	Operation	Survey Area09 L14; Hdg NE
0353 – 0442	Operation	Survey Area09 L15; Hdg SW
0442 – 0530	Operation	Survey Area09 L16; Hdg NE
0530 – 0652	Operation	Survey Area09 L17; Hdg SW
0652 – 0734	Operation	Survey Area09 L18; Hdg NE
0734 – 0754	Operation	Survey Area09 L19; Hdg SW
0754 – 0828	Operation	Survey Area09 L20; Hdg NE
0828 – 0848	Operation	Survey Area09 L21; Hdg SW
0848 – 0905	Operation	Survey Area09 L22; Hdg NE
0905 – 0925	Operation	Survey Area09 L23; Hdg SW
0925 – 0943	Operation	Survey Area09 L24; Hdg NE
0943 – 1001	Operation	Survey Area09 L25; Hdg SW
1001 – 1021	Operation	Survey Area09 L26; Hdg NE
1021 – 1039	Operation	Survey Area09 L27; Hdg SW
1039 – 1109	Operation	Survey Area09 L28; Hdg NE
1109 – 1126	Operation	Survey Area09 L29; Hdg SW
1126 – 1144	Operation	Survey Area09 L30; Hdg NE
1144 – 1201	Operation	Survey Area09 L31; Hdg SW
1201 - 1225	Operation	Survey Area09 L32; Hdg NE
1225 – 1245	Operation	Perform final S/V Dip at Area09
1245 - 1430	Operation	Survey reconnaissance line to Area11
1430 – 1459	Operation	Perform S/V Dip at Area11
1459 – 2400	Operation	Survey several short cross lines in E-W/W-E to cover Area11

Weather

Weather/sea state conditions	0000-0600	0600-1200	1200-1800	1800-2400	Remarks
	NE 5 2	NE 5 2	NE 4 2	NE 5 3	

Overall Progress

Type	Today (h)	Accum (h)	Remarks
Mob/Demob	0	12,5	
Operation	24	534,25	
Equipment/Downtime	0	30,25	
Ship/Plant Downtime	0	22,75	
WOW	0	110,25	
Transit	0	101	
Total:	24	811	

Planned operation for the next 24 hours

Finish survey Area11

OSAE comments

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Purchaser's Representative Comments

OSAE Party Chief
Marc Kebbel

Geotek Representative
Alan Judd

Weather

Weather/sea state conditions	0000-0600	0600-1200	1200-1800	1800-2400	Remarks
	E 6 3	E 6-7 3-4	E 7 4	E 6-7 4	

Overall Progress

Type	Today (h)	Accum (h)	Remarks
Mob/Demob	0	12,5	
Operation	4,5	538,75	
Equipment/Downtime	0	30,25	
Ship/Plant Downtime	0	22,75	
WOW	10,5	120,75	
Transit	9	110	Chargeable
Total:	24	835	

Planned operation for the next 24 hours

Survey Area12 Central Trench

OSAE comments

Area 13 was surveyed only with MBES. It was agreed with the client only to produce an unedited Shaded Relief Geo-Tiff. .

Purchaser's Representative Comments

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OSAE Party Chief
Marc Kebbel

Geotek Representative
Alan Judd

Weather

Weather/sea state conditions	0000-0600	0600-1200	1200-1800	1800-2400	Remarks
	ESE 7 4	E 7-8 4-5	ESE 4-5 3-4	SE 3 1-2	

Overall Progress

Type	Today (h)	Accum (h)	Remarks
Mob/Demob	0	12,5	
Operation	6,25	545	
Equipment/Downtime	0	30,25	
Ship/Plant Downtime	0	22,75	
WOW	8	128,75	
Transit	9,75	119,75	Chargeable
Total:	24	859	

Planned operation for the next 24 hours

Port Call in Heysham end of geophysical survey operations – demob – mob for Cruise C
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OSAE comments

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Purchaser's Representative Comments

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OSAE Party Chief
Marc Kebbel

Geotek Representative
Alan Judd

Weather

Weather/sea state conditions	0000-0600	0600-1200	1200-1800	1800-2400	Remarks
	SE 3 1	SE 3 1			

Overall Progress

Type	Today (h)	Accum (h)	Remarks
Mob/Demob	5	12,5	
Operation	5,75	545	
Equipment/Downtime	0	30,25	
Ship/Plant Downtime	0	22,75	
WOW	0	128,75	
Transit	1,5	119,75	Chargeable
Total:	12,25	859	

Planned operation for the next 24 hours

Mob for Cruise C

OSAE comments

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Purchaser's Representative Comments

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OSAE Party Chief
Marc Kebbel

Geotek Representative
Alan Judd

C. Survey Data

C.1 Area 1

General:

The average number of hit counts and the amount of cross profiles don't meet MCA requirements. Figure C.1-1 shows a statistic figure of the standard deviation of the surveyed area.

The statistic is based on 2m*2m grid cell size.

All lines were surveyed in N/S-S/N directions. The poor weather conditions degraded the quality of the data on all lines. Nevertheless all data were processed in the best possible survey manner. The transit to the Area was logged and the data are digitally stored. It was agreed with the client not to process or chart the transit data.

All other data were processed for spikes, tide corrected to LAT (Lowest Astronomical Tide) and charted.

The SSS and Bathymetry data are available as XTF files.

SSS and SBP data have not been fully interpreted as per contractual obligation.

SSS was set to 100 kHz and 100m range !

The Chirp sub bottom profiler was triggered with 0.25 s and a chirp length of 10 milliseconds.

SBP data are available as Tra files which are 16-Bit Motorola SegY Files

Bathymetry:

The line spacing was a choice of the client and driven by the MBES swath width. The survey was laid out to reach 100% coverage of the area. One sound velocity dip was performed. No planned cross lines were surveyed.

Vertical control

Tide values were extracted from a standard tide program. The used tide station was Hilbre Island

The station was fed into OSAE's tide processing SW and a tide model was generated for the hole area. This guarantees a "relative" accurate model, which is again only a model, and not as accurate as real time tide gauges which can provide an "absolute" model. The error budget for the used tide data was according the SW 22cm!

Side Scan Sonar: / Sub Bottom Profiler:

SSS was set to 100 kHz and 100m range.

The Chirp sub bottom profiler was triggered with 0.25 s and a chirp length of 10 milliseconds.

SSS data are available as XTF-Files.

SBP data are available as Tra files which are 16-Bit Motorola SegY Files but saved by the data acquisition SW as *.Tra!

It is not necessary to rename the files. Most seismic processing packages are able to import the data directly as SegY.

OSAE tested the data import on REFLEX seismic processing SW and on ER Mapper visualisation SW without having any problems!

SSS records were annotated throughout the SW package and printed on an EPC 9600 plotter.

SBP records were annotated throughout the SW package and printed on an EPC 9600 plotter.

Especially the SSS records were affected by the weather on some lines but according to the client still of acceptable value which didn't represent OSAE's opinion in all stages.

Charting :

OSAE and the client worked out the layout. One chart was generated for that area containing.

6 boxes. Box one representing bathymetry – contour lines;

Box two representing bathymetry – shaded relief view; box three representing SSS – mosaic; box 4 representing SSS-tracks; box 5 representing SBP- tracks and box 6 representing the location map.

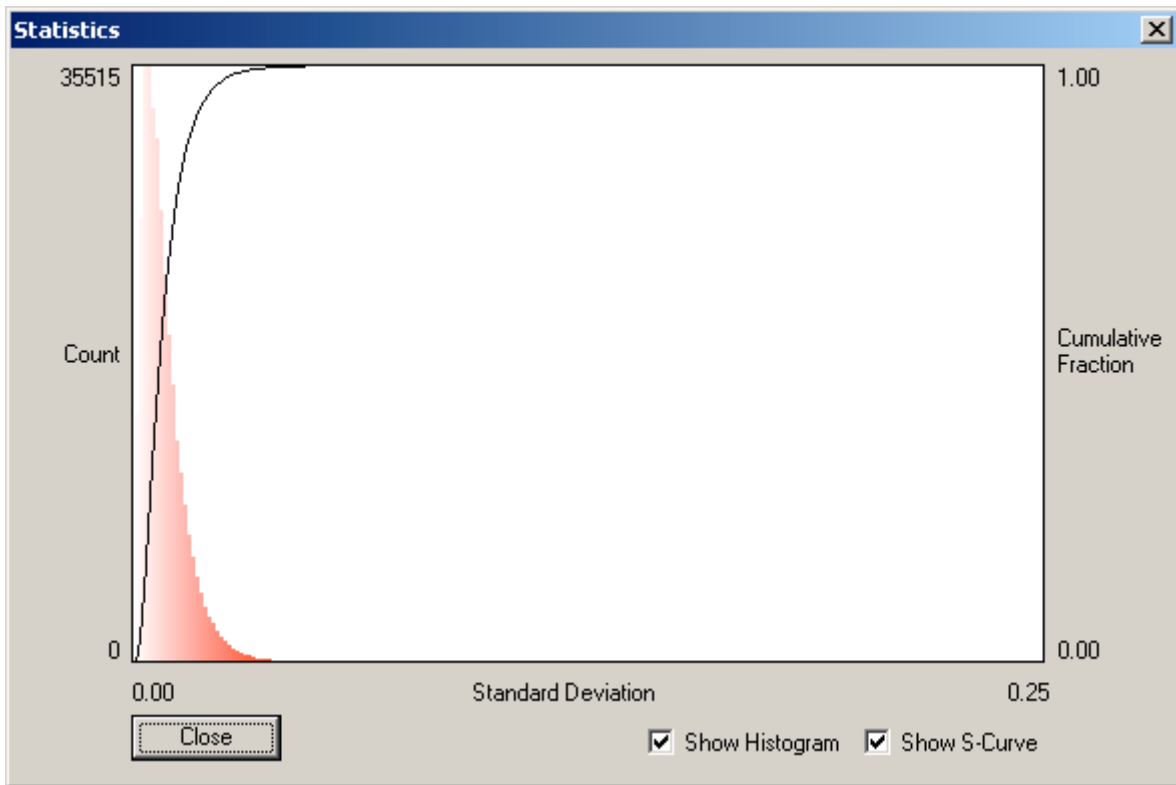


Figure C.1-1 Statistic – Standard Deviation Area1 Cruise B

C.2 Area2 – Lune Deep

General:

The average number of hit counts and the amount of cross profiles don't meet MCA requirements. Figure 8.2.1-2 shows the standard deviation of the surveyed area..

The survey area was abandoned due to the poor weather conditions and therefore regarded as finished.

Nevertheless all data were processed in the best possible survey manner. The transit to the Area was logged and the data are digitally stored. This data set is not processed or charted.

All other data were processed for spikes, tide corrected to LAT (Lowest Astronomical Tide) and charted.

The SSS and Bathymetry data are available as XTF files.

SSS and SBP data have not been fully interpreted as per contractual obligation.

SSS was set to 100 kHz and 100m range!

The Chirp sub bottom profiler was triggered with 0.25 s and a chirp length of 10 milliseconds.

SBP data are available as Tra files which are 16-Bit Motorola SegY Files.

Bathymetry:

The line spacing was a choice of the client and driven by the MBES swath

width. The survey was laid out to reach 100% coverage of the area. One sound velocity dip was performed. No planned cross lines were surveyed.

Vertical control

No POL data were required for that area due to the. Tide values were extracted from a standard tide program. The used tide stations was Fleetwood

The station was fed into OSAE's tide processing SW and a tide model was generated for the hole area. This guarantees a "relative" accurate model, which is again only a model, and not as accurate as real time tide gauges which can provide an "absolute" model. The error budget for the used tide data was according the SW 22cm !

Side Scan Sonar: / Sub Bottom Profiler:

SSS was set to 100 kHz and 100m range .

The Chirp sub bottom profiler was triggered with 0.25 s and a chirp length of 10 milliseconds.

SSS data are available as XTF-Files.

SBP data are available as Tra files which are 16-Bit Motorola SegY Files but saved by the data acquisition SW as *.Tra!

It is not necessary to rename the files. Most seismic processing packages are able to import the data directly as SegY.

OSAE tested the data import on REFLEX seismic processing SW and on ER Mapper visualisation SW without having any problems!

SSS records were annotated throughout the SW package and printed on an EPC 9600 plotter.

SBP records were annotated throughout the SW package and printed on an EPC 9600 plotter.

Especially the SSS records were affected by the weather on some lines but according to the client still of acceptable value that didn't represent OSAE's opinion in all stages.

Charting :

OSAE and the client worked out the layout. One chart containing five boxes was generated for that area.

Box one representing bathymetry – contour lines;

Box two representing bathymetry – shaded relief view; Box three representing SSS – mosaic; Box 4 representing SSS-tracks and Box 5 representing SBP- tracks.

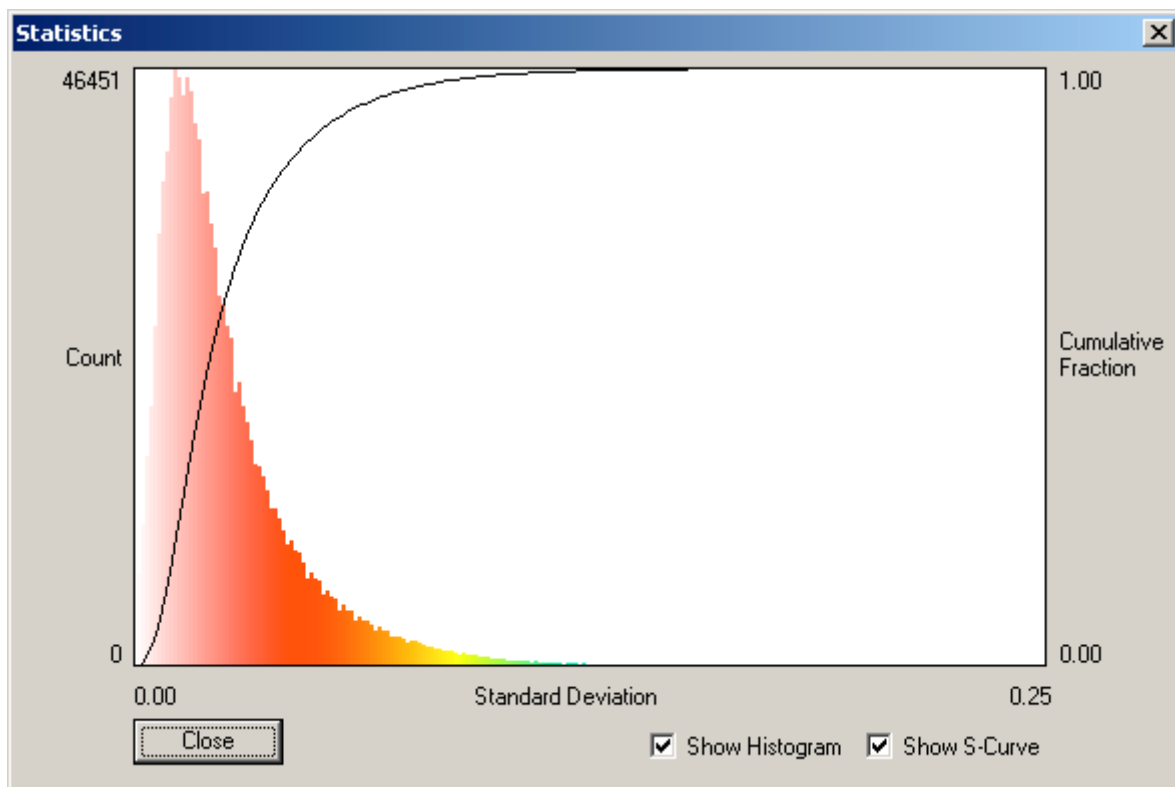


Figure C.2-1 Statistic – Standard Deviation Area2 Cruise B

C.3 Area 3 – Wigtown Bay

General:

The average number of hit counts doesn't meet MCA requirements. Several cross lines were surveyed. Figure C.3-1 shows the standard deviation of the surveyed area.

The weather was rough and its influence is visible in the data. The survey was stopped for a few hours due to wind force 8-9 bft and sea state 5. The survey was carried on in better but still difficult conditions as wind force 6-7bft and sea state 3-4

Nevertheless all data were processed in the best possible survey manner.

All other data were processed for spikes, tide corrected to LAT (Lowest Astronomical Tide) and charted.

The SSS and Bathymetry data are available as XTF files.

SSS and SBP data have not been fully interpreted as per contractual obligation.

SSS was set to 100 kHz and 100m range! In an area of special interest the range was decreased to 50m and cross lines surveyed.

The Chirp sub bottom profiler was triggered with 0.25 s and a chirp length of 10 milliseconds.

SBP data are available as Tra files which are 16-Bit Motorola SegY Files .

Bathymetry:

The line spacing was a choice of the client and driven by the MBES swath width. The survey was laid out to reach 100% coverage of the proposed area. Sound velocity dips were performed daily or when the quality indicator of the MBES data shows a significant change. 18 planned cross lines were surveyed

Vertical control

During the post process two significant zones were investigated in the data set and three positions were picked out were POL data were requested.

The POL data of the two stations were fed into OSAE's tide processing SW and a tide model was generated for the hole area. This guarantees a "relative" accurate model, which is again only a model, and not as accurate as real time tide gauges which can provide an "absolute" model. The error budget for the POL data is not available till today

Side Scan Sonar: / Sub Bottom Profiler:

SSS was set to 100 kHz and 100m range. On the cross lines defining an area of special interest the range was reduced to 50m

The Chirp sub bottom profiler was triggered with 0.25 s and a chirp length of 10 milliseconds.

SSS data are available as XTF-Files.

SBP data are available as Tra files which are 16-Bit Motorola SegY Files but saved by the data acquisition SW as *.Tra ! It is not necessary to rename the files. Most seismic processing packages are able to import the data directly as SegY. OSAE tested the data import on REFLEX seismic processing SW and on ER Mapper visualisation SW without having any problems!

SSS records were annotated throughout the SW package and printed on an EPC 9600 plotter.

SBP records were annotated throughout the SW package and printed on an EPC 9600 plotter.

Especially the SSS records were affected by the weather on some lines but according to the client still of acceptable value which didn't represent OSAE's opinion in all stages.

Charting :

OSAE and the client worked out the layout. The area was divided into two sections containing each five charts detailed charts were produced for three areas of special interest each containing six boxes.

Chart one representing bathymetry - contour lines;

chart two representing bathymetry – shaded relief view; chart three representing SSS – mosaic; chart 4 representing SSS-tracks and chart 5 representing SBP- tracks.

Box one representing bathymetry - contour lines;

Box two representing bathymetry – shaded relief view; Box three representing SSS – mosaic; Box 4 representing SSS-tracks, Box 5 representing SBP- tracks and Box6 representing the location map.

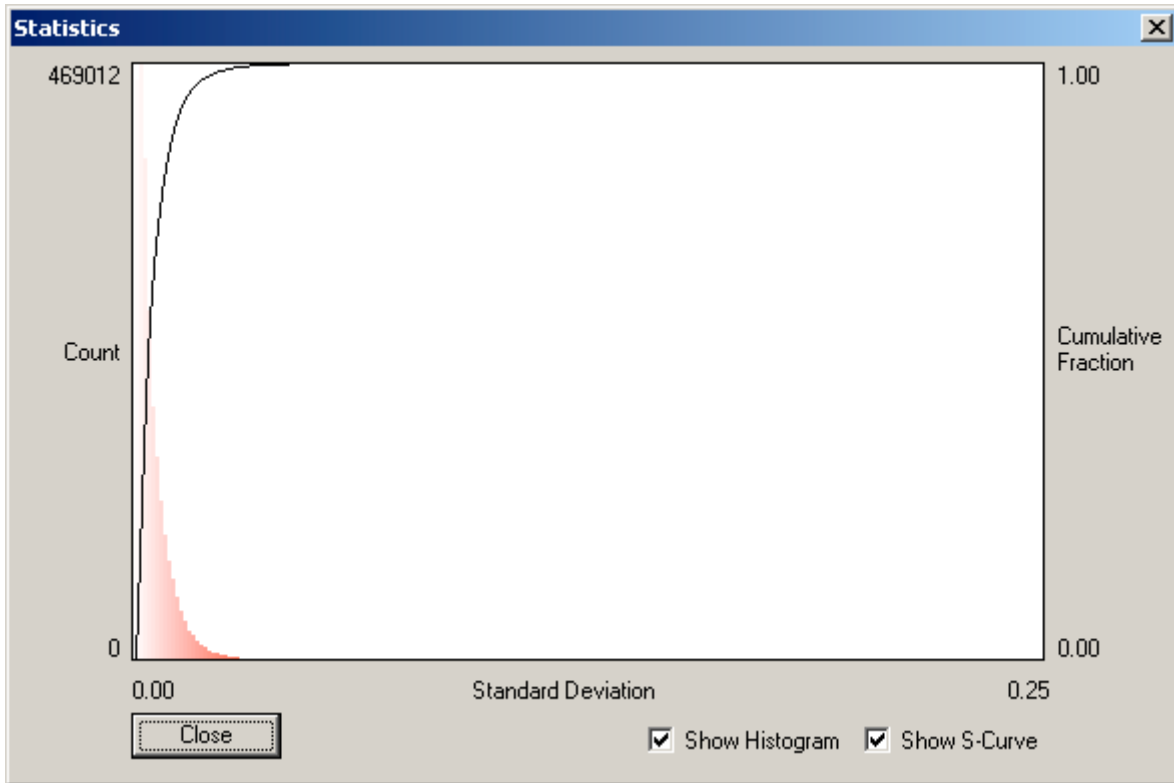


Figure C.3-1 Statistic – Standard Deviation Area3 Cruise B

C.4 Area 4 - Pisces

General:

Two cross lines were surveyed for tidal control.

Figure C.4-1 shows the standard deviation of the surveyed area.

The weather was moderate and its influence is visible in the data. The survey was stopped for two days due to wind force 8-9 bft and sea state 5 after surveying that area.

Nevertheless all data were processed in the best possible survey manner.

All other data were processed for spikes, tide corrected to LAT (Lowest Astronomical Tide) and charted.

The SSS and Bathymetry data are available as XTF files.

SSS and SBP data have not been fully interpreted as per contractual obligation.

SSS was set to 100 kHz and 100m ranges!

The Chirp sub bottom profiler was triggered with 0.25 s and a chirp length of 10 milliseconds.

SBP data are available as Tra files which are 16-Bit Motorola SegY Files .

Bathymetry:

The line spacing was a choice of the client and driven by the MBES data density. The survey was laid out to reach 100% coverage of the proposed area. Sound velocity dips were performed daily or when the quality indicator of the MBES data shows a significant change. 18 planned cross lines were surveyed and a final S/V dip performed.

Vertical control

Tide values were extracted from a standard tide program. The used tide station was Ardglass

The station was fed into OSAE's tide processing SW and a tide model was generated for the hole area. This guarantees a "relative" accurate model, which is again only a model, and not as accurate as real time tide gauges which can provide an "absolute" model. The error budget for the used tide data was according the SW 22cm!

Side Scan Sonar: / Sub Bottom Profiler:

SSS was set to 100 kHz and 100m range .

The Chirp sub bottom profiler was triggered with 0.25 s and a chirp length of 10 milliseconds.

SSS data are available as XTF-Files.

SBP data are available as Tra files which are 16-Bit Motorola SegY Files but saved by the data acquisition SW as *.Tra

! It is not necessary to rename the files. Most seismic processing packages are able to import the data directly as SegY.

OSAE tested the data import on REFLEX seismic processing SW and on ER Mapper visualisation SW without having any problems!

SSS records were annotated throughout the SW package and printed on an EPC 9600 plotter.

SBP records were annotated throughout the SW package and printed on an EPC 9600 plotter.

Especially the SSS records were affected by the weather on some lines but according to the client still of acceptable value, which didn't represent OSAE's opinion in all stages.

Charting:

OSAE and the client worked out the layout. The chart was divided into six boxes.

Box one representing bathymetry - contour lines;

Box two representing bathymetry – shaded relief view; Box three representing SSS – mosaic; Box 4 representing SSS-tracks, Box 5 representing SBP- tracks and Box6 representing the location map.

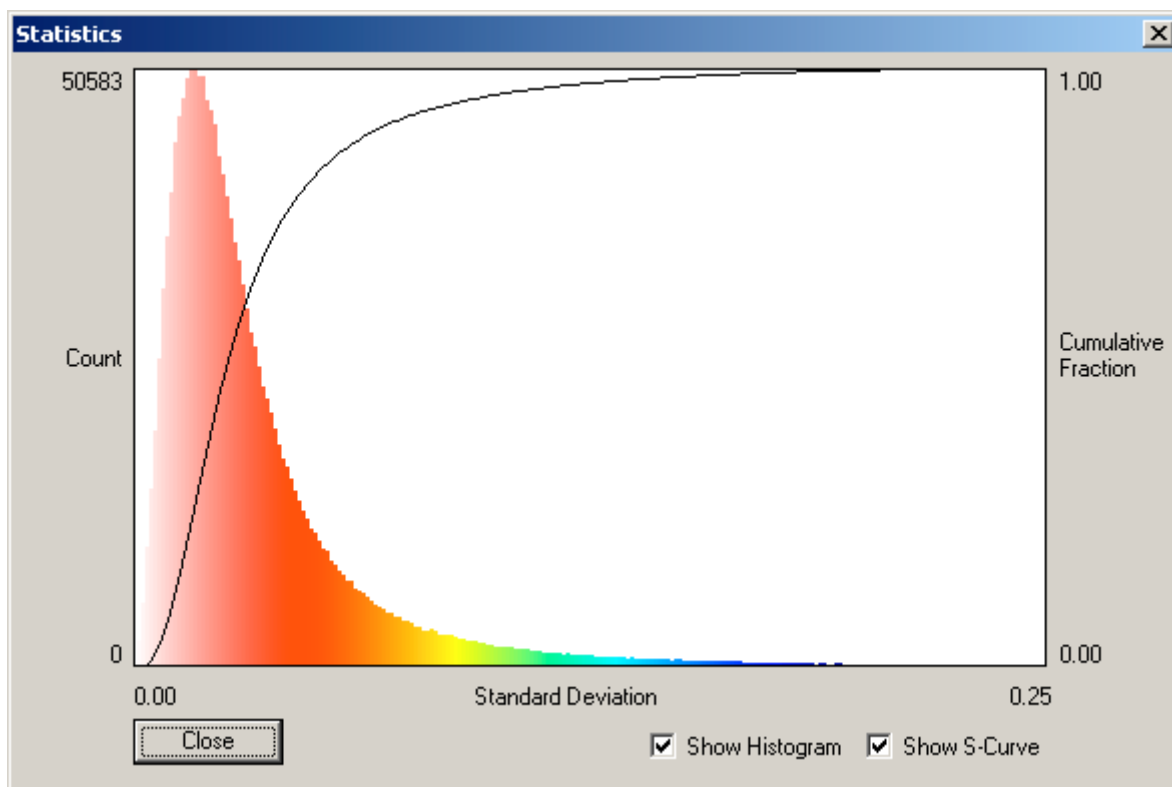


Figure C.4-1 Statistic – Standard Deviation Area4 Cruise B

C.5 Area5 – Yuan’s Pockmarks

General:

Figure C.5-1 shows the standard deviation of the surveyed area.

The weather was good to moderate.

Nevertheless all data were processed in the best possible survey manner.

All other data were processed for spikes, tide corrected to LAT (Lowest Astronomical Tide) and charted.

The SSS and Bathymetry data are available as XTF files.

SSS and SBP data have not been fully interpreted as per contractual obligation.

SSS was set to 100 kHz and 100m range!

The Chirp sub bottom profiler was triggered with 0.25 s and a chirp length of 10 milliseconds.

SBP data are available as Tra files which are 16-Bit Motorola SegY Files

Bathymetry:

The line spacing was a choice of the client and driven by the MBES data density. The survey was laid out to reach 100% coverage of the proposed area. Sound velocity dips were performed daily or when the quality indicator of the MBES data shows a significant change. Altogether 18 lines and five planned cross lines were surveyed and a final S/V dip performed.

Vertical control

Tide values were extracted from a standard tide program. The used tide station was Ardglass

The station was fed into OSAE’s tide processing SW and a tide model was generated for the hole area. This guarantees a “relative” accurate model, which is again only a model, and not as accurate as real time tide gauges which can provide an “absolute” model. The error budget for the used tide data was according the SW 22cm!

Side Scan Sonar: / Sub Bottom Profiler:

SSS was set to 100 kHz and 100m ranges.

The Chirp sub bottom profiler was triggered with 0.25 s and a chirp length of 10 milliseconds.

SSS data are available as XTF-Files.

SBP data are available as Tra files which are 16-Bit Motorola SegY Files but saved by the data acquisition SW as *.Tra

! It is not necessary to rename the files . Most seismic processing packages are able to import the data directly as SegY.

OSAE tested the data import on REFLEX seismic processing SW and on ER Mapper visualisation SW without having any problems!

SSS records were annotated throughout the SW package and printed on an EPC 9600 plotter.

SBP records were annotated throughout the SW package and printed on an EPC 9600 plotter.

Especially the SSS records were affected by the weather on some lines but according to the client still of acceptable value which didn’t represent OSAE’s opinion in all stages.

On half of the area SSS was positioned via manual layback after weak signals were investigated on both ATS Beacon.

Charting:

OSAE and the client worked out the layout. The chart was divided into five boxes.

Box one representing bathymetry - contour lines;

Box two representing bathymetry – shaded relief view; Box three representing SSS – mosaic; Box 4 representing SSS and Box five representing SBP tracks.

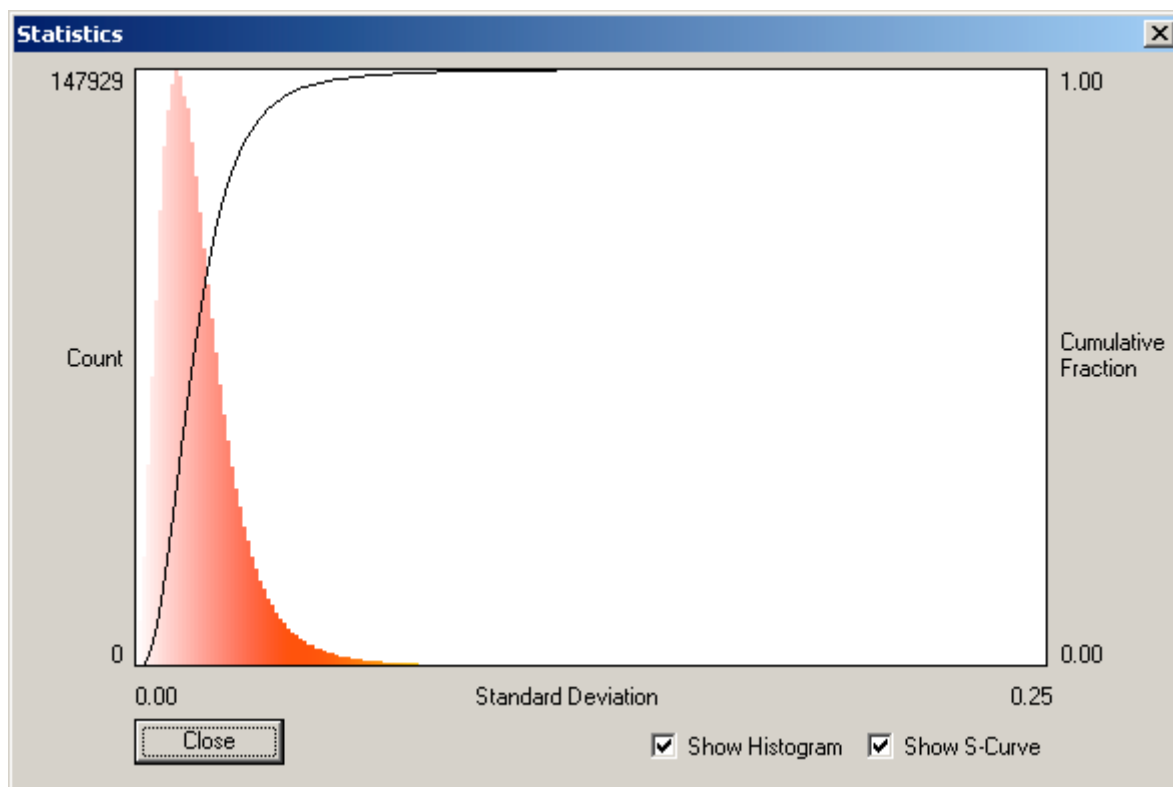


Figure C.5-1 Statistic – Standard Deviation Area5 CruiseB

C.6 Area6 – Peel Basin II

General:

Figure C.6-1 shows the standard deviation of the surveyed area.

The weather was good to moderate.

Nevertheless all data were processed in the best possible survey manner.

All other data were processed for spikes, tide corrected to LAT (Lowest Astronomical Tide) and charted.

The SSS and Bathymetry data are available as XTF files.

SSS and SBP data have not been fully interpreted as per contractual obligation.

SSS was set to 100 kHz and 100m range!

The Chirp sub bottom profiler was triggered with 0.25 s and a chirp length of 10 milliseconds.

SBP data are available as Tra files which are 16-Bit Motorola SegY Files.

Bathymetry:

The line spacing was a choice of the client and driven by the MBES data density. The survey was laid out to reach 100% coverage of the proposed area. Sound velocity dips were performed prior and after the survey or when the quality indicator of the MBES data shows a significant change. Altogether 19 lines and two planned cross lines were surveyed.

Vertical control

Tide values were extracted from a standard tide program. The used tide station was Ardglass

The station was fed into OSAE's tide processing SW and a tide model was generated for the hole area. This guarantees a "relative" accurate model, which is again only a model, and not as accurate as real time tide gauges which can provide an "absolute" model. The error budget for the used tide data was according the SW 22cm!

SSS was set to 100 kHz and 100m range.

The Chirp sub bottom profiler was triggered with 0.25 s and a chirp length of 10 milliseconds.

SSS data are available as XTF-Files.

SBP data are available as Tra files which are 16-Bit Motorola SegY Files but saved by the data acquisition SW as *.Tra

! It is not necessary to rename the files. Most seismic processing packages are able to import the data directly as SegY.

OSAE tested the data import on REFLEX seismic processing SW and on ER Mapper visualisation SW without having any problems!

SSS records were annotated throughout the SW package and printed on an EPC 9600 plotter.

SBP records were annotated throughout the SW package and printed on an EPC 9600 plotter.

Especially the SSS records were affected by the weather on some lines but according to the client still of acceptable value, which didn't represent OSAE's opinion in all stages.

SSS was positioned via manual layback.

Charting:

OSAE and the client worked out the layout. The chart was divided into five boxes.

Box one representing bathymetry - contour lines;

Box two representing bathymetry – shaded relief view; Box three representing SSS – mosaic; Box 4 representing SSS-tracks and Box five representing SBP tracks.

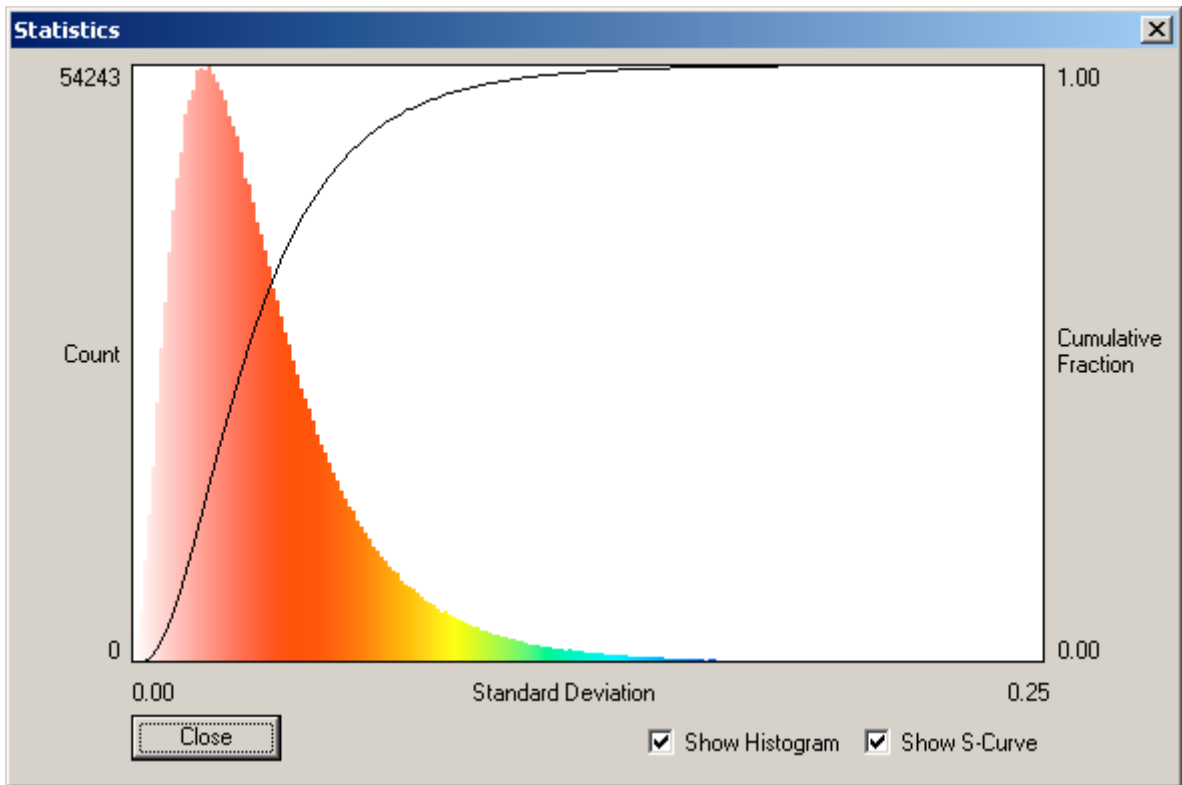


Figure C.6-1 Statistic – Standard Deviation Area6 CruiseB

C.7 Area7 – Texel 11

General:

Two cross lines were surveyed for tidal control.

Figure 8.1.7-2 shows the standard deviation of the surveyed area.

The weather was good to moderate.

Nevertheless all data were processed in the best possible survey manner.

All other data were processed for spikes, tide corrected to LAT (Lowest Astronomical Tide) and charted.

The SSS and Bathymetry data are available as XTF files.

SSS and SBP data have not been fully interpreted as per contractual obligation.

SSS was set to 100 kHz and 100m range!

The Chirp sub bottom profiler was triggered with 0.25 s and a chirp length of 10 milliseconds.

SBP data are available as Tra files which are 16-Bit Motorola SegY Files

Bathymetry:

The line spacing was a choice of the client and driven by the MBES data density. The survey was laid out to reach 100% coverage of the proposed area. Sound velocity dips were performed prior and after the survey or when the quality indicator of the MBES data shows a significant change. Altogether 19 lines and two planned cross lines were surveyed.

Vertical control

Tide values were extracted from a standard tide program. The used tide station was Holyhead

The station was fed into OSAE's tide processing SW and a tide model was generated for the hole area. This guarantees a "relative" accurate model, which is again only a model, and not as accurate as real time tide gauges which can provide an "absolute" model. The error budget for the used tide data was according to the SW 22cm!

Side Scan Sonar: / Sub Bottom Profiler:

SSS was set to 100 kHz and 100m range.

The Chirp sub bottom profiler was triggered with 0.25 s and a chirp length of 10 milliseconds.

SSS data are available as XTF-Files.

SBP data are available as Tra files which are 16-Bit Motorola SegY Files but saved by the data acquisition SW as *.Tra!

It is not necessary to rename the files. Most seismic processing packages are able to import the data directly as SegY.

OSAE tested the data import on REFLEX seismic processing SW and on ER Mapper visualisation SW without having any problems!

SSS records were annotated throughout the SW package and printed on an EPC 9600 plotter.

SBP records were annotated throughout the SW package and printed on an EPC 9600 plotter.

Especially the SSS records were affected by the weather on some lines but according to the client still of acceptable value, which didn't represent OSAE's opinion in all stages.

SSS was positioned via manual layback.

Charting:

OSAE and the client worked out the layout. The chart was divided into five boxes.

Box one representing bathymetry - contour lines;

Box two representing bathymetry – shaded relief view; Box three representing SSS – mosaic; Box 4 representing SSS-

tracks and Box five representing SBP tracks.

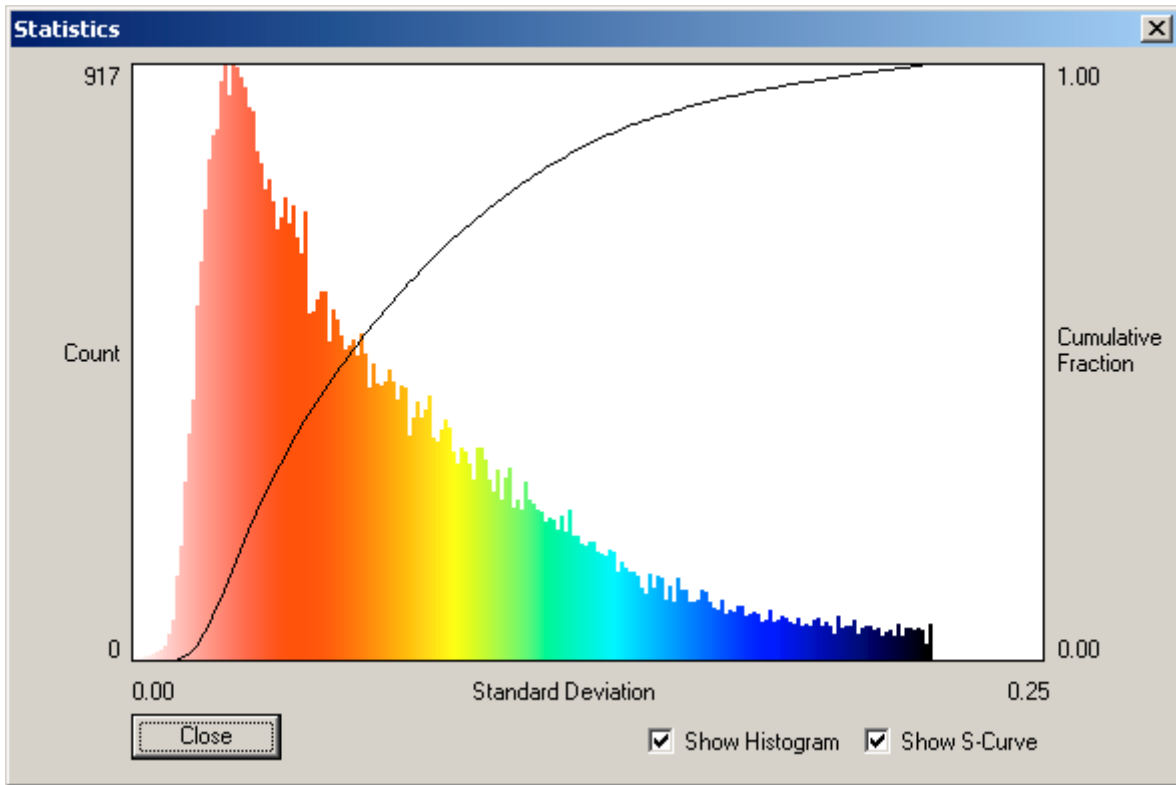


Figure C.7-1 Statistic – Standard Deviation Area7 CruiseB

C.8 Area8 – Texel 10

General:

One cross line was surveyed for tidal control.

Figure C.8-1 shows the standard deviation of the surveyed area.

The weather was good to moderate.

Nevertheless all data were processed in the best possible survey manner.

All other data were processed for spikes, tide corrected to LAT (Lowest Astronomical Tide) and charted.

The SSS and Bathymetry data are available as XTF files.

SSS and SBP data have not been fully interpreted as per contractual obligation.

SSS was set to 100 kHz and 100m range!

The Chirp sub bottom profiler was triggered with 0.25 s and a chirp length of 10 milliseconds.

SBP data are available as Tra files which are 16-Bit Motorola SegY Files .

Bathymetry:

The line spacing was a choice of the client and driven by the MBES data density. The survey was laid out to reach 100% coverage of the proposed area. Sound velocity dips were performed prior and after the survey or when the quality indicator of the MBES data shows a significant change. Altogether 7 lines and one planned cross lines were surveyed.

Vertical control

Tide values were extracted from a standard tide program. The used tide station was Holyhead.

The station was fed into OSAE's tide processing SW and a tide model was generated for the hole area. This guarantees a "relative" accurate model, which is again only a model, and not as accurate as real time tide gauges which can provide an "absolute" model. The error budget for the used tide data was according the SW 22cm!

Side Scan Sonar: / Sub Bottom Profiler:

SSS was set to 100 kHz and 100m range.

The Chirp sub bottom profiler was triggered with 0.25 s and a chirp length of 10 milliseconds.

SSS data are available as XTF-Files.

SBP data are available as Tra files which are 16-Bit Motorola SegY Files but saved by the data acquisition SW as *.Tra

! It is not necessary to rename the files. Most seismic processing packages are able to import the data directly as SegY.

OSAE tested the data import on REFLEX seismic processing SW and on ER Mapper visualisation SW without having any problems!

SSS records were annotated throughout the SW package and printed on an EPC 9600 plotter.

SBP records were annotated throughout the SW package and printed on an EPC 9600 plotter.

Especially the SSS records were affected by the weather on some lines but according to the client still of acceptable value which didn't represent OSAE's opinion in all stages.

SSS was positioned via manual layback.

Charting :

OSAE and the client worked out the layout. The chart was divided into five boxes.

Box one representing bathymetry - contour lines;

Box two representing bathymetry – shaded relief view; Box three representing SSS – mosaic; Box 4 representing SSS tracks and Box five representing SBP tracks.

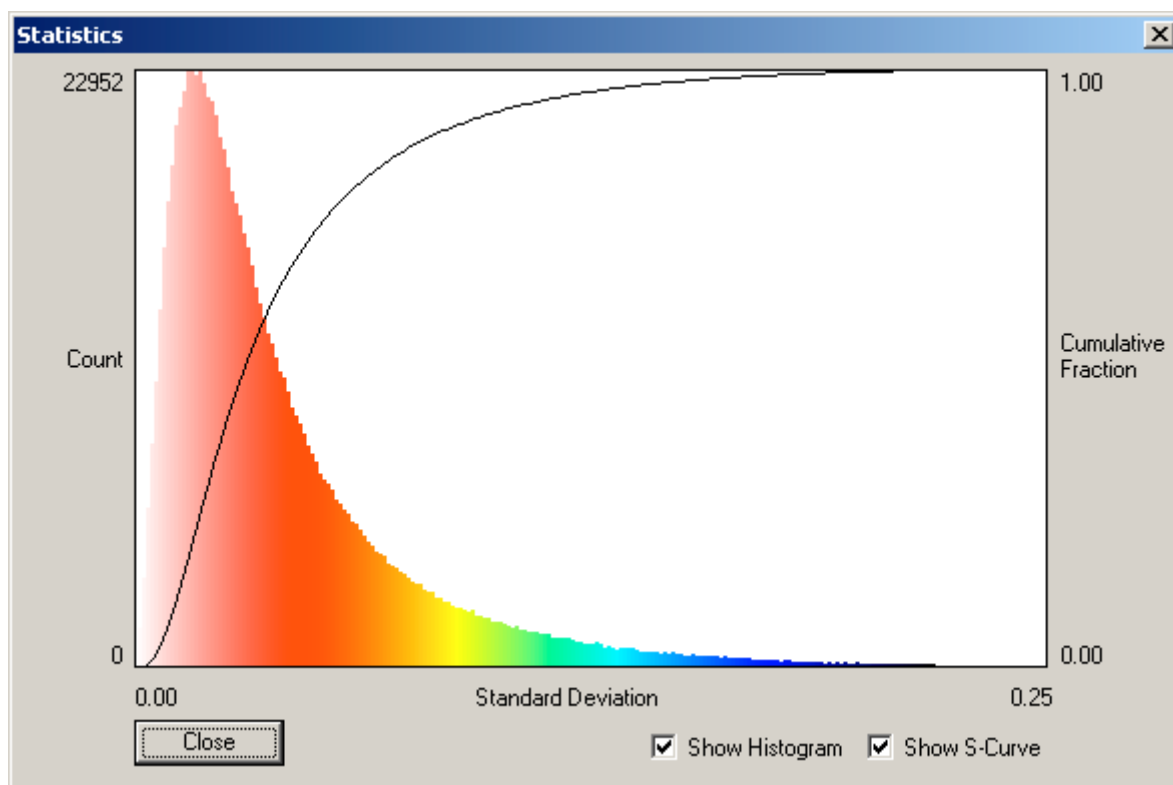


Figure C.8-1 Statistic – Standard Deviation Area8 CruiseB

C.9 Area9 – Harvey’s Trench

General:

Seven lines and twenty-four cross lines were surveyed. The cross lines were surveyed along the trench so the main route was crossing the trench.

Figure 8.1.9-2 shows the standard deviation of the surveyed area.

The weather was good to moderate.

Nevertheless all data were processed in the best possible survey manner.

All other data were processed for spikes, tide corrected to LAT (Lowest Astronomical Tide) and charted.

The SSS and Bathymetry data are available as XTF files.

SSS and SBP data have not been fully interpreted as per contractual obligation.

SSS was set to 100 kHz and 100m range!

The Chirp sub bottom profiler was triggered with 0.25 s and a chirp length of 10 milliseconds.

SBP data are available as Tra files which are 16-Bit Motorola SegY Files .

Bathymetry:

The line spacing was a choice of the client and driven by the MBES data density. The survey was laid out to reach 100% coverage of the proposed area. Sound velocity dips were performed prior and after the survey or when the quality indicator of the MBES data shows a significant change. Altogether 7 lines and 24 planned cross lines were surveyed.

Vertical control

No POL data were required for that area due to the tide values were extracted from a standard tide program. The used tide station was Holyhead

The station was fed into OSAE’s tide processing SW and a tide model was generated for the hole area. This guarantees a “relative” accurate model, which is again only a model, and not as accurate as real time tide gauges which can provide an “absolute” model. The error budget for the used tide data was according the SW 22cm !

Side Scan Sonar: / Sub Bottom Profiler:

SSS was set to 100 kHz and 100m range .

The Chirp sub bottom profiler was triggered with 0.25 s and a chirp length of 10 milliseconds.

SSS data are available as XTF-Files.

SBP data are available as Tra files which are 16-Bit Motorola SegY Files but saved by the data acquisition SW as *.Tra

! It is not necessary to rename the files . Most seismic processing packages are able to import the data directly as SegY.

OSAE tested the data import on REFLEX seismic processing SW and on ER Mapper visualisation SW without having any problems!

SSS records were annotated throughout the SW package and printed on an EPC 9600 plotter.

SBP records were annotated throughout the SW package and printed on an EPC 9600 plotter.

Especially the SSS records were affected by the weather on some lines but according to the client still of acceptable value which didn’t represent OSAE’s opinion in all stages.

SSS was positioned via manual layback.

Charting:

OSAE and the client worked out the layout. The chart was divided into five boxes.

Box one representing bathymetry - contour lines;

Box two representing bathymetry – shaded relief view; Box three representing SSS – mosaic; Box 4 representing SSS-

tracks and Box five representing SBP-tracks.

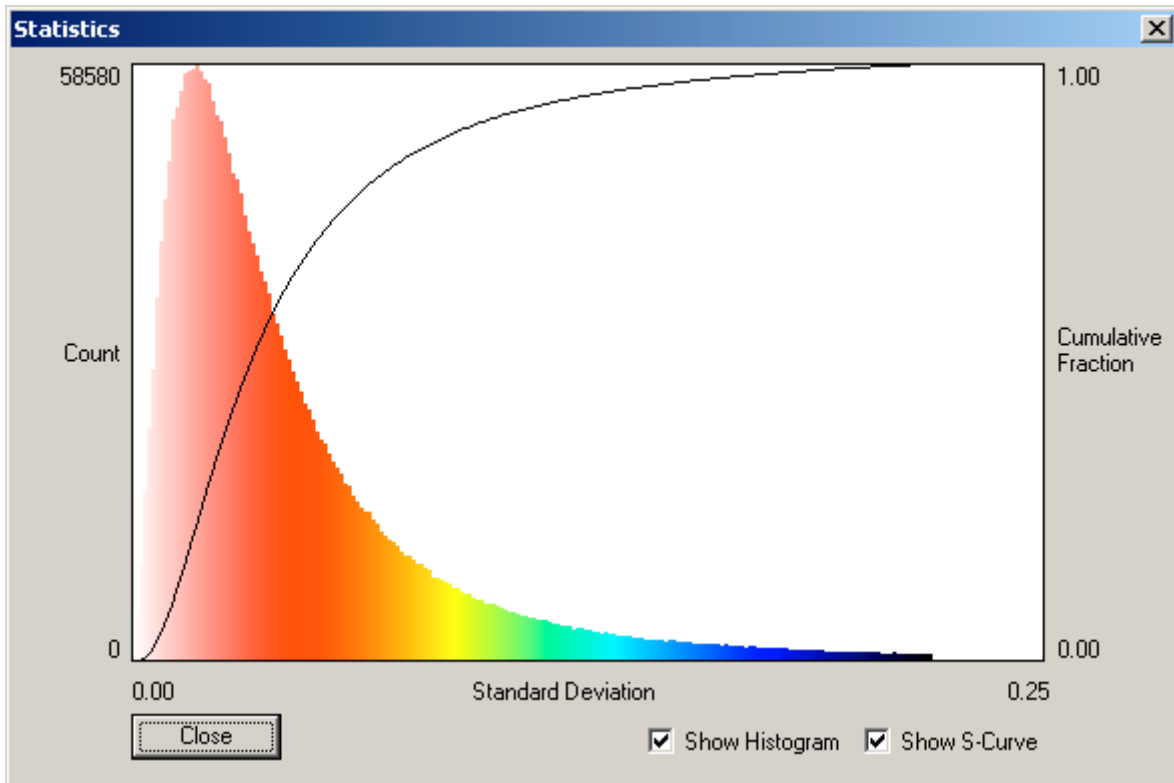


Figure C.9-1 Statistic – Standard Deviation Area9 CruiseB

C.10 Area 10 Codling Extension

General:

Ten lines and two cross lines were surveyed.

Figure C.10-1 shows the standard deviation of the surveyed area.

The weather was moderate with sometimes-strong winds.

Nevertheless all data were processed in the best possible survey manner.

All other data were processed for spikes, tide corrected to LAT (Lowest Astronomical Tide) and charted.

The SSS and Bathymetry data are available as XTF files.

SSS and SBP data have not been fully interpreted as per contractual obligation.

SSS was set to 100 kHz and 100m range!

The Chirp sub bottom profiler was triggered with 0.25 s and a chirp length of 10 milliseconds.

SBP data are available as Tra files which are 16-Bit Motorola SegY Files .

Bathymetry:

The line spacing was a choice of the client and driven by the MBES data density. The survey was laid out to reach 100% coverage of the proposed area. Sound velocity dips were performed prior and after the survey or when the quality indicator of the MBES data shows a significant change. Altogether 10 lines and two planned cross lines were surveyed.

Vertical control

During the post process three significant zones were investigated in the data set and three positions were picked out were POL data were requested.

The POL data of the two stations were fed into OSAE's tide processing SW and a tide model was generated for the hole area. This guarantees a "relative" accurate model which is again only a model and not as accurate as real time tide gauges which can provide an "absolute" model . The error budget for the POL data is not available till today.

Side Scan Sonar: / Sub Bottom Profiler:

SSS was set to 100 kHz and 100m range .

The Chirp sub bottom profiler was triggered with 0.25 s and a chirp length of 10 milliseconds.

SSS data are available as XTF-Files.

SBP data are available as Tra files which are 16-Bit Motorola SegY Files but saved by the data acquisition SW as *.Tra

! It is not necessary to rename the files . Most seismic processing packages are able to import the data directly as SegY.

OSAE tested the data import on REFLEX seismic processing SW and on ER Mapper visualisation SW without having any problems!

SSS records were annotated throughout the SW package and printed on an EPC 9600 plotter.

SBP records were annotated throughout the SW package and printed on an EPC 9600 plotter.

Especially the SSS records were affected by the weather on some lines but according to the client still of acceptable value which didn't represent OSAE's opinion in all stages.

SSS was positioned via manual layback.

Charting:

OSAE and the client worked out the layout. The Area was separated into two charts each divided into five boxes.

Box one representing bathymetry - contour lines;

Box two representing bathymetry – shaded relief view; Box three representing SSS – mosaic; Box 4 representing SSS-

tracks and Box 5 representing SBP-tracks.

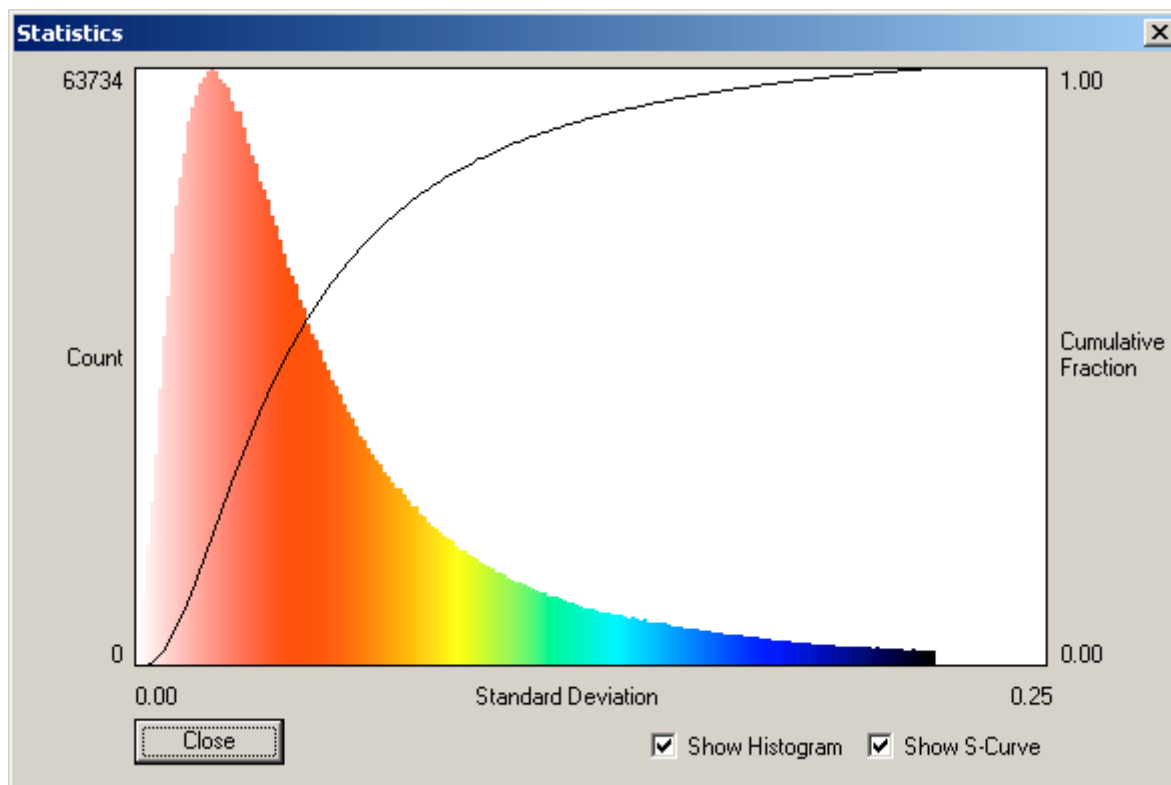


Figure C.10-1 Statistic – Standard Deviation Area10 CruiseB

C.11 Area 11 – Whittington’s Domes

General:

Nineteen lines and two cross lines were surveyed.

Figure C.11-1 shows the standard deviation of the surveyed area.

The weather was moderate with later strong winds.

Nevertheless all data were processed in the best possible survey manner.

All other data were processed for spikes, tide corrected to LAT (Lowest Astronomical Tide) and charted.

The SSS and Bathymetry data are available as XTF files.

SSS and SBP data have not been fully interpreted as per contractual obligation.

SSS was set to 100 kHz and 100m range!

The Chirp sub bottom profiler was triggered with 0.25 s and a chirp length of 10 milliseconds.

SBP data are available as Tra files which are 16-Bit Motorola SegY Files.

Bathymetry:

The line spacing was a choice of the client and driven by the MBES data density. The survey was laid out to reach 100% coverage of the proposed area. Sound velocity dips were performed prior and after the survey or when the quality indicator of the MBES data shows a significant change. Altogether 19 lines and two planned cross lines were surveyed.

Vertical control

No POL data were required for that area due to the. Tide values were extracted from a standard tide program. The used tide stations was Holyhead

The station was fed into OSAE’s tide processing SW and a tide model was generated for the hole area. This guarantees a “relative” accurate model which is again only a model and not as accurate as real time tide gauges which can provide an “absolute” model . The error budget for the used tide data was according the SW 22cm

Side Scan Sonar: / Sub Bottom Profiler:

SSS was set to 100 kHz and 100m range .

The Chirp sub bottom profiler was triggered with 0.25 s and a chirp length of 10 milliseconds.

SSS data are available as XTF-Files.

SBP data are available as Tra files which are 16-Bit Motorola SegY Files but saved by the data acquisition SW as *.Tra

! It is not necessary to rename the files. Most seismic processing packages are able to import the data directly as SegY.

OSAE tested the data import on REFLEX seismic processing SW and on ER Mapper visualisation SW without having any problems!

SSS records were annotated throughout the SW package and printed on an EPC 9600 plotter.

SBP records were annotated throughout the SW package and printed on an EPC 9600 plotter.

Especially the SSS records were affected by the weather on some lines but according to the client still of acceptable value, which didn’t represent OSAE’s opinion in all stages.

SSS was positioned via manual layback.

Charting:

OSAE and the client worked out the layout. The Chart was separated into six boxes.

Box one representing bathymetry - contour lines;

Box two representing bathymetry – shaded relief view; Box three representing SSS – mosaic; Box 4 representing SSS-

tracks, Box 5 representing SBP- tracks and Box 6 representing the location map.

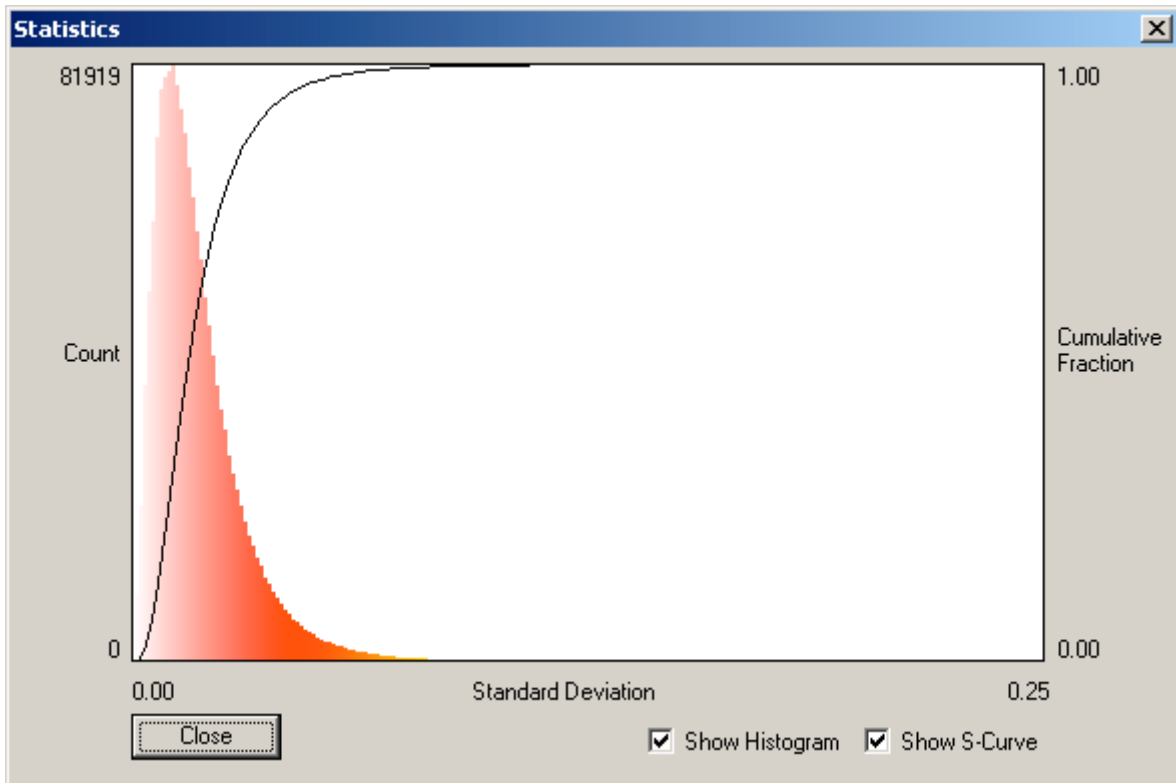


Figure C.11-1 Statistic – Standard Deviation Area11- CruiseB

C.12 Area12 Central Trench

Due to the weather conditions there was no survey in this area possible and the survey in this area was cancelled.

C.13 Area13 Wingfield's Pingo

In this area were only 6 lines and one cross-line surveyed in bad weather conditions. It was agreed with the client only to produce a shaded relief view out of unedited data and as GeoTiff.

D Operational Summary:

Operational summary

The following diagram gives an operational summary (Cruise A & B) of the survey activities of the SV Meridian during the SEA6-Meridian Project.

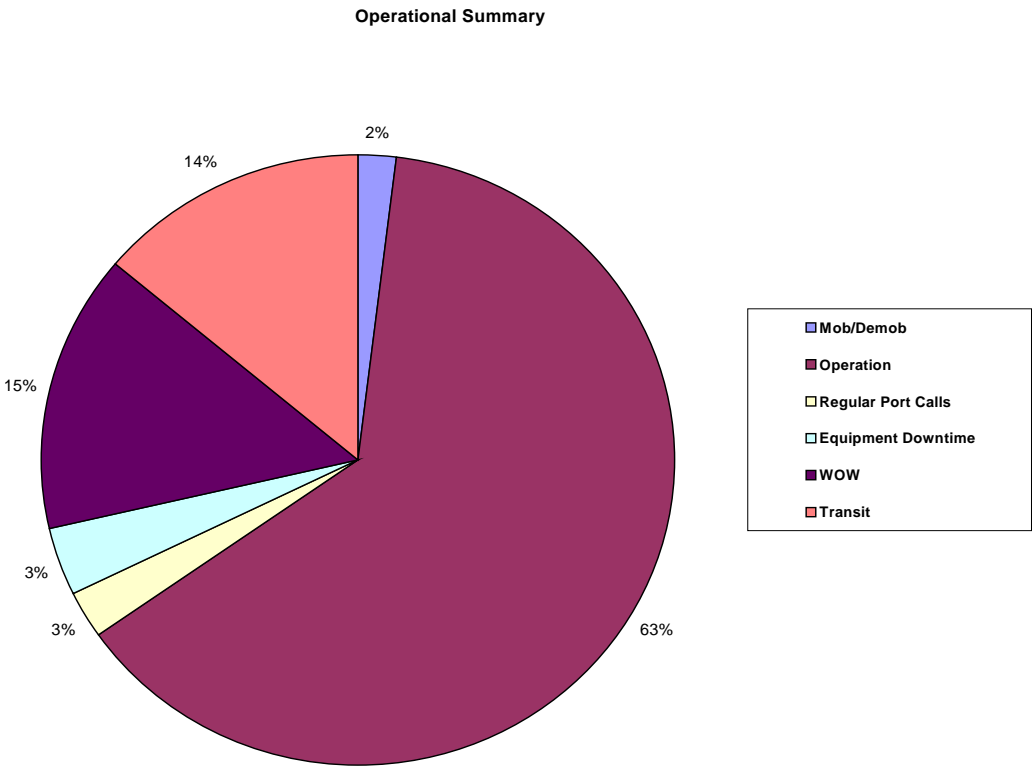


Figure 0-1 Operational Summary

From a total of 871.25 hours, 550.75 hours were assigned to operation, 121.25 to transit, 128.75 to WOW, 22.75 to regular Port Calls; 30.25 to Equipment Downtime and 17.5 to mob / demob.

E Appendix

Calibration Report[..\Calibration Report_final_V1_1.pdf](#)**Survey Log**[\\helmsman-113\logs_meridian\Geotek 2004\Survey & Daily Log.xls](#)**SSS & SBP Log**[G:\216-04-803_raw_von_online_sss_sbp\Logs_korrigiert\unkorrigiert\SBP-SSS-GEO2004_cruise B1.xls](#)[G:\216-04-803_raw_von_online_sss_sbp\Logs_korrigiert\unkorrigiert\SBP-SSS-GEO2004_cruise B2.xls](#)**List of deliverables**

List of deliverables (as per delivery note 09.09.2004):

Item	Quantity	Description	Media
1	2	Survey Report incl. Calibration Report incl. MCA Report	CD
2	4	Boxes SSS & SBP hardcopies Cruise A	Paper
3	3	Boxes SSS 6 SBP hardcopies Cruise B	Paper
4	1	Box DESO25 SBES hardcopies Cruise A	Paper
5	1	Set of charts containing 29charts incl. Cruise A Area 3 (Geotek)	Paper
6	1	Set of charts containing 29charts incl. Cruise A Area 3 (BGS)	Paper
7	1	Set of charts containing 29charts incl. Cruise A Area 3 (DTI)	Paper
8	3	Overview charts	Paper
9	1	Digital Survey data	Hard Disc

Table Fehler! Kein Text mit angegebener Formatvorlage im Dokument.-1: List of deliverables.

Digital Survey data:

SSS-XTF / MBES-XTF / SBP-Tra / SBP-Par / SVP-ASCII / Tide-ASCII / SBP-UKOOA / Gridded xyz / Shaded Relief-Geo Tiff / Mosaic-Geo Tiff / Charts-PDF and PLT

The project structure from Caris will be extracted and delivered end of September 2004.

The data shall be forwarded to the MCA.

Table of submitted data:

Section	Submitted	Date/Reference
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A. General Data	Report	09/09/2004
B. Daily Narrative	Report	09/09/2004
C1. Survey Data – MBES	Report (appendix)	09/09/2004
C2. Survey Data – SBES	As surveyed	
D. Geodetic Data	Refer to C	
E. Tidal Data	Refer to Caris data	
F. Environmental Data		
G. Seabed Features and Contacts	None	
H. Coastal Topography	None	
I. Lights and Buoys	None	
J. Radio Signals	None	
K. Geophysical Data	Report (appendix)	09/09/2004