

**DEPLOYMENT/ MAINTENANCE OF
DATA BUOYS IN ARABIAN SEA**

ORV SAGAR KANYA SK-213

November 22 to November 29, 2004

Goa to Goa



**NATIONAL DATA BUOY PROGRAMME
NATIONAL INSTITUTE OF OCEAN TECHNOLOGY
CHENNAI**

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1. CRUISE SUMMARY

The ORV Sagarkanya cruise SK-213 was taken up to service and maintain the data buoys in Arabian Sea.

2. OBJECTIVES OF THE CRUISE

The main objectives of the cruise are:

- Deployment of 4 deep water buoys at OB3, DS2, DS7 and DS6 locations.
- Deployment of one shallow water buoys off Ratnagiri SW2
- Recovery of the SW2 and DS2 data buoys (old).

3. LIST OF PARTICIPANTS

NIOT, Chennai

1. Mr. D.Rajasekhar Chief Scientist
2. Mr. D.Shivakumar
3. Mr. M.Arulmuthiah
4. Mr. K.Ramasundaram
5. Mr. P. Ramesh

SEAMEN CHARTED FROM M/s. SEAPOL LOGISTICS, CHENNAI

1. Mr. Gopalakrishnan
2. Mr. jagthesh
3. Mr. Senthil kumar

4. DIARY OF EVENTS

Date	Time	Event
22.11.04	1.30 Hrs	Scientist Boarded the ship.
	17.00- 19.30 Hrs	Loading of the materials
	20.30 Hrs	Ship sailed out from Goa.
23.11.04	8.00 – 12.00 HRS	Preparation of mooring, Fixing of keel weight with cylinder and assembly of mast., arm and sensors.
	12.30 Hrs	Deployed SW2 Buoy at N 17°01 12 and E 72 ° 28 48 at 85M Of water depth.
	15.30 Hrs	Ship sailed towards OB3 Location.
24.11.04	08.00- 12.00 Hrs	Preparation of mooring, Fixing of keel weight with cylinder and assembly of mast. Arm and sensors
	23.00-1.00	Deployed OB3 data buoy at N 12.498° and E 72.011° a 1650 m of water depth.
25.11.04	15.00 – 18.00Hrs	Received drifted DS2 buoy from Dr..koya, Lakshadeep Admn
	19.00 TO 21.00 Hrs	Deployed DS2 Data buoy at N 10.64812° and E 72.51425° At 1880m of water depth.
26.11.04	08.30 To 15.30 Hrs	Preparation of mooring, Fixing of keel weight with cylinder and assembly of mast. Arm and sensors
	1600 To 1730 Hrs	Deployed DS7 Data buoy at N 8.31487° and E 72.661° At 2100m of water depth.

27.11.04	05.00 To 06.30 Hrs	Preparation of mooring, Fixing of keel weight with cylinder and assembly of mast. Arm and sensors
	06.30 To 08.30 Hrs	Deployed DS6 Data buoy at N 8.317° and E 72.759° At 2000m of water depth.
	1500 Hrs	Proceeding towards Goa.
28.11.04	08.30 To 15.30 Hrs	Packing completed and arranged packed material in the dry lab port side.
29.11.04	11.00 Hrs	Anchored Off Goa.

5. PREPARATION OF DATA BUOYS

Five data buoys with mooring systems were loaded on board ORV Sagar Kanya. The data Buoys were assembled and tested before the deployment.

5.1 SETTING UP OF FIELD STATION

A field station was set up on board the ship in wet lab on the starboard side of the main deck, to communicate with the buoy while testing the assembly and to receive initial set of data from the buoy and for communicating with NIOT.

5.2 BUOY CONFIGURATION

The Data Buoy

The data buoy used in deep-water buoy is of discus shaped hull and a keel weight mounted under the hull. The deep-water buoy has a diameter of 2.8 meters and a total height of 5.85 meters weighing about 950 Kg, when assembled with its mast and keel. The sensors are fixed at a height of 3 meters from the water surface. The central cylinder of the buoy contains all electronic modules, power package and the wave sensor. The buoy is equipped with a mast to support the meteorological sensors and Inmarsat antenna. Four solar panels are mounted on top of the buoy to charge the lead acid batteries. The buoys are also fitted with a ventilation system to prevent any hydrogen gas accumulation inside the cylinder.

5.3 SENSOR DETAILS

The details of sensors mounted on the buoys deployed are shown in the table below

Sensor	Make	Range	Accuracy	Resolution	Sampling duration /frequency
Air pressure	Vaisala	800 – 1100 hPa	± 0.1 hPa	0.01 hPa	Only one sample
Air temperature	Omega Eng.	10 – 50°C	± 0.1°C	0.01°C	15 min, 1/sec
Wind (speed, direction)	Lambrecht	0 – 60 ms ⁻¹ , 0 – 360°	± 1.5% FS, ± 3.6°	0.07 ms ⁻¹ , 0.1°	15 min, 1/sec
Water temperature	NE Sensortec / Falmouth	-5 – 45°C	± 0.1°C	0.01°C	15 min, 1/sec
Conductivity	NE Sensortec / Falmouth	2 – 77 m mho cm ⁻¹	± 0.06 m mho cm ⁻¹	0.01 m mho cm ⁻¹	15 min, 1/sec
Surface current (speed, dirn)	NE Sensortec/ Falmouth	0 – 6 ms ⁻¹ , 0 – 360°	± 3% FS, ± 2°	0.005 ms ⁻¹ , 0.36°	15 min, 2/sec
Wave Parameters	Seatex	± 20m, 0 – 360°	± 10 cm, ± 5°	1 cm, < 0.1°	34 min, 2/sec
Relative Humidity (on DS6 buoy)	Rotronix	0-100%	+/-1%	1%	10 min./sec

6. OPERATIONS

6.1 Recovery of SW2 Data Buoy.

SW2 data buoy was recovered from Off Ratnagiri on 23.11.04 at 12.30 hrs

6.2 Deployment Of SW2

A Shallow water Met ocean data buoy was deployed at SW2 location on 23.11.04

Position N 17° 01.12
E 72° 28.48

Depth 85m

6.2 DEPLOYMENT OF OB3 BUOY

A deep water Met ocean data buoy was deployed at OB3 location on 24.11.04

Position N 12. 498°

E 72.011°

Depth 1650 m

6.3 DEPLOYMENT OF DS2 Data BUOY

(Recovered old DS2 Buoy from Lakshadweep Admn from off kavarati)

A deep water Met ocean data buoy was deployed at DS2 location on 25.11.04

Position N 10.64812°

E 72.51425°

Depth 1880 m

6.4 DEPLOYMENT OF DS7 BUOY

A deep water Met ocean data buoy was deployed at DS7 location on 26.11.04

Position N 8.31487°
E 72.661°

Depth 2100 m

6.5 DEPLOYMENT OF DS6BUOY

A deep water Met ocean data buoy was deployed at DS6 location on 27.11.04

Position N 8.317°
E 72.759°

Depth 2000 m

Drawings of mooring configuration and deployment sheets are enclosed.

7. PERFORMANCE OF EQUIPMENTS ON BOARD SAGARKANYA

The following equipments were used during the cruise and their performance is indicated below.

1. ATLAS cranes in the mid ship and in the aft were used for deployment, retrieval and anchor dropping and their performance was satisfactory. There was oil leak from both the cranes.
2. Deep-sea winch with aluminum drum was used for laying the mooring ropes, it worked satisfactorily.
3. Deep sea and shallow water echo sounders worked satisfactorily.
4. The general air conditioning in the ship was poor needs to be attended. Fans in some of the living cabins and recreation room need repair.
5. Capstan was used and working satisfactorily.
6. Main deck needs patchwork.

The Following suggestions may kindly be incorporated during forthcoming dry dock package to enable smoother and safer operations of Deep-sea moorings.

1. Both the Atlas cranes need to be thoroughly serviced, repaired and all Oil leakages to be set right. All high-pressure hoses need to be replaced.
2. All corroded high-pressure system pipes of the Deep-sea winch are to be replaced and winch to be serviced. Winch foundation needs to be checked.
3. All lugs/eye hooks on the jib boom, and A frame to be strengthened.
4. The Ships edge on starboard side main deck needs to be fitted with dismantling type ROLLERS. The rollers can be fabricated form 4-inch diameter MS Sc 40 pipe. The roller has to be in a continuous length of 10 meters and welded to the ship side as mooring rope will be sliding and moving over along the length of the roller.

8. ACKNOWLEDGEMENTS

We thank the Department of Ocean Development, New Delhi, for providing ship time on ORV Sagar Kanya. We express our sincere thanks to **Dr. Pandey, Director, NCAOR** and **Dr. M. Sudhakar, Group Director, NCAOR**, for coordinating the cruise. Our sincere thanks to Captain, officers and the crew of ORV Sagar Kanya for their cooperation throughout the cruise and their sincere effort in helping us to complete the task.

We express our sincere thanks to **Dr. S. Kathirolu, Director, NIOT** for entrusting this task. We are also thankful to all **NDBP colleagues** at NIOT for helping us at various stages for the successful completion of the cruise.

SW2

To be deployed

Deployed on:

Lat : 17° 01' 14" N

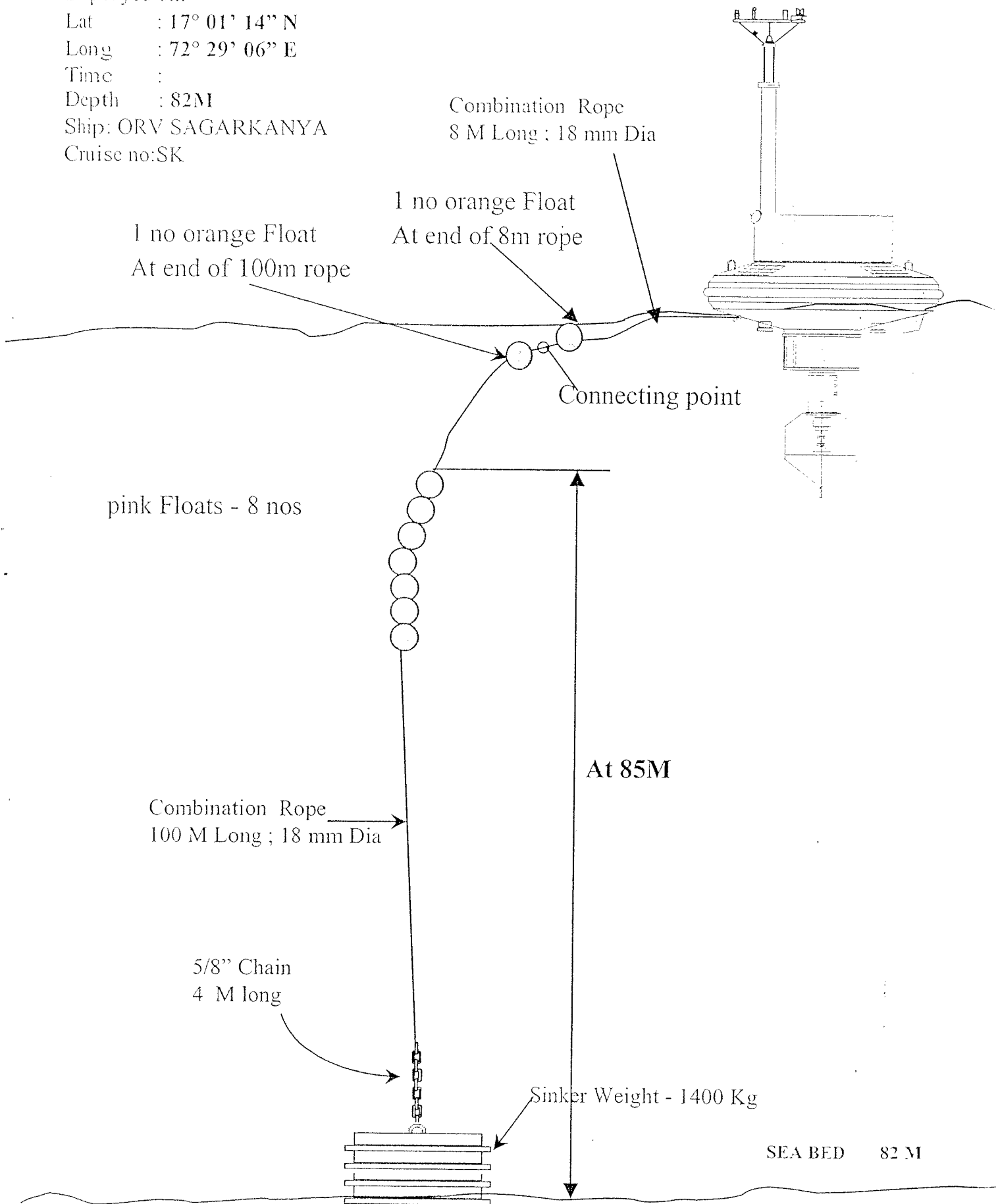
Long : 72° 29' 06" E

Time :

Depth : 82M

Ship: ORV SAGARKANYA

Cruise no:SK



To be deployed

OB3

Deployed on:

Lat : 12° 29' 21" N

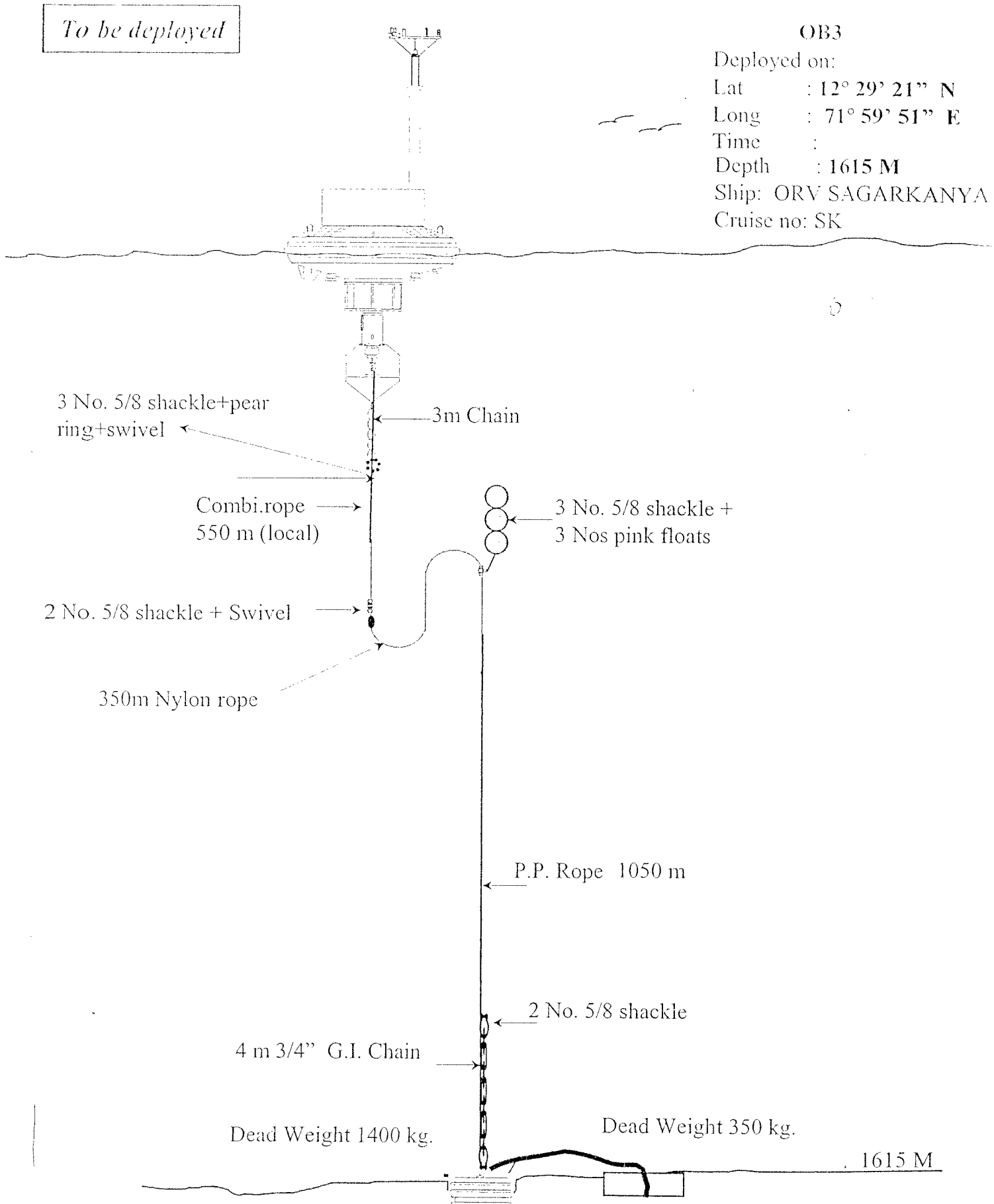
Long : 71° 59' 51" E

Time :

Depth : 1615 M

Ship: ORV SAGARKANYA

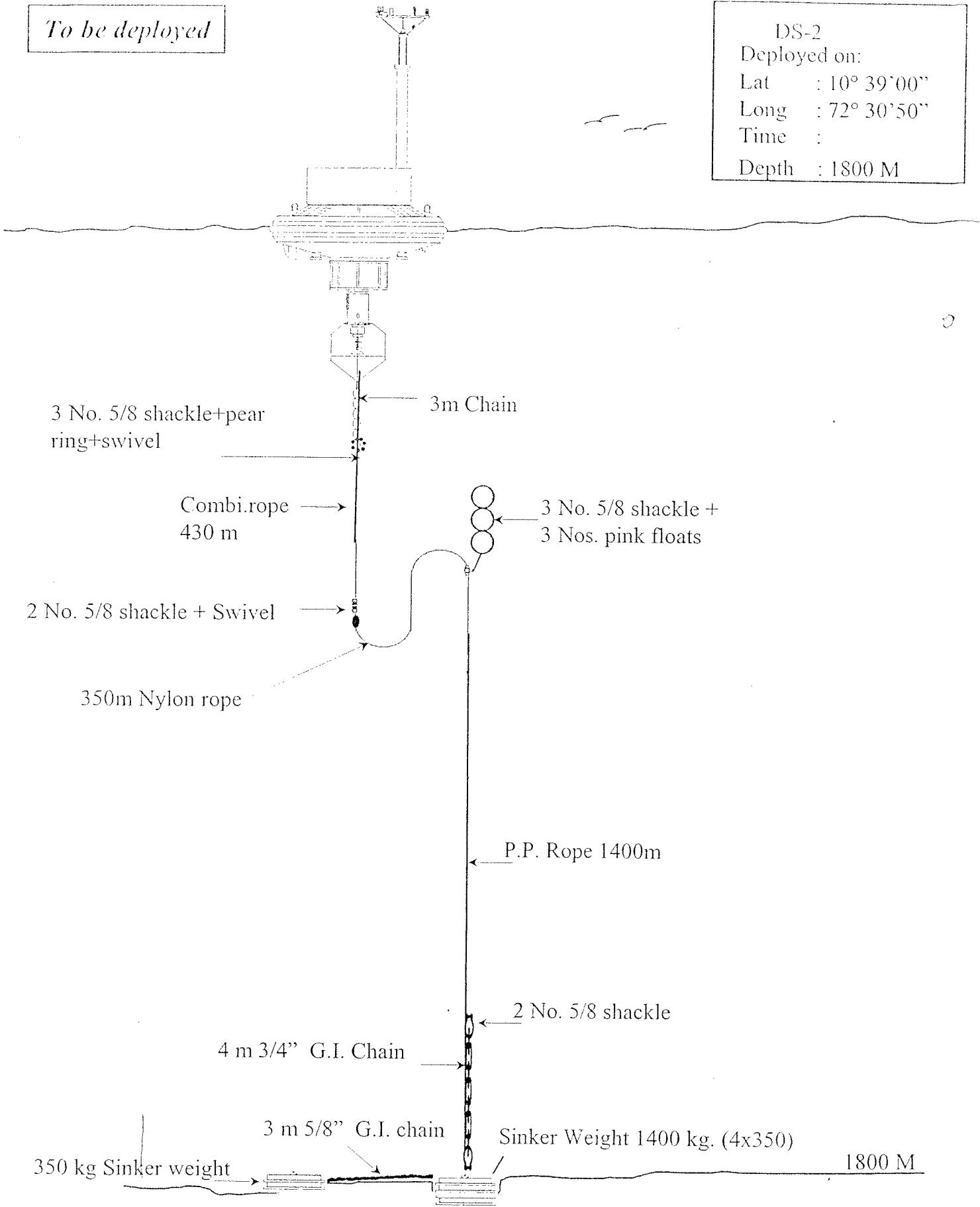
Cruise no: SK



Mooring Configuration For Data Buoy At- OB3

To be deployed

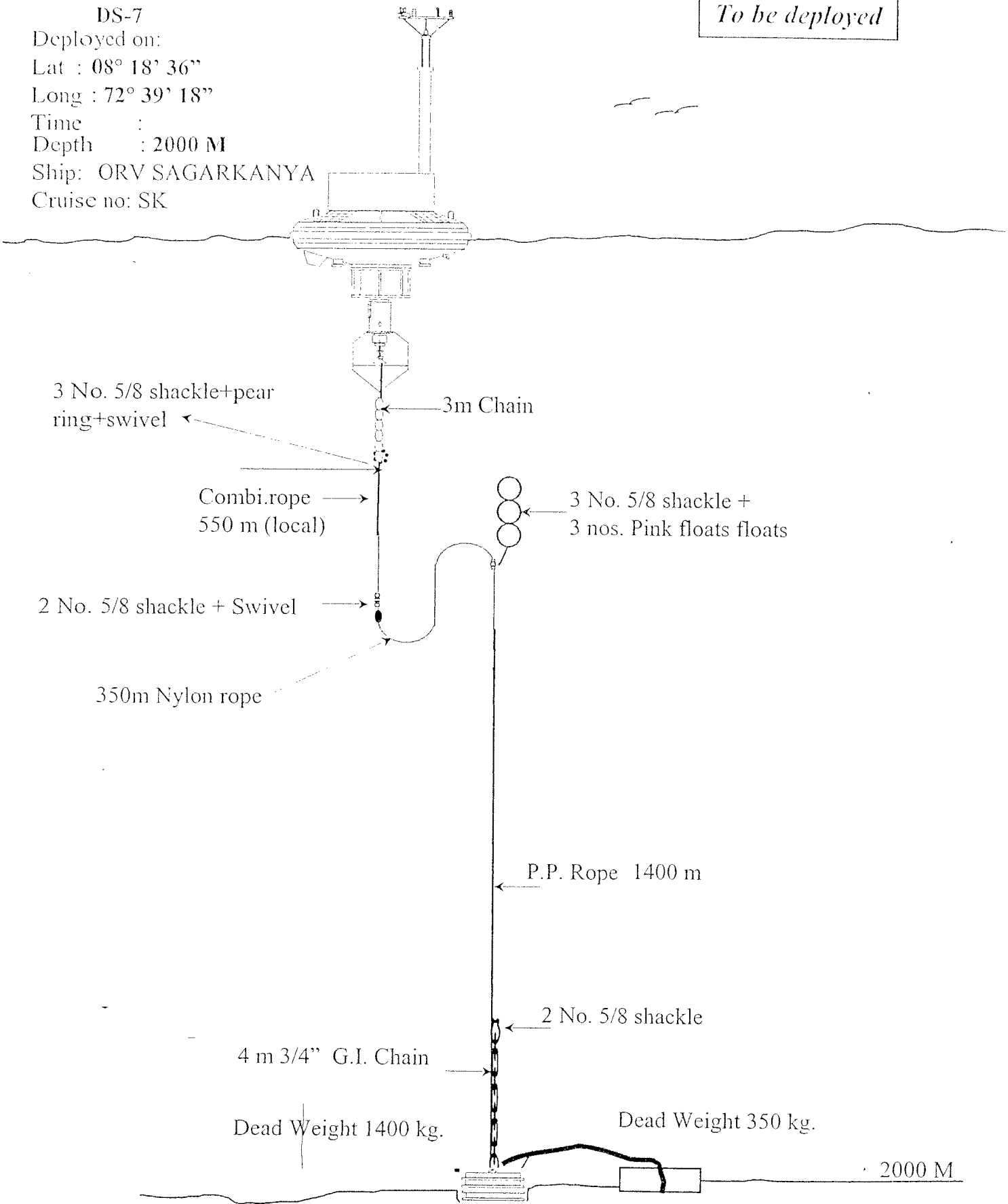
DS-2
Deployed on:
Lat : 10° 39' 00"
Long : 72° 30' 50"
Time :
Depth : 1800 M



Mooring Configuration For Data Buoy At- DS2

DS-7
Deployed on:
Lat : 08° 18' 36"
Long : 72° 39' 18"
Time :
Depth : 2000 M
Ship: ORV SAGARKANYA
Cruise no: SK

To be deployed



Mooring Configuration For Data Buoy At- DS7

DS-6

Deployed on:

Lat : 8° 18' 00" N

Long : 72° 45' 36" E

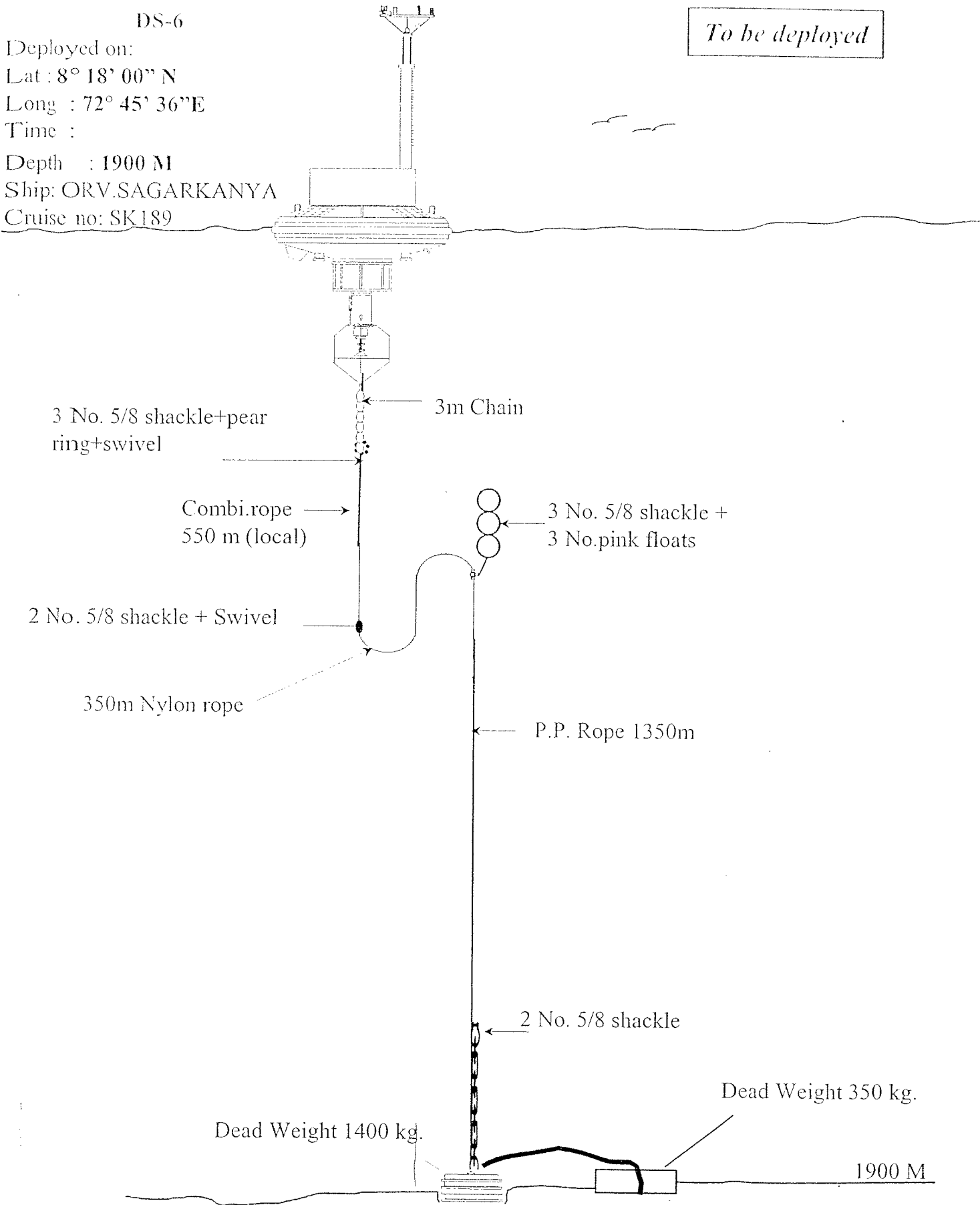
Time :

Depth : 1900 M

Ship: ORV.SAGARKANYA

Cruise no: SK189

To be deployed

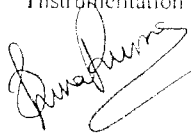


Mooring Configuration For Data Buoy At- DS6

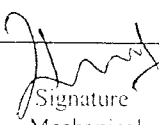
DEPLOYMENT SHEET

GENERAL										
Station & ID		DS7								
Position		Latitude	8.3148 N		Longitude	72.661 E				
Deployment		Date	26-11-04		Time (IST)	16:45 hrs				
Station Depth (m)		2076 mts								
Mooring length (m)		2300 mts								
Flash Light Characteristics		5 flash every 20 Sec								
CPU Type		GENI 2000. S. No: 083								
Satellite used (Please tick the appropriate column)		INMARSAT	<input checked="" type="checkbox"/>		INSAT					
Transceiver ID		492428086								
Software Version		1.31 ver								
Buoy Type (Please tick the appropriate column)		Spar			Discus	<input checked="" type="checkbox"/>		Imported Hull	<input checked="" type="checkbox"/>	
Vessel Name and Cruise Reference ID		SAGAR KANYA Nov 04								
INSTRUMENT FIT										
Sensor		Serial No.		Sensor		Serial No.		Item Description		Serial No.
Air Pressure- 1		X3710006		MRU		1104		Radar Reflector		Indigenous
Air Pressure -2		-		UCM.		-		Keel Weight and Frame		Indigenous
Air Temperature		Yes.		FALMOUTH-CM		1749 15 Jul 04		Battery Box		Indigenous
Wind-1		711108.0003		Battery		12V- 42 Ah.		Sensor Carrier Arm		SS
Wind-2		-		Antenna- INMARSAT		Trimble		Upper Mast		Al
Solar Panel		Tata BP		Power Box with Ah and Charger Module		234		Cylinder		Al
Solar Panel Cable		OCEANOR, MCIL 2M		Must Cable		OCEANOR		Beacon Light		Jotron.
Field Team Remarks										
Sat										
Shore Station Remarks										
Satisfactory										

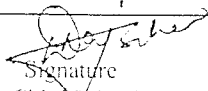
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Instrumentation



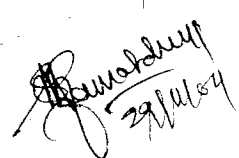
Signature
Mechanical



Signature
Chief Scientist



Date: 29 Nov



29 Jul 04

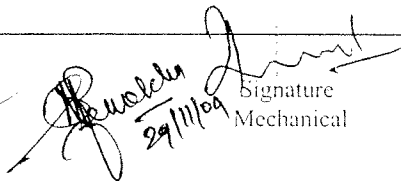
DEPLOYMENT SHEET

GENERAL					
Station & ID		SW2			
Position		Latitude	17Deg 01 min 12"	Longitude	72 deg 28 min 48"
Deployment		Date	23-11-04	Time (IST)	13:15 hrs
Station Depth (m)		85 mts			
Mooring length (m)		110 mts			
Flash Light Characteristics		1 flash every 4 secs			
CPU Type		GENI 2000, S. No: 078			
Satellite used (Please tick the appropriate column)		INMARSAT	<input checked="" type="checkbox"/>	INSAT	<input type="checkbox"/>
Transceiver ID		0200007651			
Software Version		1.31 ver			
Buoy Type (Please tick the appropriate column)		Spar	<input type="checkbox"/>	Discus	<input checked="" type="checkbox"/>
		Imported Hull	<input type="checkbox"/>	Indigenous Hull	<input checked="" type="checkbox"/>
Vessel Name and Cruise Reference ID		SAGAR KANYA Nov 04			
INSTRUMENT FIT					
Sensor	Serial No.	Sensor	Serial No.	Item Description	Serial No.
Air Pressure-1	X 0440009	MRU	1901	Radar Reflector	Indigenous
Air Pressure -2	-	UCM.	-	Keel Weight and Frame	Indigenous
Air Temperature	Yes.	FALMOUTH-CM	1753-15 Jul04	Battery Box	Indigenous
Wind-1	711108.0006	Battery	12V- 42 Ah.	Sensor Carrier Arm	AI
Wind-2	-	Antenna- INMARSAT	0310012074	Upper Mast	SS
Solar Panel	TATABP	Power Box with Ah and Charger Module	-	Cylinder	AI.
Solar Panel Cable	OCEANOR, MCIL 2M	Mast Cable	OCEANOR	Beacon Light	Jotron.
Field Team Remarks					
Set					
Shore Station Remarks					
Satisfactory					

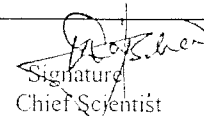
Signature
Instrumentation



Signature
Mechanical



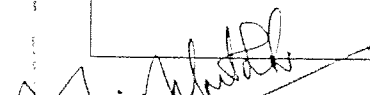
Signature
Chief Scientist

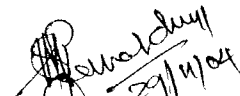


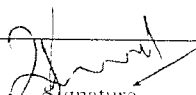
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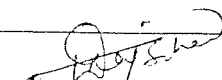
DEPLOYMENT SHEET

GENERAL									
Station & ID		DS2							
Position		Latitude	10.64812 N	Longitude	72.51425 E				
Deployment		Date	25-11-04	Time (IST)	20:45 hrs				
Station Depth (m)		1880 mts							
Mooring length (m)		2100 mts							
Flash Light Characteristics		1 flash every 4 Sec							
CPU Type		GENI 2000. S. No: 084							
Satellite used (Please tick the appropriate column)		INMARSAT	<input checked="" type="checkbox"/>	INSAT	<input type="checkbox"/>				
Transceiver ID		Thrane & Thrane							
Software Version		1.31 ver							
Buoy Type (Please tick the appropriate column)		Spar	<input type="checkbox"/>	Discus	<input checked="" type="checkbox"/>	Imported Hull	<input checked="" type="checkbox"/>	Indigenous Hull	<input type="checkbox"/>
Vessel Name and Cruise Reference ID		SAGAR KANYA Nov 04							
INSTRUMENT FIT									
<i>Sensor</i>	<i>Serial No.</i>	<i>Sensor</i>	<i>Serial No.</i>	<i>Item Description</i>	<i>Serial No.</i>				
Air Pressure- 1	X4830003	MRU	2352	Radar Reflector	Indigenous				
Air Pressure -2	-	UCM.	6012	Keel Weight and Frame	Indigenous				
Air Temperature	Yes.	FALMOUTH-CM	-	Battery Box	Indigenous				
Wind-1	680438.0002	Battery	12V- 42 Ah.	Sensor Carrier Arm	A1				
Wind-2	-	Antenna- INMARSAT	T&T	Upper Mast	A1				
Solar Panel	Tata BP	Power Box with Ah and Charger Module	-	Cylinder	A1				
Solar Panel Cable	OCEANOR, MCIL 2M	Mast Cable	OCEANOR	Beacon Light	Jotron.				
Field Team Remarks									
Sat									
Shore Station Remarks									
Sahyachary									


Signature
Instrumentation


29/11/04


Signature
Mechanical


Signature
Chief Scientist

Date: 29 Nov

DEPLOYMENT SHEET

GENERAL

Station & ID		DS6			
Position	Latitude	8.317 N	Longitude	72.759 E	
Deployment	Date	27-11-04	Time (IST)	07:45 hrs	
Station Depth (m)	1980 mts				
Mooring length (m)	2200 mts				
Flash Light Characteristics	2 flash every 5 Sec				
CPU Type	Dolphin II, S. No: 03				
Satellite used (Please tick the appropriate column)	INMARSAT		INSAT	↗	
Transceiver ID	Avantel- SI No: 003				
Software Version					
Buoy Type (Please tick the appropriate column)	Spar		Discus	↗	Imported Hull
					Indigenous Hull
					Frp
Vessel Name and Cruise Reference ID	SAGAR KANYA Nov 04				

INSTRUMENT FIT

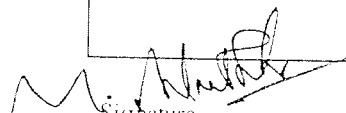
Sensor	Serial No.	Sensor	Serial No.	Item Description	Serial No.
Air Pressure- 1	Z 2850004	Falmouth CT	1519D 30 Sep 02	Radar Reflector	Indigenous
Air Pressure -2	-	GPS	Raytheon	Keel Weight and Frame	Indigenous
Air Temperature	-	Humidity	20971026	Battery Box	Indigenous
Wind-1	711108.0008	Battery	12V- 42 Ah.	Sensor Carrier Arm	AI
Wind-2	-	Antenna- INSAT	1704A2033	Upper Mast	SS
Solar Panel	Tata BP	Power Controller	01	Cylinder	AI
Solar Panel Cable	OCEANOR, MCIL 2M	Mast Cable	OCEANOR	Beacon Light	Indigenous

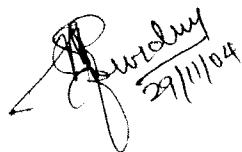
Field Team Remarks

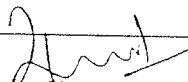
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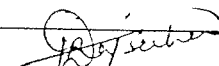
Shore Station Remarks

Satisfactory


Signature
Instrumentation


29/11/04


Signature
Mechanical


Signature
Chief Scientist

Date: 29 Nov

DEPLOYMENT SHEET 1

GENERAL

Station & ID		OB3			
Position		Latitude	12.498 N	Longitude	72.011 E
Deployment		Date	25-11-04	Time (IST)	01:00 hrs
Station Depth (m)		1662 mts			
Mooring length (m)		1850 mts			
Flash Light Characteristics		1 flash every 4 secs			
CPU Type		GENI 2000, S. No: 052			
Satellite used (Please tick the appropriate column)		INMARSAT	<input checked="" type="checkbox"/>	INSAT	<input type="checkbox"/>
Transceiver ID		492428087.SI No: 0200012712			
Software Version		1.31 Ver			
Buoy Type (Please tick the appropriate column)		Spar	<input type="checkbox"/>	Discus	<input checked="" type="checkbox"/>
		Imported Hull	<input checked="" type="checkbox"/>	Indigenous Hull	<input type="checkbox"/>
Vessel Name and Cruise Reference ID		SAGAR KANYA Nov 04			

INSTRUMENT FIT

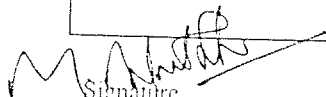
Sensor	Serial No.	Sensor	Serial No.	Item Description	Serial No.
Air Pressure- 1	R 5010016	MRU	2262	Radar Reflector	Indigenous
Air Pressure -2	-	UCM.	-	Keel Weight and Frame	Indigenous
Air Temperature	Yes.	FALMOUTH-CM	Yes	Battery Box	Indigenous
Wind-1	701049.0011	Battery	12V- 42 Ah.	Sensor Carrier Arm	AI
Wind-2	-	Antenna- INMARSAT	Trimble	Upper Mast	AI
Solar Panel	MSX	Power Box with Ah and Charger Module	-	Cylinder	AI
Solar Panel Cable	OCEANOR, MCIL 2M	Mast Cable	OCEANOR	Beacon Light	Jotron.

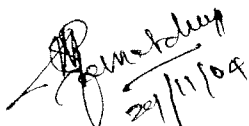
Field Team Remarks

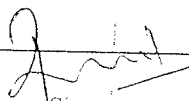
Sat

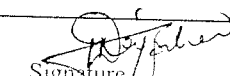
Shore Station Remarks

Satisfactory


Signature
Instrumentation


29/11/04


Signature
Mechanical


Signature
Chief Scientist

Date: 29 Nov