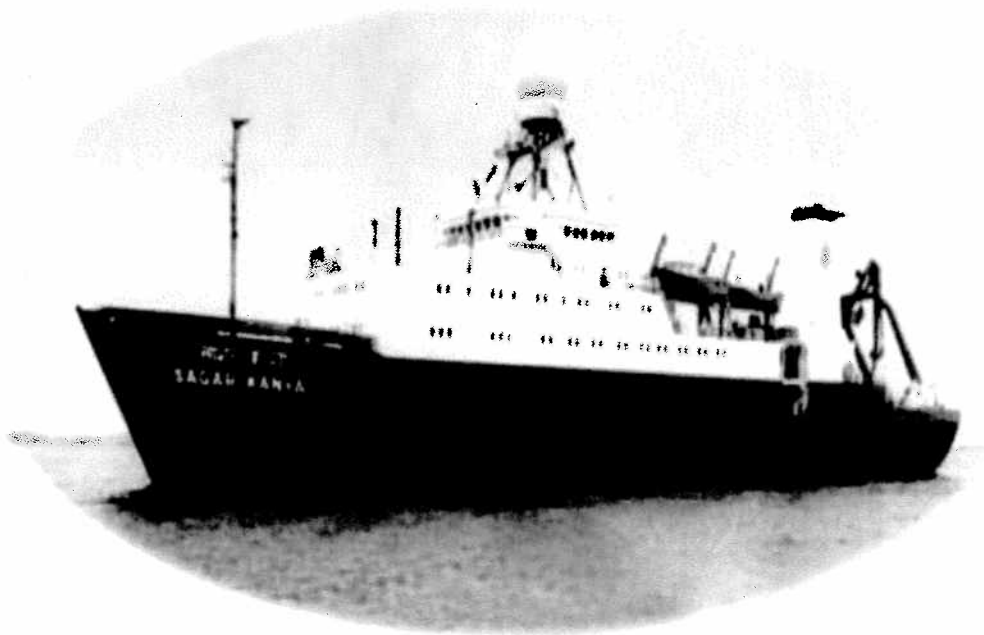


ORV SAGAR KANYA

CRUISE SK-241

SB 3012 Multibeam System – Sea Acceptance Test (SAT)



Period	:	29.10.2007 to 06.11.2007
Participating	:	NCAOR, NIO, L3-Elac, Norinco (AMC onboard)
Area of Survey	:	Arabian Sea/Bay of Bengal (Karwar to Chennai)
Sea Condition	:	Calm to moderate

National Centre for Antarctic & Ocean Research
(Ministry of Earth Sciences, Govt. of India)
Headland Sada, Goa.

ORV SAGAR KANYA CRUISE SK-241

SB 3012 Multibeam System – Sea Acceptance Test (SAT)

Date: 06.11.2007
Onboard ORV Sagar Kanya

REPORT

Period : 29.10.2007 to 06.11.2007

Participating organization : NCAOR, NIO, L3-Elac, Norinco (AMC onboard).

Area : Arabian Sea / Bay of Bengal (Karwar to Chennai)
Vessel called Kochi (anchorage) to pick up critical PCB of Multibeam system.

Sea Condition : Calm to moderate.

Participants:-

1. Shri. M.M. Subramaniam	NCAOR	Chief Scientist
2. Dr. SM Pednekar	NCAOR	
3. Shri. N. Prabakaran	NIO	Dy. Chief Scientist
4. Shri. R. Manimurali	NIO	
5. Shri. J. Brockoff	L3-Elac (OEM)	
6. Shri. H. Siedenberg	L3-Elac (OEM)	
7. Shri. Rolf Geb Ehlers	L3-Elac (OEM)	
8. Shri. K. Madhusudan	Norinco (AMC onboard)	
9. Shri. M Dayalan	Norinco (AMC onboard)	
10. Shri. T. Ramesh	Norinco (AMC onboard)	
11. Shri. Parsuram M	Norinco (AMC onboard)	
12. Shri. Mukund Kumar Chavan	Shipboard Asst.	
13. Shri. T. Dipesh Kumar	Shipboard Asst.	
14. Shri. C. Sandip Kumar	Shipboard Asst.	
15. Shri. Anil Kumar Patel	Shipboard Asst.	

Objectives:

The calibration, Sea-trails and Sea-acceptance tests of SB3012 Multibeam System by Engineer from OEM M/s L3-Elac Nautik, Germany.

Master
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R. Manimurali
N. Pr...
06/11/07

Preparations:

- Prior commencing the cruise / trials, various sub-systems of the SB-3012 were tested by OEM engineers.
- The new PAC boards received from OEM onboard after repairs / modifications. As per these modifications, the PCBs already installed onboard were also attended and necessary alterations / changes done by OEM. Then new PAC boards were installed.
- Noticed that the GPS time synchronization unit not working and observed the antenna cable was cut inside the bulkhead panels in A-deck. Suitable connector was introduced and GPS was made operational.
- SVP, DGPS, motion sensor etc are found to be fine.
- When testing the Transmitter unit, OEM found that a power PCB was faulty without which the system cannot be started. The spare needed to be air-lifted from OEM factory at Germany. OEM engineers made arrangements and PCB arrived at Kochi and was brought onboard on 31st Oct morning at Kochi anchorage (Vessel touched Kochi enroute for collecting the PCB). OEM had mobilised the spare from Germany to India in less than two working days.

Performance of SB 3012 system:-

1. Transmitters / Receivers etc:-

After the installation of PAC boards, modifications in existing boards and replacement of transmitter power PCB, the system started pinging. However, the OEM Engineer Mr. Brockoff informed that five out of 64 Hydrophones are observed to be not satisfactorily functioning and the signals from these 5 hydrophones are weak. OEM Engineers checked and ruled out the problem in amplifier, cable and software for the Hydrophones' signal weakness and concluded that the Hydrophones themselves are faulty. OEM engineers opined that as such this problem is not critical and effects would be negligible. Because, the shallow surveys will not use all 64 Hydrophones (only 32 will be used) and during the deep surveys, the effect of 5 Hydrophones out of 64 hydrophones is tolerable. However, the OEM will replace the Hydrophones during the vessel's forth coming dry-dock. The Transmitter / Receiver was operational since 31.10.2007 (after installing power PCB) throughout the cruise without any problem.

2. Surface Sound Velocity (SSV) Sensor.

During the sailing / trials, surface sound velocity sensor worked fine and online data was being received by the SB3012 system. When the sensor was attempted to retract at the end of the cruise, today morning, the sensor got stuck half way through as happened in May, 2006. Presently, the sensor is taken as much as possible and locked. However SSV sensor is functional. Appropriate remedial measures to be planned as this has happened twice. OEM engineer will discuss with his mechanical design engineers and revert.

3. Sound Velocity Profiler (SVP)

Two sound velocity profiles were made during the cruise for feeding the same to SB 3012 system and the SVP worked satisfactorily.

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Brockoff

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4. Positioning

During the cruise, C-Nav DGPS functioned well. However the signal subscription is expiring soon on 24.11.2004. The renewal of signal subscription is required immediately as the Multibeam bathymetric survey cruise is already scheduled in the first week of December, 2007.

5. Roll / Pitch / Yaw Calibration

The calibration survey lines were planned and surveys were carried out by OEM. The roll offset calculations were made several times and the results of same on data quality did not improve till the roll calibration value which was calculated on 5th Nov early morning properly and entered into system.

6. Heading Offset

Calculation made for the heading offset and the same was observed to be negligible.

7. Position Latency

As informed by OEM Engr., the DGPS is being used and Satellite Controlled NTP time server is interfaced with computers, hence it is not required to be position latency calculation.

8. Data Processing / Plotting

The data collected in the above surveys not processed by OEM engineers as the engineers were busy till the last day for system calibration. Only on 5th Nov, the calibration was done satisfactorily and the testing commenced. All the modules of EIVA software to be demonstrated in detail by OEM.

9. Side Scan Imagery

The side scan imagery data acquired. Online printer provided with system worked fine. The depth reference stamp is to be introduced by OEM by upgrading software to fulfill the above requirement.

10. Water Column Image

Water column image is functional and the sample data were recorded during trial-surveys. The volume of data may be kept in mind (in the range of 20 to 30 GB per day) during data collection.

11. Beam angle:

Selected Auto mode for beam angle and following angles (approximately) were used by the system in different depth ranges;

Depth 3000+ m	: $\approx 90^\circ$ (minimum beam angle)
Depth 2000+ m	: $\approx 105^\circ$
Depth 1000+m	: $\approx 135^\circ$
Depth 200+ m	: $\approx 150^\circ$ (maximum beam angle)

OEM Engineer informed that the beam angle shall be minimum (i.e. 90°) in the depth ranges beyond 3700m (the maximum depth range we encountered in this cruise) also.

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Boat Deck
N. Prasad

R.M.

Ambar
06/11/07

Jal

12. Beam Steering:

Confirmed the "Sweep Direction" display on acquisition terminal alternatively changing between Port and Starboard.

13. Helmsman displays

Helmsman displays and all parameters were functional in Multibeam lab, Bridge and Dry lab-starboard.

14. Gravimeter Interfacing

Existing Gravimeter onboard was interfaced and data stored online in the computer along with Multibeam data for testing purpose.

15. Training / Acclimatization

All participants from NCAOR, NIO and AMC got acclimatized with the functionality of the equipment, system operation and data acquisition. Our knowledge in data acquisition and survey line management greatly improved. Vessel's Navigational personnel also got acclimatized to Helmsman display parameters and effectively maintained the survey lines.

However, participants could not fully process the data as the system calibration was done satisfactorily only on 5th Nov and the trials / testing commenced. OEM expert in EIVA software need to demonstrate the complete functionality of all EIVA software modules for processing / plotting the real data collection at sea.

16. Overall System Performance

It took several days to make the system ready for trial data collection after calibrations. The calibrations were attempted several times by OEM and the data quality did not improve till 4th Nov (raw data display copies enclosed). When the roll offset value calculated on 5th early morning was fed into system, the data quality improved satisfactorily and the mismatch in the overlap data disappeared.

There were two continuous artifacts along swath track survey line between ± 500 m swath coverage (port and starboard sides), particularly in deeper areas, which will increase the data processing time. As we require to remove some beams, resulting lose of information and it is not expected to have such a problem in a brand new system which will be used atleast for a decade to come. The OEM engineer is not sure of the reasons for the problem however informed that the above would not affect the data quality. The above is considered by the participants as a critical item and requires rectification for the satisfactory acceptance of the system. Extra shiptime at sea was also offered for the same.

Following items also brought to the notice of OEM engineers for their constructive efforts to rectify and enable the Multibeam user community with a quality and efficient data acquisition system while improving the capabilities of OEM.

- It should be possible to modify the Digital Terrain Model (DTM) in Helmsman display during surveys as there are possibilities of modifications in runlines due to the topographical features and other reasons during the survey run.

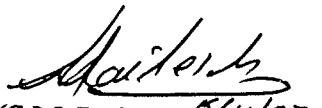
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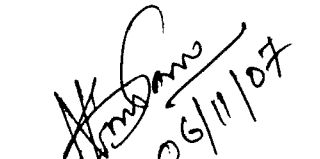
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- "Distance Along" info on Helmsman may preferably be in "NM" instead of metres.
- Facility of exporting Position data in Lat / Long format also is understood to be available in the EIVA software, and ELac to get information for retrieval of same as we are not able to retrieve .
- WCI manual not available. Soft copy of all manuals required.
- Correct 'Level Control Board' to be supplied.
- Data gaps (around centre beam area, constantly) appear.
- Observed during shallow surveys (around 1000m water depths), the bathymetric data is intermittently not getting painted online on Helmsman display. However, checked and found the data is stored safely.


The rectifications need to be attended immediately by OEM, as a survey cruise is already scheduled to commence in the first week of December, 2007. (This may be considered by OEM as one month notice for deputing engineer(s) with the solutions for all the above items with readiness for rectification, Sea-Acceptance and for participating in the regular survey cruise SK-243 for one month period). The system may also be checked by NCAOR again in deeper waters in the forthcoming cruise SK-242 whether any such artifacts specified at pre-page persists.

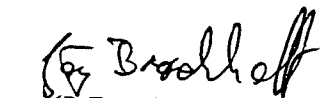

 (S.M. Pednekar) 8/11/07
 NCAOR

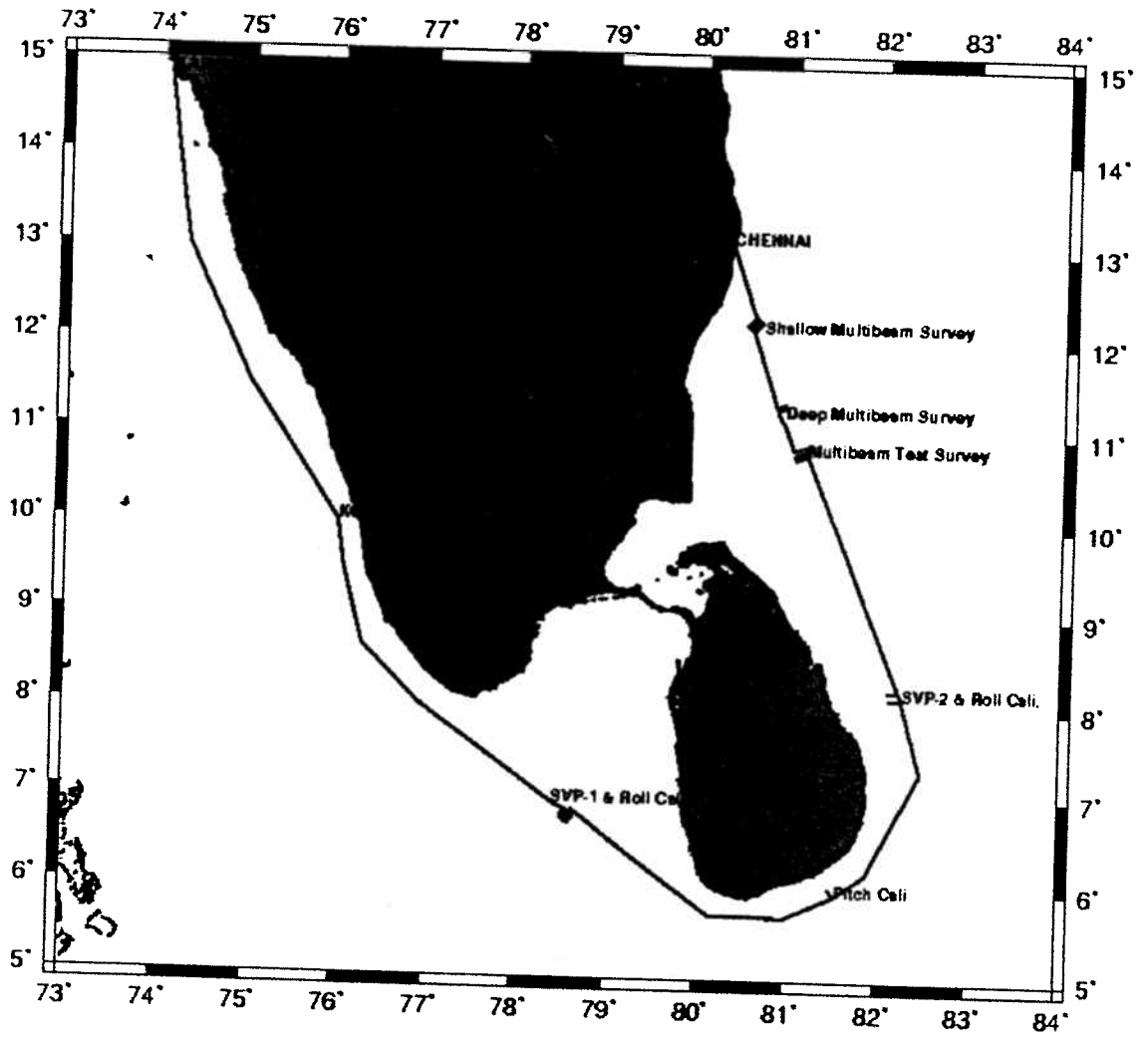

 (K. Madhusudan)
 Norinco, AMC onboard


 (R. Manimurali)
 NIO


 (M.M. Subramaniam)
 Chief Scientist
 NCAOR


 (N. Prabaharan)
 Dy. Ch. Scientist
 NIO


 (J. Brockoff)
 M/s L3 Elac-Nautik



SK-241 Cruise Track

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N. Kumar

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(S. S. B. B. B.)

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