

STRENGTHENING OF THE NATIONAL HYDROGRAPHIC OFFICE OF SRI LANKA

A GERMAN TECHNICAL CO-OPERATION DEVELOPMENT PROJECT

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Abstract

The project 'Strengthening of the National Hydrographic Office of Sri Lanka' was initiated in 1988 as a project of Technical co-operation between the Government of the Democratic Socialist Republic of Sri Lanka and the Federal Republic of Germany. Implementing agencies were the Deutsche Gesellschaft für technische Zusammenarbeit (GTZ — German Agency for Technical Co-operation) and the National Aquatic Resources Agency of Sri Lanka (NARA).

Hamburg Port Consulting, with its qualified and experienced experts in Hydrography and on account of their close co-operation with the Bundesamt für Seeschifffahrt und Hydrographie (BSH — Federal Maritime and Hydrographic Agency) and the Forschungsbereich Hydrographie of the Fachhochschule Hamburg (Hamburg Polytechnic — research section 'Hydrography'), is carrying out the German part of the project by sub-contract. Since 1988, experts of HPC have been working on the project in Sri Lanka.

In September 1990, phase I of the Project was completed successfully. The personnel of the National Hydrographic Office (NHO) were trained in basic hydrography, an outfit of hydrographic equipment was installed and put into operation, and the NHO was enabled to produce fair-sheets.

At present, phase II of the project is in progress (1990 to 1993). The objectives of phase II are the expansion and improvement of phase I to carry on the training on-the-job, to organize training courses and to install additional equipment. It is intended to procure a survey vessel and a small survey boat.

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INTRODUCTION

For projects of technical co-operation, the Deutsche Gesellschaft für technische Zusammenarbeit (GTZ — German Agency for Technical Co-operation) is the implementing agency of the government of the Federal Republic of Germany, namely the Bundesministerium für wirtschaftliche Zusammenarbeit (BMS — Ministry of Economic Co-operation). The GTZ investigates the prerequisites for the provision of budgetary support as well as the use of the funds and the progress of a project. Implementation of a project is either carried out by GTZ itself or placed with competent and expert firms by sub-contract.

HPC Hamburg Port Consulting is an international Management Consultancy specialized in assisting the international maritime trade sector, in particular port authorities and transport organizations, private enterprises and public bodies alike.

HPC employs about 120 full-time experts, all of whom have many years of practical experience as master mariners, engineers, economists, EDP-hardware specialists, analysts and programmers, hydrographers, training officers, operation managers or as marketing experts. Furthermore, HPC can use the experience of its parent company, the HHLA Hamburger Hafen- und Lagerhaus-AG (Hamburg Port and Warehouse Corporation), which is the largest and most specialized port operator in the Port of Hamburg.

The Hydrographic Department of HPC was established in 1980, when HPC experienced a worldwide need for the transfer of knowledge in the various fields of Hydrography. Furthermore, discussions about the International Convention on the Law of the Sea in 1982 drew HPC's attention to a worldwide demand for assistance and support.

The National Aquatic Resources Agency of Sri Lanka (NARA) was constituted by an Act of Parliament in 1981. It is the principal national Institution in Sri Lanka charged with research, development and management activities in the field of aquatic resources. Other duties of the Agency are to provide advisory services on scientific, technological and legal matters related to the management and development of aquatic resources and to organize training of personnel in fields related to development and exploration.

NARA is the focal point of all matters dealing with aquatic resources in Sri Lanka and that is why the National Hydrographic Office of Sri Lanka (NHO) is placed under the umbrella of NARA.

The National Hydrographic Office of Sri Lanka was inaugurated in 1984, with the joint partnership of the Survey Department, the Sri Lanka Navy and NARA. The NHO is managed by a Board of three directors, consisting of representatives from the partner organizations. Such a partnership include co-operation, especially in budgetary and personnel matters.

1. BACKGROUND OF THE PROJECT

Simple hydrographic surveys were executed by NHO for a great variety of users in Sri Lanka, such as the different units of NARA, the Environmental Study Unit, the Aquaculture Division, the Coral Survey Unit and the Oceanography Division and also for external organizations, such as the Ceylon Petroleum Corporation, the Ceylon Electricity Board and the Ministry for Fisheries and Aquatic Resources.

The surveys were executed in a very traditional way with the method of fixing positions by theodolite and sounding with a portable analog echosounder. The processing of the results was carried out manually by plotting the positions and depths and drawing the bathymetric contours by hand.

As the requirements with regard to quality and quantity of hydrographic surveys in Sri Lanka increased rapidly, it was obvious that this relatively inaccurate and time-consuming method was no longer adequate. In order to enable the NHO to provide the hydrographic data required it was essential to introduce modern equipment and procedures of data collection and processing as well as adequate training of personnel. In order to do this, the Government of Sri Lanka applied for technical and financial support from the BMZ.

Before the bilateral agreement for the project to strengthen the NHO was signed, a so-called fact-finding mission was executed by GTZ. The objective of this mission was to investigate the prerequisites of the project in question.

The needs for the strengthening of the NHO had to be determined and a project master-plan had to be developed. The results of the fact-finding mission were the basis of the bilateral agreement. The general outline of the first phase of the project was defined in the project document regulating the project implementation and the contribution of the two Governments concerned.

2. CONCEPT OF IMPLEMENTATION

The aim of the project 'Strengthening of the National Hydrographic Office of Sri Lanka' is to enable the NHO to provide better and more comprehensive hydrographic data to user organizations in Sri Lanka.

The concept of implementation of the project is based on different phases: a two-year phase I, a three-year phase II and a two-year phase III. Each phase is defined by its own objectives and activities, each moving in the direction of the overall project objective. The definition was done in close co-operation with the NHO and the potential user organizations of hydrographic data in Sri Lanka.

Each phase of the project is accompanied by a project evaluation. An evaluation in this context is understood as an assessment of the project's progress with regard to the specific circumstances within the developing country. It has to be assessed whether the output of the project meets the objectives,

whether the course of the project was planned realistically or whether the strategy of implementation needs to be revised. It is essential to adjust the project activities to the actual progress, if necessary.

2.1 First phase of the project

The bilateral agreement of the project commits the contribution of both partners concerned. The German part covers services by expert personnel, the supply of equipment and the organization and realization of training, whilst the counterpart has to make available the necessary personnel, ship's capacity as well as to meet the operational and maintenance costs in respect of the project.

Based upon the results obtained by the fact-finding mission, the tasks of the consultants are described as follows:

- procurement and installation of equipment
- development of an organizational chart and definition of technical and administrative processes
- training of the counterpart 'on-the-job'
- advice in the preparation of technical reference manuals
- advice in the field of co-operation with national and international organizations
- advice in developing a work plan

In this context, it was essential to draw up a detailed equipment concept and training program with the aim of providing the NHO with the most effective support to develop an efficient Hydrographic Service.

2.1.1 Experts

The implementation of the project is managed in close co-operation with the counterpart by a project manager of HPC. He is responsible for the coordination of all project activities with the counterpart. The task of the project manager is to develop the strategies of implementation and to offer the technical support. In his work, he is supported by a number of short-term experts. The author was sent to work on the project, as a short term expert in hydrography, for an eight-month period. Her duty was to support the project, especially in the technical and operational fields of a Hydrographic Office, i.e. to install the equipment after its arrival in Sri Lanka, to test the instruments and to train the local personnel in operating them. The expert in hydrography also provided advisory services in planning and carrying out a survey and in processing the acquired hydrographic data. The time schedule for the employment of the short-term experts was chosen in respect of the opportunity to give initial training to local NHO personnel in Hydrography in Germany and then to carry on this work in Sri Lanka.

The project provides for the establishment of an electronic workshop within the NHO. Hydrographic work is carried out by using electronic equipment and instruments for both the data collection as well as for its processing. For the daily work it is therefore essential for the local personnel to obtain basic knowledge in electronics. Especially in a developing country, where it might be difficult to

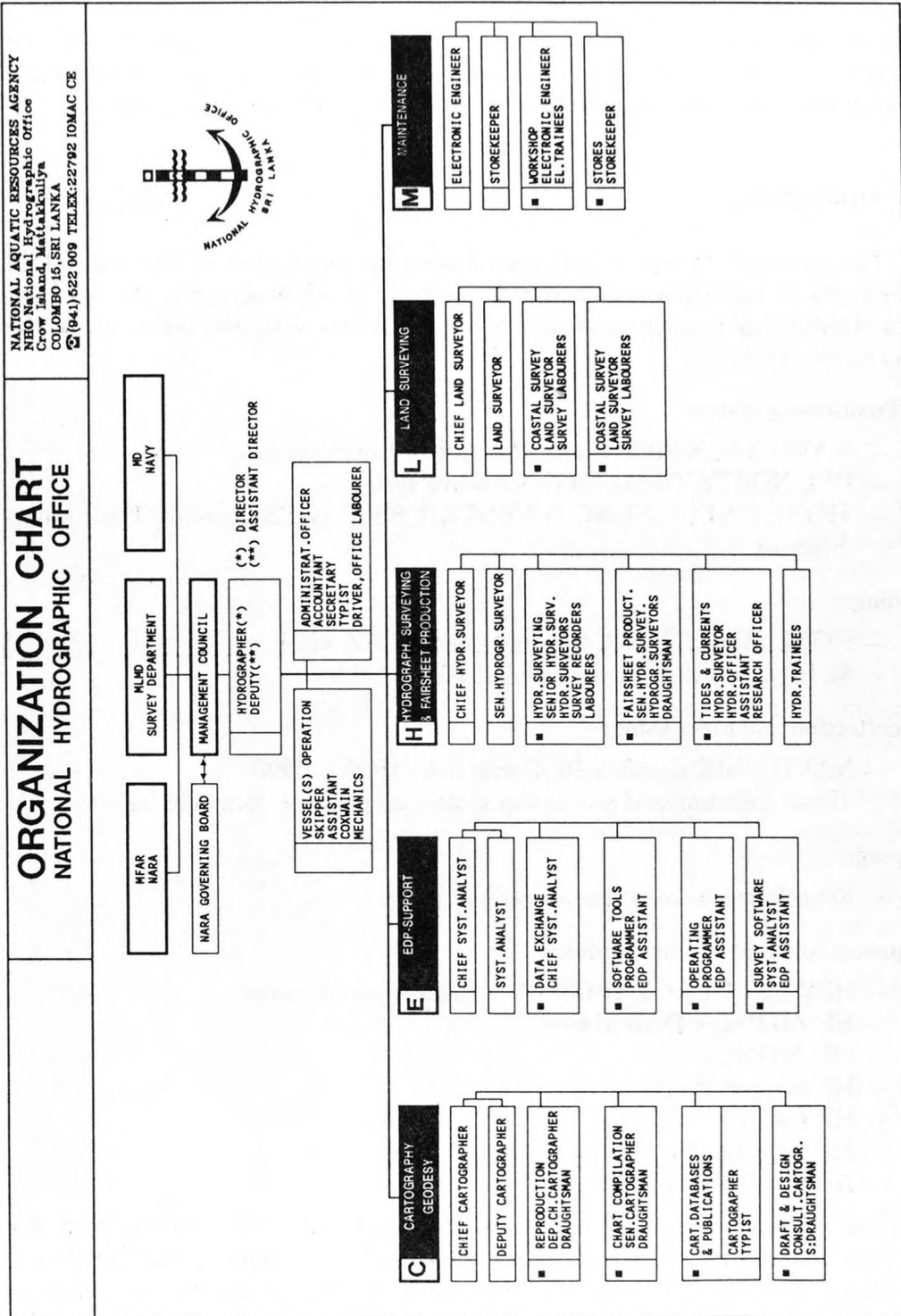


FIG. 1.— Organization Chart of the National Hydrographic Office of Sri Lanka.

maintain echosounders or to repair personal computers, routine maintenance and repair should be carried out by the local employees.

For three months, a short-term expert in electronics was sent to work on the project by HPC. It was his duty to work out a plan to establish an electronic workshop and to train the local staff in the basics of maintenance and repair.

2.1.2 Equipment

The concept of equipment was drawn up in respect of the individual requirements in operation and administration of the Hydrographic Office of Sri Lanka. Hydrographic equipment and office equipment was purchased out of the project funds as follows:

Positioning system:

- NAVITRACK 2000 (Laser Polar 3D Tracking-system)
- DEL NORTE Trisponder (Microwave system)
- HONEYWELL ELAC NAVSTAR 8800 (GPS Satellite Positioning System)

Sounding:

- HONEYWELL ELAC Survey Sounder LAZ 4721
(2 frequency digital echosounder, 15/200 kHz)

Data collection and processing:

- NAVITONIK Comflex 1050 with NAVISOFT 1000
(Data collection and processing system on personal computer basis)

Tidegauge:

- Rennekamp (analog/digital pressure gauge)

Post processing and administration:

- HEWLETT PACKARD (HP) Workstations (Network)
- HP A0 Plotter Draft Master
- HP A3 Plotter
- HP Rugged Writer
- HP Laserjet
- HP Scan Jet Plus A4 Scanner
- Aristo A0 Digitizer

The concept of equipment provides a digital data flow, starting with the data collection and the processing of the data, up to the output of the fair-sheets. The depths, positions and tidal data are stored on diskette or streamer tape on board. The processing of the survey data is carried out in the office, where the hydrographic personnel check the data, implement the tidal reduction and plot the computer aided fair-sheets.

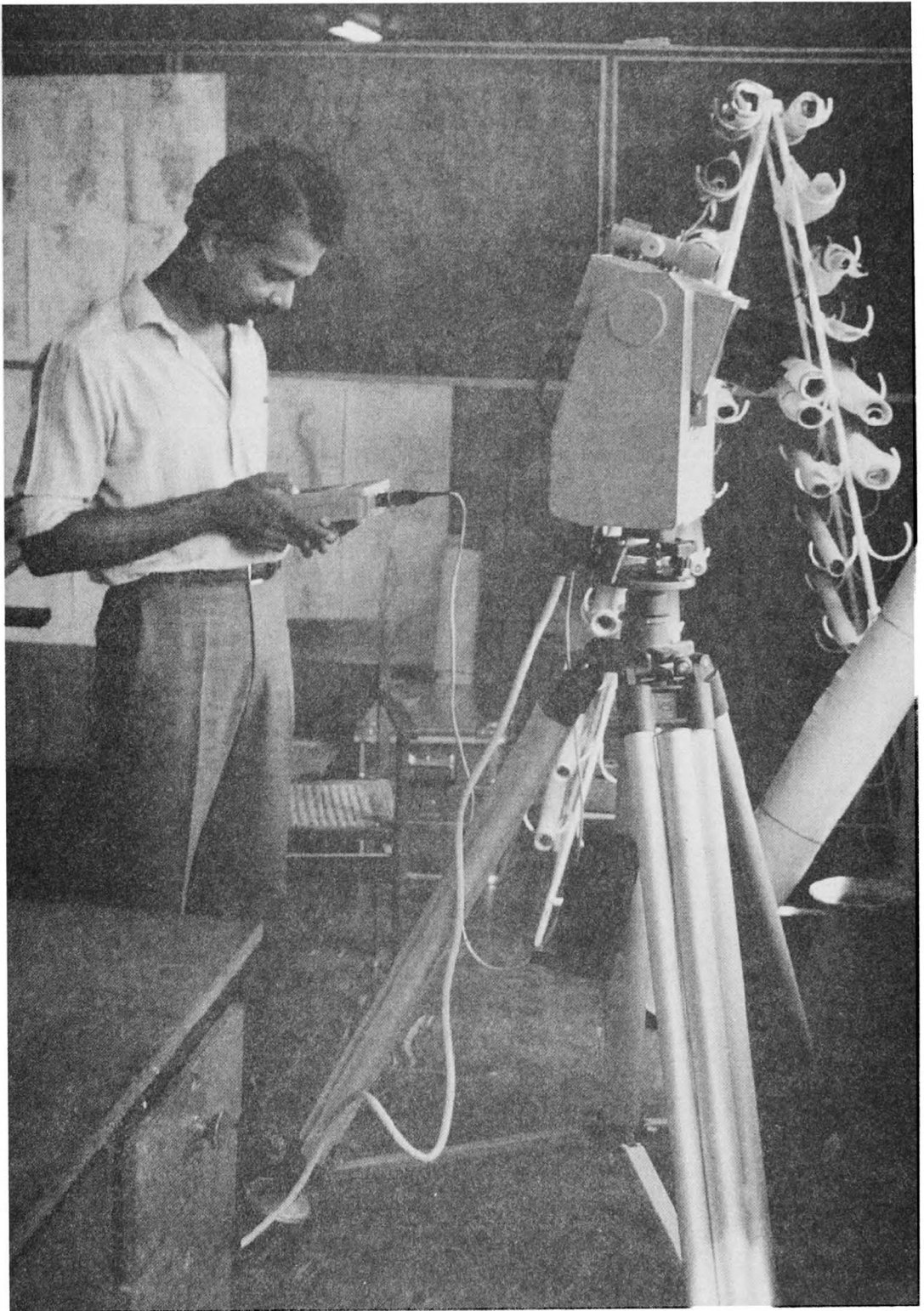


FIG. 2.— Training with the NAVITRACK.

2.1.3 Training

The training programme of phase I of the project included, first of all, a continuous training 'on-the-job' of the employees of the NHO. In addition, a three months course in hydrography for five NHO trainees was held in Germany. This course was provided by HPC in co-operation with the Fachhochschule Hamburg, Forschungsbereich Hydrographie and the Bundesamt für Seeschifffahrt und Hydrographie (BSH). The upgrading course in hydrography, an individual programme of instruction, was tailored to the needs of the hydrographic trainees in respect of their education and experience. Beside a number of different topics in hydrography and applied science, a two weeks' practice on board and the processing of the collected data by the trainees afterwards was included:

Schedule

Upgrading course in hydrography

Hydrography

Introduction to Hydrography
 Hydrographic Positioning Systems
 Depth Sounding and Side Scan sonar
 Sub-bottom Profiling

Automated Survey Systems

Introduction to EDP
 Hard- and Software Configurations
 Training in Hydrographic Software by Computer Aided Learning

Hydrographic Survey Planning
 Hydrographic Survey Operation
 Post-processing of Hydrographic Surveys

Oceanography and Meteorology

Tides and Tidal Currents
 Tidal Datum and Tidal Reductions

Charting

Introduction to Charting
 Automated Fair-Sheet Production

Law of the Sea

Overview of the Law of the Sea

In this connection, grateful thanks have to be extended to the Head of the Forschungsbereich Hydrographie of the Fachhochschule Hamburg, Prof. P. ANDREE for developing the concept, and for organizing and teaching the course. HPC has to thank also the BSH and the Behörde für Strom- und Hafenaufbau (Hamburg Port Authority) for making available the Survey, Wreck Search and Research Vessel ATAIR and the ship NIGE WARK for the practical training on board.

2.2 Status of the project after two years

Phase I of the project was evaluated after two years as having been completed successfully. The outputs of the first phase were as follows:

- the organizational structure was improved,
- the office infrastructure was improved,
- additional hydrographic equipment had been procured, installed and put into operation,
- five counterpart hydrographic surveyors had been trained in Germany.

The experiences gained during phase I of the project showed that it was an advantage to train the counterparts in Hamburg, making use of the capacities available there and with equipment to be provided in the project. Back in Sri Lanka, the hydrographic trainees were able to work with instruments and techniques they were familiar with, and could put into practice — with the assistance of the experts — the knowledge gained during the upgrading course. Thus, practical work could be started with a minimum of preparation in Sri Lanka.

During the first phase, extensive hydrographic surveys were carried out by NHO for the Coast Conservation Department (CCD) of Sri Lanka, Hydrographic data from the coastline out to 20 m depth were needed to evaluate measurements taken by CCD to protect the south-west coast of Sri Lanka. The coastline suffers from coastal erosion. This work showed impressively, how hydrographic surveys can be of use for different activities in the maritime sector, such as the monitoring of coastal erosion.

The employment of the electronic engineer was the first step to establish an electronic workshop within the NHO. From the very beginning it was understood that a workshop, fulfilling the requirements of an overall service, could not be realized with the framework of the project. Therefore, considerably more budgetary and technical support will be required. It is the objective of the project to create a basis for an electronic workshop capable of development.

2.3 Second phase of the project

Directly following the evaluation of phase I, a workshop for object-oriented project planning was held in Sri Lanka for phase II. Personnel from NHO, the representatives of the three partners of NHO, representatives of GTZ and HPC were invited to participate. The result of the planning workshop was a detailed plan of operation dealing with all aspects of phase II.

Two serious constraints in the further development of NHO were identified during the workshop: the shortage of personnel in the NHO and the very limited ship's capacity.

A sufficient number of employees must be provided by the counterpart. In this connection, the financial situation of Sri Lanka poses a problem. Nevertheless, only by providing a sufficient number of staff will the NHO be able to get the maximum benefit out of the project.

One of the main objectives of phase II is to make available ship's capacity as requested. First of all, the concept of equipment includes the procurement of a small survey boat, with trailer. After successful operations with this survey boat, the final decision on the procurement of a medium size survey vessel (15 to 20 meters) will be taken in the middle of the period of phase II.

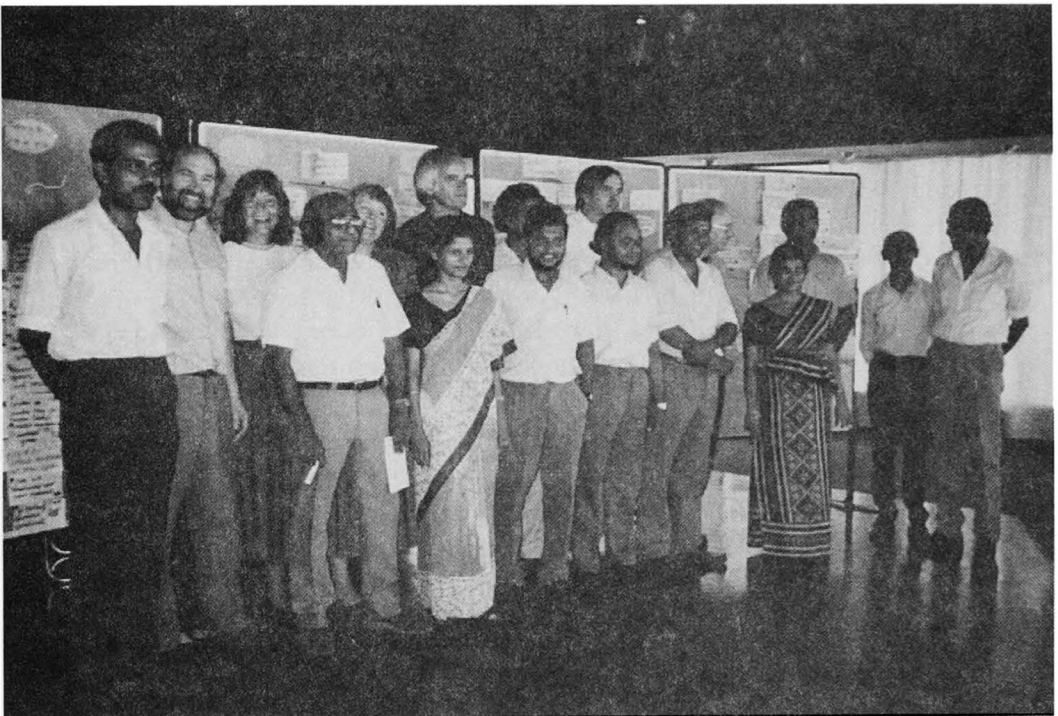


FIG. 3.— Participants of the planning workshop of phase II.

From left to right:

Mr. S. Withana (NHO)
 Mr. W. Zimmermann (GTZ)
 Mrs. U. Bielke (Hydro. Expert, HPC)
 Mr. R.S.S. Ameresekere (NHO)
 Mrs. C. Addy (GTZ)
 Mrs. M.D.C. Jayanthi (NHO)
 Dr. E. Spreen (Moderator)
 Mr. M. A. Aryawansa (NHO)
 Dr. S. Wickremeratne (NARA)

Mr S.W.S. Weerasinghe (NHO)
 Mr. M. Gruber (Project Manager, HPC)
 Mr. N. Silva (NHO)
 Prof. P. Andree (Hamburg Polytechnic, HPC)
 Mrs. M. Samaranayake (Co-Moderator)
 Dr. H.W. Jayewardene (Chairman NARA)
 Mr. W. Gunaratne (NHO)
 Mr. S. Jayatillake (Survey Department)

By the end of phase II, the NHO should be strengthened so as to be able to operate the survey vessel. The most under-estimated problem in a developing country is to make available the budget for the daily operating costs of a large survey or research vessel. It has to be understood that the availability of a ship does not necessarily solve the problem of operating a ship.

Therefore, the concept provides a survey vessel which will be enough to cover the shelf areas of Sri Lanka but as small as possible in order to minimize the operating costs and the number of staff required. Under the supervision of the project manager, a working group has been set up to work out the specifications of the vessel.

3. EXPERIENCE AND OUTLOOK

The experience gained during the first phase of the project showed that the survey activities in harbour and near-shore areas have a high priority, since they are of immediate and direct benefit for the users. As mentioned above, hydrographic data were needed to support coastal protection programmes. Furthermore, a user seminar held in Sri Lanka by NHO, with the participation of potential users of hydrographic data, showed impressively that quite a number of local organizations require comprehensive hydrographic data for their work. For example, hydrographic data are needed to monitor the silting of inland water reservoirs, for planning activities in connection with the construction or extension of fishery harbours, or to support research and development activities in the field of aquatic resources within NARA.

In phase I, the concept of equipment was drawn up to cover the coastal areas up to the 200 miles zone. The planning of phase II takes into account the recognition of the slow extension of surveys from near-shore to off-shore. First of all, a small survey boat will be procured and, later on, a medium size survey vessel. A complete survey of the Exclusive Economic Zone of Sri Lanka, as required by the UN Convention on the Law of the Sea, will be a duty of NHO in the future.

The project 'Strengthening of the National Hydrographic Office of Sri Lanka' has a pilot character for the eastern region of the Indian Ocean, but not only Sri Lanka has realized that an efficient Hydrographic Service will benefit the development and maintenance of economic and social advancement of a coastal State.

The Indian Ocean Marine Affairs Co-operation (IOMAC), after all, was founded as a result of the intensive involvement and action taken by the former Chairman of NARA, Dr. Hiran W. JAYEWARDENE, Secretary-General of IOMAC. The multinational organization IOMAC has the aim to enable a close co-operation of all Indian Ocean coastal States in surveying, research, development and exploration of the aquatic resources of the region. The services of efficient hydrographic offices in the region can contribute much to an economically and ecologically wise utilization of such resources.

Hamburg Port Consulting will report about the future development of the National Hydrographic Office of Sri Lanka.