



FORV SAGAR SAMPADA

GOVERNMENT OF INDIA

DEPARTMENT OF OCEAN DEVELOPMENT

This Booklet was published to mark the arrival of the
Fishery and Oceanographic Research Vessel

SAGAR SAMPADA

in India in December 1984

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FISHERY AND OCEANOGRAPHIC RESEARCH VESSEL *SAGAR SAMPADA*

FORV *SAGAR SAMPADA*, a multipurpose fisheries and oceanographic research vessel, was constructed at the Dannebrog Shipyard Ltd., Denmark under the Danish assistance programme to India. It has been delivered to the Department of Ocean Development, Government of India on 6th November, 1984. The Danish International Development Agency (DANIDA) provided the aid for the scientific equipments.

The vessel has been designed by the consulting firm Dwingen Marineconsult A/S in close co-operation with the Indian authorities. The firm has also been responsible for the approval of drawings and owner's survey and served as advisors to the Government of India for the selection of the building yard, contracting and co-ordination with the shipyard and DANIDA.

The vessel is based on the long and rich experience gained through the construction of several research vessels, particularly the Danish oceanographic and fishery research vessel *DANA*.

MAJOR RESEARCH OBJECTIVES

FORV *SAGAR SAMPADA* has been designed for fisheries and oceanographic research in the Exclusive Economic Zone of India and the contiguous high seas. The vessel is ice-strengthened to give support to India's Antarctic scientific programmes for working as far south as 60° S latitude. FORV *SAGAR SAMPADA* complements ORV *SAGAR KANYA* which is equipped for geoscientific, meteorological, physical and chemical oceanographic work, by fulfilling the needs of on-board research on marine living organisms and their environment.

Marine Fisheries Resources Research is the principal function of the vessel. It is well equipped for locating fish resources, assessing their extent of distribution and quantifying the fish stocks in the column waters and on sea bottom through effective use of a multiplicity of fishing gear such as bottom trawl, pelagic and midwater trawls and long-line, and aided by modern



Wheel-house

underwater acoustics and electronic data processing systems. The data acquired through these integrated methods would have a high degree of reliability in estimating the commercial fish stocks and those which are under-exploited, non-conventional and new to the fishery. Besides, the vessel would carry out directed research on spawning populations/grounds and young fish, information on which is essential for fishery predictions, conservation and management of resources.

Oceanographic Research which forms an integral part of marine fisheries research is the second plank of operation of the vessel. The physical, chemical and biological factors of the sea which influence and control the quality and levels of primary, secondary and tertiary production, life-history of fishes and special features such as upwelling, convergence, deep-scattering layers and marine pollution are to be investigated. Such wide-ranging studies have been made possible in the vessel through automatic data acquisition system, water sampling and analysis of different parameters through sophisticated instruments and temperature-controlled aquarium facility conveniently spread out in specific laboratories.

Meteorological Research forming part of oceanographic research is carried out in the vessel to understand the weather phenomena over the Indian and Southern Indian Oceans and the subcontinent, particularly the monsoons and tropical cyclones.

FORV SAGAR SAMPAD

VESSEL DETAILS

Classification

Det Norske Veritas
+ IA1 Deep Sea Fishing Stern Trawler
ICE 1B + MV
Indian Register of Shipping

☪ SUL Stern Trawler HM (B) ☪ 1Y



Wheel-house control panel

Principal particulars

Length overall	..	71.50 m
Length B.P.	..	63.00 m
Breadth moulded	..	16.40 m
Depth to maindeck — Deck 4	..	9.00 m
Depth to freeboard deck — Deck 3	..	6.40 m
Draught	..	5.60 m
Dead weight	..	1140 t
Fuel oil capacity	..	425.4 cu. m
Freshwater capacity	..	204.4 cu. m
Ballast water capacity	..	466.5 cu. m
Gross tonnage	..	2661 t
Net tonnage	..	798 t
Cruising range (12 knots)	..	18,000 n. miles

PROPULSION

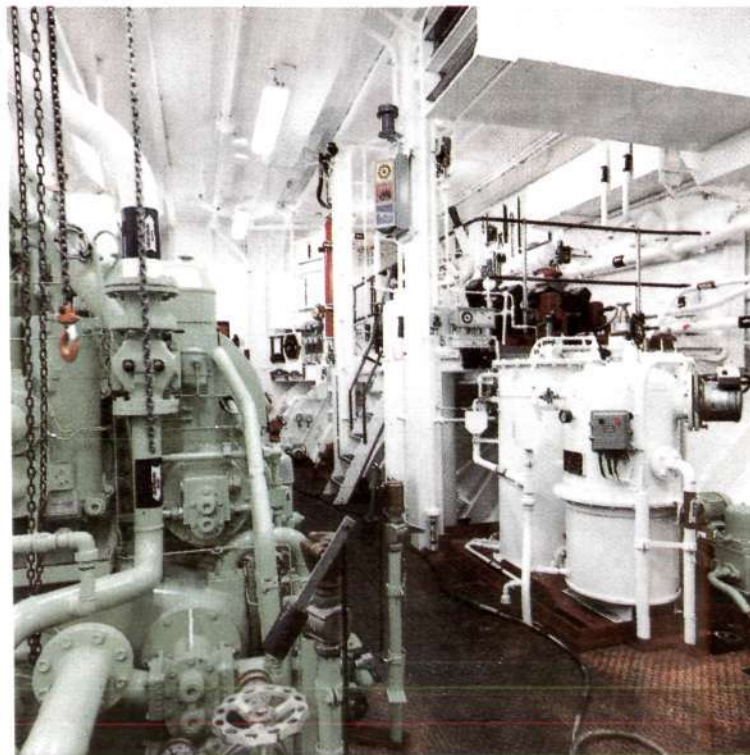
The vessel has one B & W Alpha Diesel main engine Type 8L28/32-VO developing 2285 BHP at 775 rpm driving a controllable pitch propeller. An automatic Alpha manoeuvring system with main control station in the wheel house and aft wheel house.

AUXILIARY DIESEL GENERATING SETS

2 sets, each 550 kW
2 sets, each 330 kW

SIDE THRUSTER

The vessel is fitted with a 500 HP Bow Thruster which makes the vessel very manoeuvrable at sea and in the harbour. The Bow Thruster is controlled from the Bridge and Fishing Bridge.



Engine room

SPEED

Trial speed 13.4 knots

WHEEL-HOUSE

The wheel house is equipped with modern navigational equipment, e.g. satellite navigator, one 10 cm and one 3 cm radar, one automatic visual direction finder, one facsimile receiver, one complete radio station, two VHF radio telephones, two gyrocompasses, one doppler log and one echosounder.

The navigation system will be connected to the vessel's EDP room for coding of navigational data.

COMMUNICATIONS

A Sailor Tandem Station forms the communication facility. The main transmitter and reserve transmitter are equally powerful and have the same facilities. The transmitter has an output power of 800 Watt PEP measured according to CEPT specs. The Station is pre-wired to accept telex, ship's automatic telephone system and taperecorder from either main or reserve station.

ACCOMMODATION

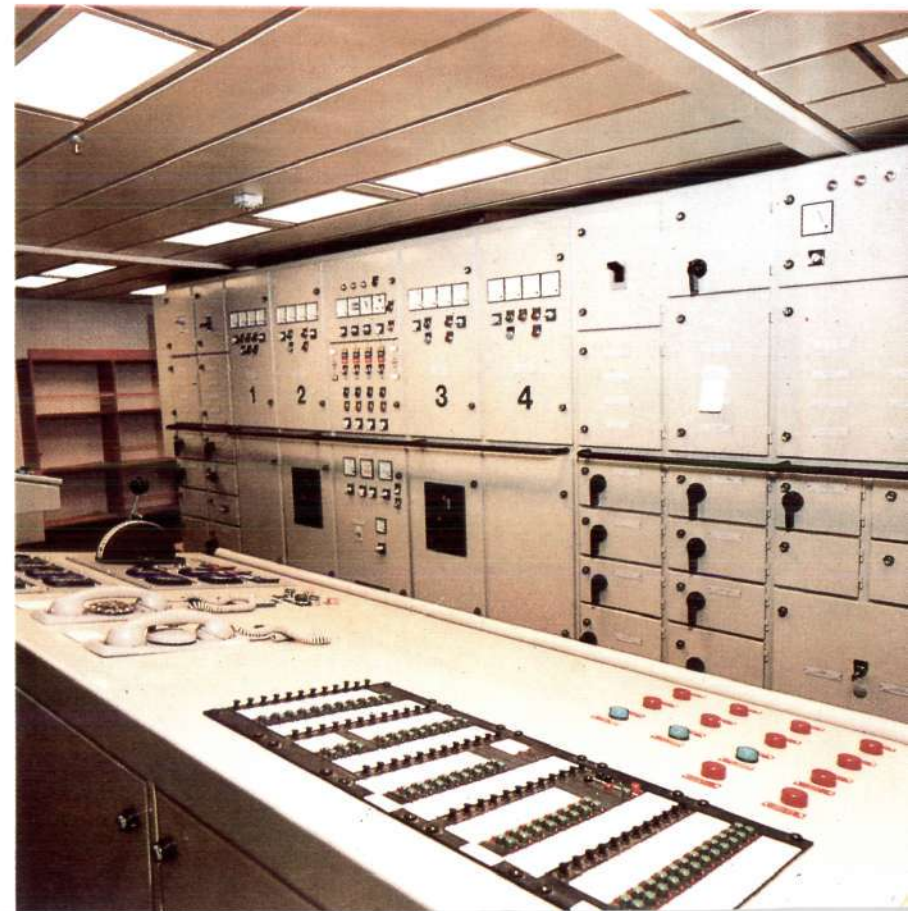
The accommodation is based for a total complement of 59, including 12 scientists, one master fisherman, 6 fishing hands and officers and crew of the vessel. The cabins are comfortable with a pleasant decor.

FISHING DECK

The vessel is essentially a stern trawler and is also equipped for long-line fishing. Bottom trawling upto a depth of 1000 m is a special feature. It is also suited for midwater and pelagic trawling.

There are two main trawl winches, each to take 3200 m length of 22 mm ϕ wire with a pulling capacity of 15 t. The vessel has an autotrawl system to electrically control shooting, trawling and hauling from the fishing bridge, in addition to manual

Engine control room



control from the deck. Besides, there are 2 Gilson winches of 6 t pull each, 2 swepline/bobbin winches of 6 t pull each and 2 net sounding cable winches of 2.4 t pull each. One net drum of 10 m³ capacity with a pull of 15 t is on fishing deck and one of 6 m³ capacity with a pull of 6 t on the upper deck. The longline system consists of a line casting machine, a line hauler of 2 t pull and a storage winch drum for 10,000 m line 6 mm ϕ wire.

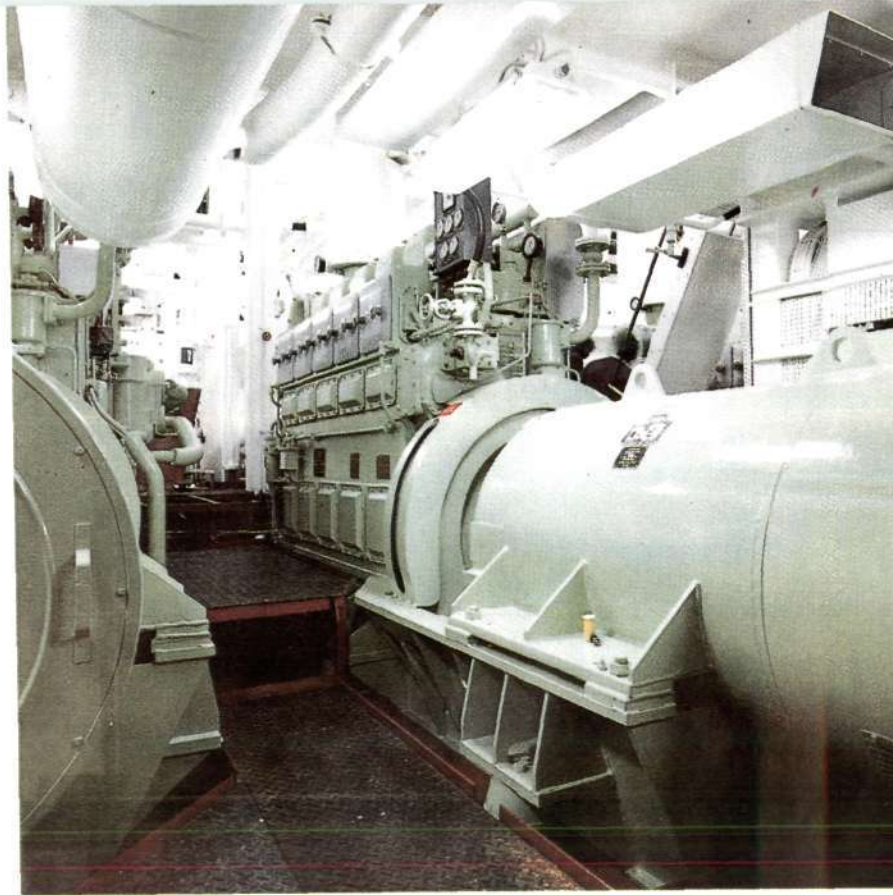
The fishing gear on board includes bottom trawls (Star trawl, Chalut-GOV trawl, large Granton trawl and Kalyut-I shrimp trawl), high-opening midwater trawls (high-speed trawl and Expo trawl), pelagic trawl, krill trawl and tuna long-line gear of 250 m \times 40 baskets with requisite accessories.

LABORATORY AND RESEARCH FACILITIES

The main physical, chemical and biological laboratories are established in one common laboratory and located on the main deck — Deck 4, to ensure optimal working conditions and easy access to the trawl deck and midship hydrographic winch area. The wet and dry fish laboratories are located on Deck 3. The acoustic detection room and the electronic data processing room are located on Deck 6 to ensure easy communication with the wheel-house. The aquaria are located on Deck 3.

COMMON WET LABORATORY

This is a composite laboratory for handling water and plankton samples. Water samples are collected using a Rosette winch with 4000 m of 12 mm ϕ cable and a hydrography winch with 10,000 m of 6 mm ϕ wire. In addition, it has a separate winch to take 10,000 m of 9 mm ϕ wire for plankton sampling. The Rosette sampler system consists of 12 water bottles of 2 l capacity each and a CTD sonde with sensors for



Generators

measuring conductivity (thereby salinity), temperature and depth, with additional probes to measure light penetration, transmission and dispersion. All parameters sensed by CTD sonde are stored in the computer in the dry chemical laboratory. Knudsen type (improved Nansen type) bottles with reversing thermometers also form part of the water sampling system. The plankton wing of the laboratory contains filtration units, cell disruptor, desiccator, muffle kiln, water purifier and optical microscopes.

CHEMISTRY LABORATORY

The dry chemical laboratory consists of sophisticated analytical instruments such as a 4-channel autoanalyser for measurement of nutrients; spectrophotometer for measurement of chlorophyll, pigments and nutrients; spectrofluorometer for measurement of chlorophyll and pollution; titrator and digital pH meter. It has a computer for automatic storage of all data from CTD probes in the Rosette sampler, autoanalyser, shipborne wave recorder, turbidity meter, nephelometer, quantimeter and transmission meter. In addition, the spectrophotometer and spectrofluorometer are manually linked to the computer.

CARBON-14 LABORATORY

The C^{14} laboratory has been designed in accordance with the Danish rules for radioisotope laboratory and has a Geiger counter with monitor, an incubator and an isotope fume cupboard. The laboratory is equipped for carrying out studies on primary production in the sea by use of isotope C^{14} .

WET AND DRY FISH LABORATORIES

All sampling of fish is handled in the wet fish laboratory. Fish catch from the trawl deck automatically goes down through the fish hatch to the wet fish laboratory situated in the deck below *via* a stainless steel six-compartment electronic balance pounder of 10 t capacity. From the pounder, the fish is carried on a conveyor belt system to the laboratory for sampling and further analysis or overboard through a rubbish chute. The



Fishing bridge of the wheel-house

laboratory has electronic balances for weighing samples. The dry fish laboratory has facilities for carrying out biological studies and has a computer for storage of data. Optical microscopes are on board for examination of biological material.

METEOROLOGICAL OFFICE

The meteorological data coming from sensors located in different parts of the ship are stored in the computer in the Met. Office. The data logged are wind direction and velocity, air and water temperatures, barometric pressure, sunshine intensity and global radiation, and atmospheric humidity. Data on rainfall, clouds and sea state are collected. Weather chart by a facsimile recorder is obtained through satellite communication and radio transmission. The Met. data can be read off on the display screen and evaluated simultaneously. The computer gives print-outs of all Met. data.

ACOUSTICS DETECTION LABORATORY

The acoustics laboratory performs one of the principal functions of the research vessel forming the main centre of operations for research relating to location and estimation of fish biomass. The instrumentation comprises of three scientific echosounders, one of frequency 12 kHz with booster and transceiver, and two, each of 38/120 kHz, one of which is connected to the QD integrator. The system also includes a radar (slave monitor). Data acquisition, analysis and biomass estimation are computerised and print-outs of basic data are obtained.

ELECTRONIC DATA PROCESSING ROOM

The EDP room is a master facility relating to hydrographic data and a service centre for all data collected in other laboratories through two computers. It has a hydrographic data handler for navigation purpose and a drafting plotter for plotting the depth profile of the ship's track from echosounder data. The meteorological telemetry buoy (WADI buoy) with sensors is connected to one of the computers through VHF station for measurements of pitch, roll, heave, heading, wind

speed and direction, and water and air temperatures. The ship's position and log are transferred to computers in other laboratories from EDP computers. Data from the laboratories stored in microdiskette are transferred on to magnetic tape for further analysis, plotting and print-outs.

Net drums of the fishing deck



EXPERIMENTAL AQUARIUM

The aquarium system consists of 12 tanks, each 300 l capacity and is supplied with water from the sea inlet in the bow of the ship. The reservoir tank of 4 m³ capacity has a built-in heating/cooling element thermostatically controlled to maintain temperatures within the range of 2°—32°C when the aquarium is used as a closed recycling system. It can also be used as an open flow-through system at ambient seawater temperature. Gravity tank, circulation pumps and air pumps are used to maintain the system. The aquarium is designed to carry out experimental studies on development and growth of eggs and larvae of marine organisms and physiological studies.

HELIPAD AND HANGAR

The helicopter deck with a helipad and hangar is one of the very special features of the ship. The deck is designed for a helicopter with a take-off weight of 1,400 kg and a rotor diameter of 8,100 mm. The hangar is a three-part telescopic aluminium structure.

OTHER FEATURES

The ship has dark room facilities for photographic work and a drawing office with drawing tables and photocopying machine. It has a conference-cum-library hall. The ship's hospital has 2 beds. The electrotechnical workshop has facilities for immediate maintenance and repair of different equipments on board. A sludge and waste incenerator burns the solid and liquid wastes of the ship.



Fishing deck

SCOPE OF RESEARCH AND UTILISATION OF *SAGAR SAMPADA*

The extension of the national maritime jurisdictional limit to 200 miles to explore, exploit, manage and conserve the living and non-living resources of our seas by the declaration of the Exclusive Economic Zone in 1976, has opened up a new chapter in the maritime activities of our country. This has provided a great opportunity and a challenge for the purposeful and beneficial use of the resources contained in this regime.

One of the important constraints in the marine resources investigation of our seas, which are of multi- and interdisciplinary nature, has been the lack of an ocean-going vessel adequately equipped for the purpose. Realising this the Government of India took action to procure two ocean-going research vessels. ORV *SAGAR KANYA*, introduced in 1983, is intended for investigations on the non-living resources and is now operated under the nodal agency of the National Institute of Oceanography, Goa.

FORV *SAGAR SAMPADA* acquired now is for the investigations on the living resources of the seas.

Helipad and hangar



The Department of Ocean Development, the Indian Council of Agricultural Research and the Shipping Corporation of India would organise and operate the programmes of FORV *SAGAR SAMPADA*. A National Cruise Planning and Programme Priorities Committee would decide and approve the programmes. The Central Marine Fisheries Research Institute, the premier National Institute in the country responsible for marine fisheries research is the contact organisation for co-ordination and management of the programmes of the vessel. Being a national facility, the user organisations comprise of all the National Institutes engaged in the R & D programmes in marine fisheries research and education, Universities and other organisations concerned with research and promotion of marine sciences, particularly on living resources.

The scope and the major investigation programmes envisaged for the vessel are :

- *Pelagic fisheries resources* in the outer continental shelf and oceanic regions of EEZ and contiguous high seas.
- *Demersal fishery resources* in the outer continental shelf.
- *Bathypelagic resources* in the EEZ and oceanic regions of EEZ.
- *Mesopelagic resources* in the Indian Ocean.
- *Oceanic fishery resources* such as tunas and related fishes in the Indian Ocean and contiguous waters.
- *Crustacean resources* in the continental shelf and oceanic regions of EEZ.
- *Molluscan resources*, particularly oceanic squids, in the outer continental shelf and oceanic regions of EEZ.



QD—integrator and computer in Acoustics detection laboratory.

- *Marine reptiles, birds and mammals.*
- *Marine invertebrates* of economic use and potential.

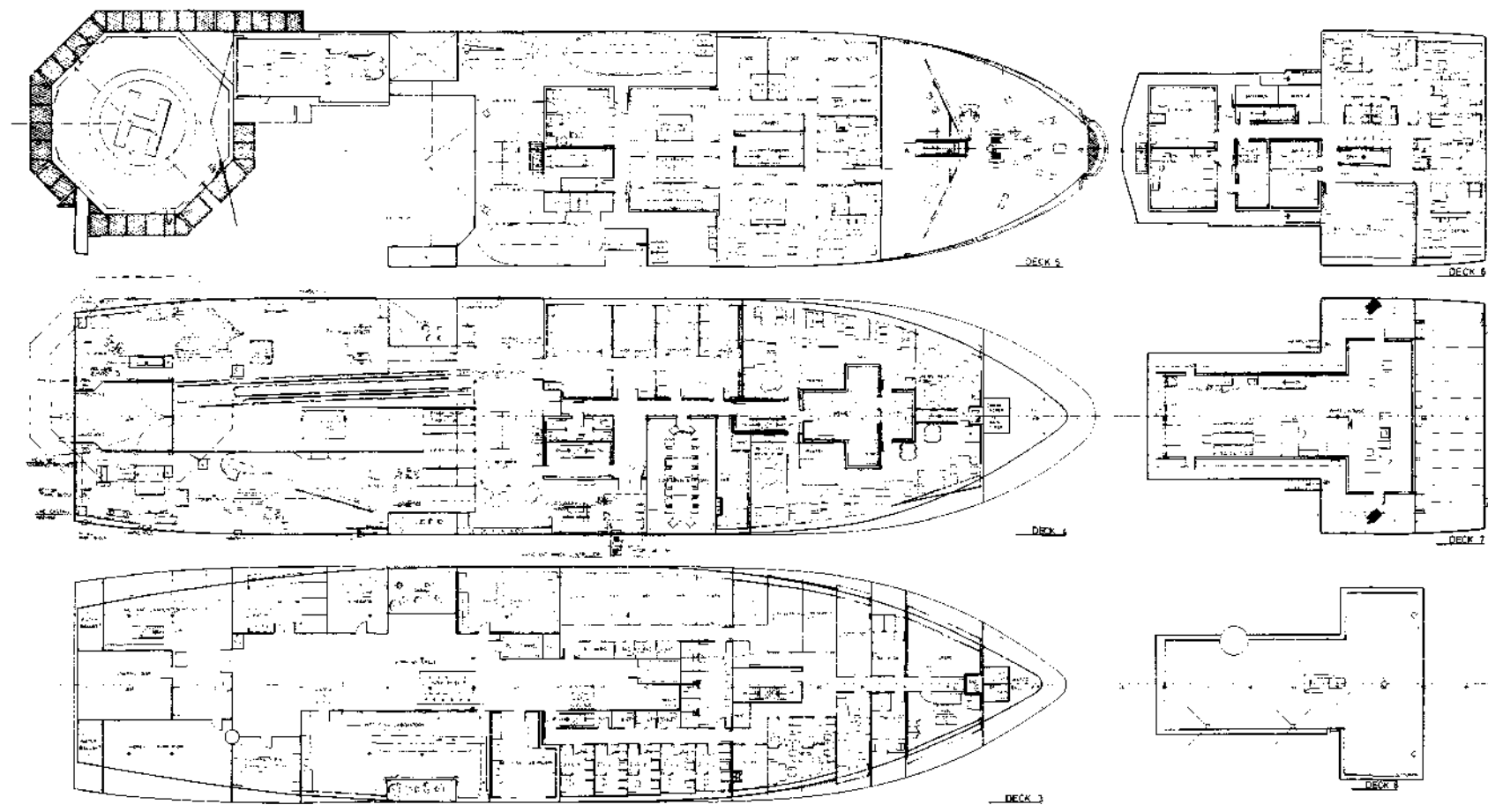
- *Primary and secondary production.*
- *Fishery oceanography.*
- *Marine algae.*

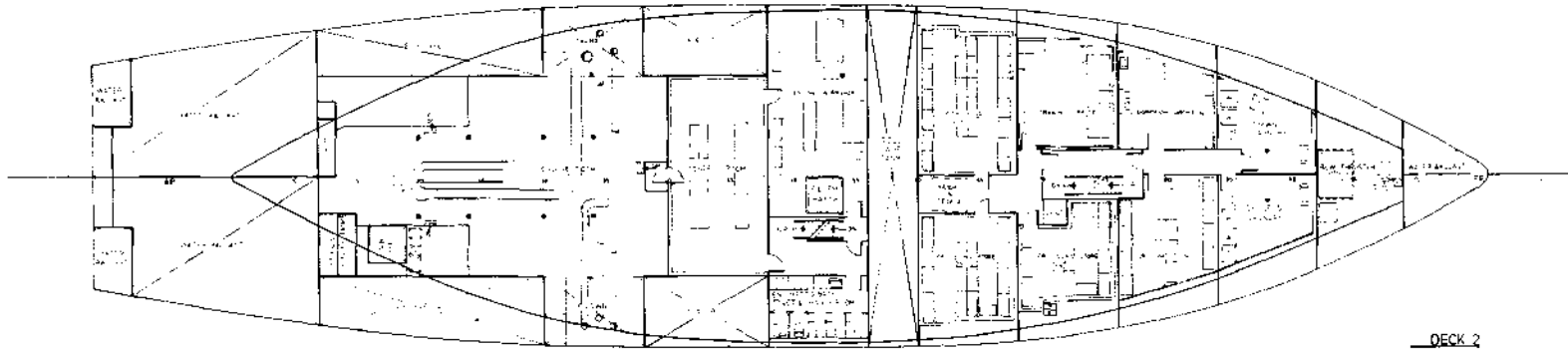
Plankton laboratory



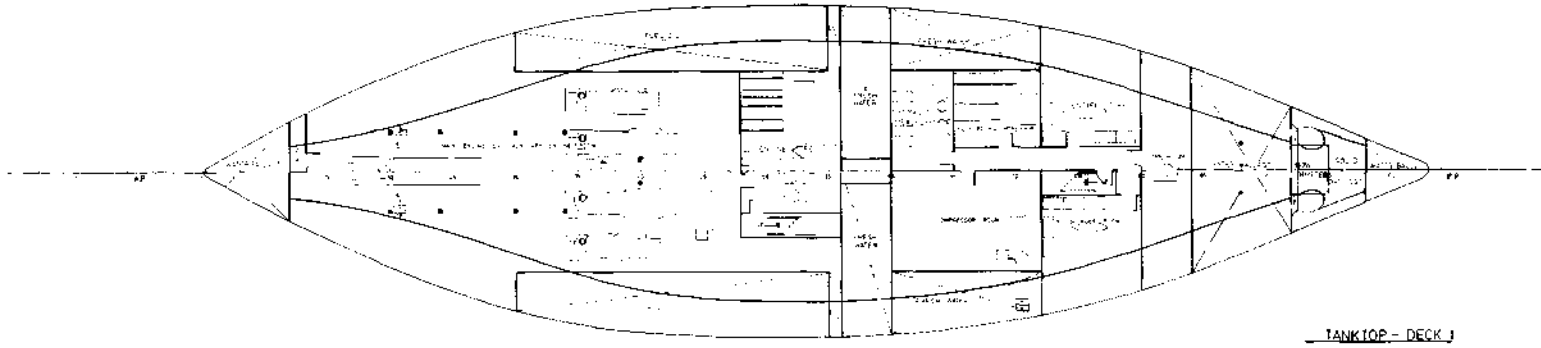
- *Krill resources in Antarctic waters.*
- *Marine biochemistry and microbiology.*
- *Physiology and behaviour of marine organisms.*
- *Meteorology and marine environment.*
- *Ecology of deep-sea grounds.*
- *Fishing gear research and harvesting technology.*
- *Post-harvest technology.*
- *Instrumentation development.*
- *Acoustic application to fishery resources assessment.*
- *Collaboration with remote sensing programme.*
- *Collaboration with Antarctica Expedition.*

The above programmes, it is hoped, would help to unfold our ocean's potentials in food production and supplies, exploitable fishery resources, technology of fishing and utilisation, and marine living resources related technologies. They would also help to develop a comprehensive national programme in marine sciences and to support basic research to enhance the ability to utilise the living resources of our seas and to predict the behaviour of oceanic environment which influences the resources as well as the quality of life. Above all, the programmes of FORV *SAGAR SAMPADA* would greatly contribute to the man-in-the-sea activities.

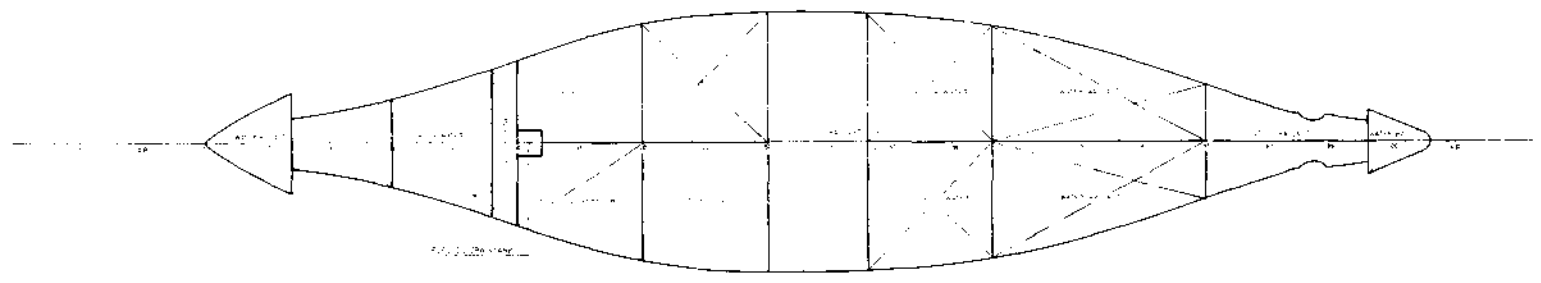




DECK 2



TANKTOP - DECK J



TANK PLAN

SCIENTIFIC EQUIPMENTS

Sl. No.	Name of the equipment	Make and type	Number of pieces
1	2	3	4

I. Plankton Laboratory

1.	Fume cupboard	D. B. Type 10	1
2.	Fume cupboard for formaldehyde	D. B. Type 10	1
3.	Refrigerator	Gram-K. 130	1
4.	Deepfreezer	Gram-F.S. 100	1
5.	Muffle kiln	Heraeus Mr 260 E	1
6.	Desiccator	Heraeus T 5042 E	1
7.	Stereo microscope	Olympus, SZ-III	1
8.	Stereo microscope	Olympus, SZ-TR	1
9.	Stereo microscope	Nikon, SMZ-10	1
10.	Microscope	Reichert, "Neovar 2 KBW 4"	1
11.	Disintegrator	Sonifier B. 30	1

II. Dry Chemical Laboratory

1.	4-Channel photometric automatic analyser	Technicon Auto Analyser II	1
2.	UV Spectrophotometer	Perkin-Elmer, 551 S	1
3.	Spectrofluorometer	Perkin-Elmer, LS-3	1
4.	Research pH meter	Radiometer, PHM 84	1
5.	Titration	Metrohm, Dosimat 655	1

Carbon-14 laboratory



1	2	3	4
6.	Fume cupboard	Type 10	1
7.	Desk top Computer	Hewlett Packard, Ser 9000 Model 220	1
8.	Dual floppy drive	Hewlett Packard, HP-9121D	1
III. C-14 Laboratory			
1.	Refrigerator	Gram-K 130	1
2.	Isotope fume cupboard	DB-Type SR 150-18/8	1
3.	Incubator	Elab. Electronic IM-10	1
4.	Geiger counter with monitor	Danish Isotope Centre, IC-14 Counter/ Processor	1
IV. Wet Fish Laboratory			
1.	Fume cupboard	D. B. Type 10	1
2.	High press rinsing unit	K. E. W. 4403 KSA	1
3.	Marine balance (capacity 100 kg)	Eilersen Electric	2
4.	Marine balance (capacity 15 kg)	Eilersen Electric	1
5.	10 ts. Balance unit	Cimbrer staal (pounder)	1
6.	Ice machine	Ziegra UBE 220-100	1



Common wet laboratory

Meteorological office



1	2	3	4
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V. Dry Fish Laboratory

1. Fume cupboard	D. B. Type 10	1
2. Incubator	Heraeus, B 5050	1
3. Refrigerator	Gram-K. 130	1
4. Freezer	Gram-F.S. 130	1
5. Stereo microscope	Nikon, SMZ-10	1
6. Stereo microscope	Olympus, SZ-III	1
7. Stereo microscope	Olympus, SZ-TR	1
8. Electronic balances	Eilersen Electric A/S Type 5000 gr.	2
9. Desk top Computer	Hewlett Packard, HP-9000/220	1
10. Dual floppy drive	Hewlett Packard, HP-9121 D	1
11. Electronic balance	Eilersen Electric A/S Type 500 gr.	1

VI. Aquaria Room

1. Reservoir tank	E. A. Wilson	1
2. Heating element for R.tank	San gz, 15 kW	1
3. Cooling element for R.tank	Sabroe, 205357-1	2
4. Gravity tank	B. S. Plastic	1
5. Circulation pumps	Iwaki, MDH-32 CM	2
6. Seawater pump	Iwaki, MDH-25 CV	1
7. Air cooler	Sabroe FSS	1
8. Aquaria	Linatex	12



Computer system in chemistry laboratory

1	2	3	4
7.	Deep sea unprotected reversing thermometers	Gohla-150/24	15
8.	CTD sonde and control unit with 7 displays	Guild Line, 87102 and 87191	1
9.	TST-3 Sensor System	Montedoro Witney, TST-3, S/N FC 3 84 E 001 and TMU 3A 84 E 024	1
10.	Quantameter	Q-meter	1

1	2	3	4
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VII. Wet Chemical Laboratory

1.	Turbidity monitor	Montedoro Witney, TMU-3B	1
2.	Water purifying plant	Millipore, Milli-RO-15 and Milli-Q	1
3.	Rosette sampler with 12 water bottles	General Oceanics 1015-12-2, 5	1
4.	Insulated water bottles	Niskin, B32	2
5.	Reversing water bottles	Niskin, A21	5
6.	Deep sea pressure protected reversing thermometers	Gohla-149/12	15

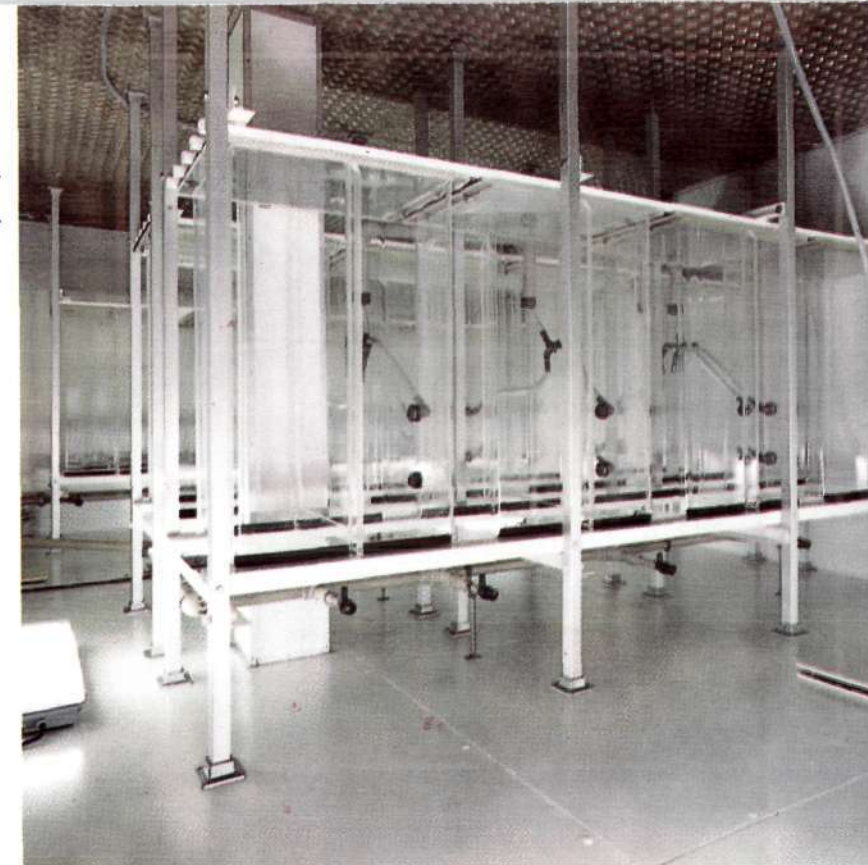
VIII. EDP Room

1.	Computer with Expander	Hewlett Packard, HP-9836	1
2.	Hydrographic data handler	Navitronic, HDH-1	1
3.	Computer	Hewlett Packard, HP-9836	1
4.	Dual floppy drive	Hewlett Packard, HP-9121	1
5.	Magnetic tape-recorders 1/2"	Cipher, F-880	2
6.	Normal printer	Hewlett Packard, HP-82906-A	1

1	2	3	4
7.	Drafting plotter	Hewlett Packard, HP-7580 B	1
8.	Driver/controller Lat. long. time	Navitronic, DRI-1	1
9.	System digital clock	Navitronic, SDC-4	1
10.	Formatter	Baydel 200	2
11.	Graphic printer	Hewlett Packard, HP-2631 G	1

IX. Acoustics Detection Room

1.	Radar Slave Monitor	Kelvin Hughes 16" RDY-A23/2	1
2.	Echo sounder 12 kHz	Simrad, EA 200	1
3.	Booster	Simrad, TR 102	1
4.	Echo sounder 38 kHz/120 kHz	Simrad, EK 400	1
5.	Echo sounder 38 kHz/120 kHz	Simrad, EA 200	1
6.	Desk top Computer	Hewlett Packard, HP-9920	1
7.	Dual floppy drive	Hewlett Packard, HP-9121	1
8.	Recorder interfaces	Navitronic, GRI-5	2
9.	Oscilloscope	Hewlett Packard	1



Experimental aquarium

	1	2	3	4
X. Dark Room				
1. Enlarger			Durst, L-900	1
2. Continuous film processor			Durst, RCP 20	1

1	2	3	4
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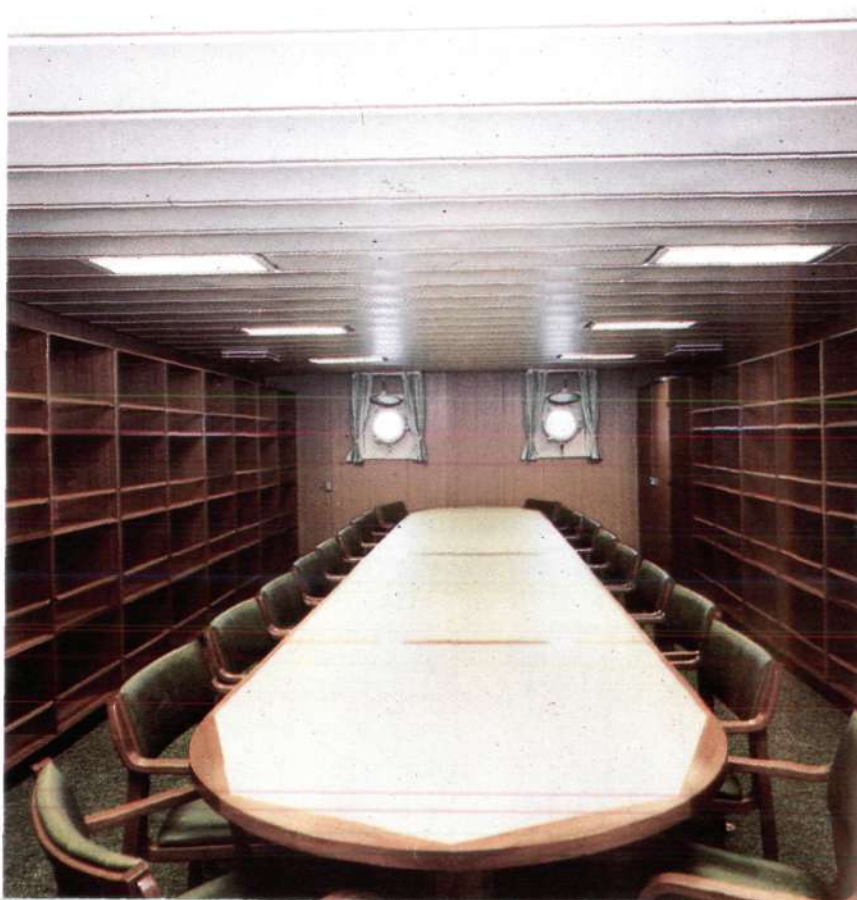
XI. Drawing Office

1. Photo copying machine	Canon, NP-200	1
2. Combined Drawing table/Light table	NTI, Tempo	1
3. Drawing table	NTI, Olnic	1
4. Drawing machine	NTI, Techmaster	1
5. Drawing machine	NTI, Medio	1

XII. Meteorological Office

1. Weather chart facsimile recorder	Muirhead, K-449	1
2. Wind speed	Malling 882-312	2
3. Wind direction	Malling 884-312	2
4. Pyranometer	Wilh. Lambrecht, 1610	1
5. Pyrheliometer	Wilh. Lambrecht, 1621	1
6. Air temperature sensor	Wilh. Lambrecht, 818	1
7. Aspiration psychrometer	Wilh. Lambrecht, 761	1
8. Transducer Display	Simrad HRD 200	1
9. Aneroid barometer	Wilh. Lambrecht J/501106	1

Conference hall cum Library





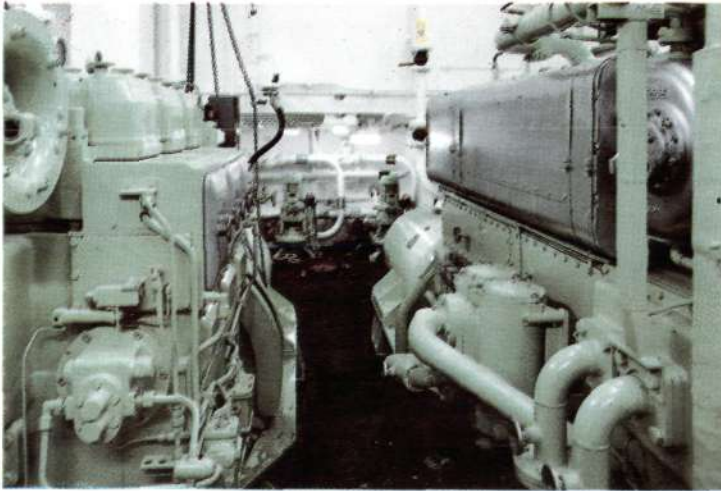
Living room in the cabin

1	2	3	4
10.	Marine barograph	Wilh. Lambrecht, 290 S9	1
11.	Marine Mercury barometer	Wilh. Lambrecht, 604	1
12.	Recording rain gauge	Wilh. Lambrecht, 1507 Type Hellmann	1

1	2	3	4
13.	Desk top Computer	Hewlett Packard, HP-9920	1
14.	Normal printer	Hewlett Packard, HP-82906A	1
15.	Dual floppy drive	Hewlett Packard, HP-9121	1
16.	Meteorological telemetry buoy	Nereides	1
17.	Telemetry transmitter/receiver	Navitronic	1

XIII. Wheel-house

1.	Radiostation and Telex equipment	S.P. Radio Tandem	1
2.	VHF Radiotelephone	S.P. Radio, RT-146	2
3.	Radar 3 cm	Kelvin Hughes	1
4.	Radar 10 cm	Kelvin Hughes	1
5.	Interswitch	Radpak 16.	1
6.	Radio direction finder	Koden, KS-541	1
7.	Gyro-compass with dualmaster compass	Anchutz, St. 4	1
8.	Autopilot	EMRI	1
9.	Doppler Speed log	Simrad, NL	1
10.	Nav. Echo Sounder	Simrad ET 100	1
11.	Satellite Navigator		1



Engine room



Helipad over the fishing deck



Conveyor belt system in wet fish lab



Rosette winch



Single cabin — inside



Galley



Officers' mess



Crew recreation room

CRUISE PLANNING AND PROGRAMME

PRIORITIES COMMITTEE

FOR OCEAN DEVELOPMENT FOR

THE RESEARCH VESSELS *SAGAR KANYA AND SAGAR SAMPADA*

- | | | | |
|--|----------|---|--------|
| 1. Secretary to the Government of India,
Department of Ocean Development | Chairman | 11. Director, Central Institute of Fisheries
Education, Bombay | Member |
| 2. Director General & Secretary to the Govt. of
India, Council of Scientific and Industrial
Research or his Representative | Member | 12. Director, Central Marine Fisheries Research
Institute, Cochin | ” |
| 3. Director General & Secretary to the Govt. of
India, Indian Council of Agricultural
Research or his Representative | ” | 13. Representative of the Department of Science
& Technology | ” |
| 4. Chairman, University Grants Commission
or her Representative | ” | 14. Representative of the Department of
Electronics | ” |
| 5. Joint Secretary to the Prime Minister | ” | 15. Representative of the Department of Space | ” |
| 6. Joint Secretary, Department of Ocean
Development | ” | 16. Representative of the Department of
Non-Conventional Sources of Energy | ” |
| 7. Financial Adviser & Jt. Secretary,
Dept. of Ocean Development | ” | 17. Representative of Department of Mines | ” |
| 8. Director, National Institute of Oceanography,
Goa. | ” | 18. Representative of Ministry of Shipping &
Transport | ” |
| 9. Director General, India Meteorological
Department | ” | 19. Representative of Oil & Natural Gas
Commission | ” |
| 10. Director, Naval Physical Oceanographic Lab.,
Cochin | ” | 20. Representative of the Chairman,
Central Board of Excise & Customs | ” |
| | | 21. Representative of the Director General,
Technical Development | ” |
| | | 22. Representative of the Ministry of
External Affairs | ” |

TERMS OF REFERENCE

- | | |
|--|----------|
| 23. Representative of the Planning Commission | Member |
| 24. Representative of the Ministry of Agriculture,
Department of Fisheries | „ |
| 25. Member, Offshore Oil & Natural Gas
Commission, Bombay | „ |
| 26. Wireless Adviser, Govt. of India,
Ministry of Communication | „ |
| 27. Director, Naval Oceanography,
Naval Headquarters | „ |
| 28. Representative of the Shipping Corporation
of India | „ |
| 29. Principal Scientific Officer (In-charge of
Ship Cell), Department of Ocean Development | „ |
| 30. Principal Scientific Officer (B)-Legal,
Department of Ocean Development | „ |
| 31. Deputy Director & Head, Geological
Oceanography Division and Incharge,
Ship Management Cell, National Institute
of Oceanography, Goa. | Convener |

1. To finalise and approve the cruise programmes of both the research vessels of the Department of Ocean Development for one year in advance, keeping in view the national priorities in various sectors of ocean research.
2. To approve the allotment of cruise time in different disciplines of oceanography and their linkages with all participating organisations working in marine research and development within the national framework.
3. Collection and utilisation of research data in various fields of oceanography by different participating organisations in relation to national security and economic needs of the country in each cruise and geographical locations.
4. Any other matter connected with the management and running of the ship.
5. The Committee will meet once or twice a year at a convenient place and time.

