

# **NATIONAL REPORT TO REGIONAL HYDROGRAPHIC COMMISSION**

## **REPUBLIC OF INDIA- FEB 2011**

### **1. Hydrographic Office / Service**

1.1 The Indian Naval Hydrographic Department (INHD), with the National Hydrographic Office located at Dehradun, is the sole national authority for publication of nautical charts and publications for navigation at sea. As part of its international responsibilities, the department provides coverage for marine safety information in the region NAVAREA VIII comprising of Indian Ocean, Arabian Sea and Bay of Bengal. With a fleet of eight modern ocean-going survey ships; fully equipped with latest hydrographic and oceanographic sensors and six more ships in the offing, it is one of the most reckonable hydrographic organisations in the world.

1.2 The INHD is involved in systematic and standardised collection of geo-referenced data pertaining to coastal configuration, bathymetry, seabed composition, tides, currents, aids to navigation etc. The data collected by the fleet of survey ships is subjected to a highly controlled process for creation of databases to be used in production of navigational charts, definition of maritime boundaries and scientific studies on seas and coastal zone. Since the past few years, the department has also been producing digital charts in the form of Electronic Navigation Charts (ENC) in accordance with specifications of International Hydrographic Organisation, for use in the Electronic Navigation Chart Display and Information System (ECDIS). The National Hydrographic Office is also involved in the task of disseminating vital marine safety information round the clock through Global Maritime Distress and Safety Services using International Maritime Satellites.

1.3 On the international front India is an active member of the International Hydrographic Organisation, Monaco and has representation on its various committees. In October 2010, a Memorandum of Understanding on hydrographic cooperation was renewed with Mauritius for a further period of five years. Hydrographic surveys of the Mauritian waters have been undertaken in the past years and one survey vessel is presently deployed for conduct of survey in Mauritian waters. In addition, surveys of ports and harbours of Srilanka, Seychelles and Maldives have also been undertaken.

1.4 The National Institute of Hydrography, Goa, an integral part of the INHD, has the national responsibility for conduct of hydrographic training within India and functions under the overall professional supervision of the Chief Hydrographer to the Govt of India. The Institute conducts courses for hydrographic officers, technicians, civilians as well as personnel from the Indian Ocean littoral states and has been classified as the Regional Hydrographic Training Centre for Africa, Persian Gulf and South East Asian region. The courses conducted by the School are recognised by the International Hydrographic Organisation; responsible for regulating and standardising hydrographic training world wide.

## 2. **Surveys**

2.1 **Coverage of New Surveys.** Indian Naval Hydrographic Department (INHD) has undertaken Hydrographic Surveys both at National and International levels. For the survey season 2010-11 important surveys of some major and minor harbours in India, based on the periodic updation scheme, have been planned such as Dhamra, Paradip, Mundra etc. surveys are also scheduled for the ongoing season towards the updation of charts for East and West coast. In addition to these navigational surveys, surveys of national importance are also allotted to ships. The department also undertook International Hydrographic Co-operation surveys of Kankasanturai Harbour, Sri Lanka in May - Jun 10 and Assumption Island, Seychelles in Oct – Nov 10. A survey ship was deployed to Maldives for CLCS claim survey and is likely to return by mid Feb 11. One more survey for Mauritius is in progress and is likely to be completed by Mar 11.

2.2 **New Technologies and/or Equipment.** The Indian Naval Hydrographic Department (INHD) is at the forefront in the induction and utilisation of modern and high-end surveying equipment/ technologies. Some of them are listed as under:-

### 2.2.1 **Positioning System.**

- (a) Long range DGPS Systems - Thales/ Magellan
- (b) Medium range DGPS systems - Hemisphere (Satellite Based)
- (c) Terrestrial DGPS systems - Trisponder (DMU 586/ DDMU 1009+)

- (d) Geodetic RTK Receivers - GPS 530/ 1230/ Viva sets

### 2.2.2 **Depth Measuring Equipment.**

- (a) Singlebeam echosounder – Atlas Deso 25/ 30
- (b) Portable echosounder – Atlas Deso 300
- (c) Multibeam echosounder – SB 2112/ 3012 (ship) and SB 1180/ 3180 (boat)

### 2.2.3 **Processing System/ Softwares.**

- (a) HYDAS, CARIS HIPS/SIPS/GIS and Hypack/Hysweep for bathymetric data collection and post processing
- (b) Geodetic data post processing software – Leica Geo Office (LGO)
- (c) ENC production software – CARIS HOM/ SAMI/ GIS Professional.
- (d) ENC validation software – d’Kart.
- (e) Digital Side Scan Sonar data post processing software – Sonarwiz, Discover.
- (f) Image processing software – ERDAS Imagine.
- (g) The department is migrating to hydrographic production database for improving the quality of products. For this the department is in the process of installing CARIS HPD software.
- (h) To improve the efficacy of chart production the department is in the process of acquiring a state of the art computer to plate system.

### 2.2.4 **Miscellaneous Equipment.**

- (a) Digital Side Scan Sonar 4200 FSL
- (b) Current Meters like 2D-ACM and Acoustic Doppler Current Profiler (ADCP)
- (c) Conductivity Depth Temperature (CTD) and Sound Velocity Profiler

(d) Motion Sensors (DMS 3-05, DMS-25, HS-50, Atlas Dynabase)

(e) Magnetometer and Automated Tide Gauge (Ceetide)

2.3 **New Ships.** In addition to the existing survey fleet of eight large survey ships, the construction of six Catamaran Hull type small survey vessels is underway with likely induction starting by mid 2011. In addition one survey training vessel is being planned for induction in 2014.

2.4 **Problems encountered.** Nil

### 3. **New Charts & Updates**

3.1 **ENCs.** India has produced 245 ENC Cells of the National Waters and two foreign ENCs (Mathurin Harbour and Cargados Carajos Shoals of Mauritius). Of all these ENCs released, the break up as per usage band index is as follows:-

<b>CATEGORY</b>	<b>USAGE BAND</b>	<b>No OF ENCs</b>
Overview	1	6
General	2	11
Coastal	3	51
Approach	4	48
Harbour	5	98
Berthing	6	31
<b>Total</b>		<b>245</b>

All the ENCs produced by INHO are subjected to stringent QA/QC before release. ENC updates are also generated and supplied every fortnight to the users.

3.2 **ENC Distribution Method.** Indian ENCs are distributed worldwide by UKHO, M/s Jeppesen Marine and M/s PRIMAR. The format of ENCs distributed by M/s Jeppesen Marine in CM-93/3 and S-63 and those distributed by UKHO and PRIMAR are in S-63 format.

3.3 **INT Charts.** India, as the coordinator of International charting group for the North Indian Ocean (Area J), has responsibility to produce 54 INT charts on medium and large scale. Out of 54 INT charts, India has produced 50 INT charts and remaining are planned to be produced in due course of time.

3.4 **National Paper Charts.** Indian National Hydrographic Office (INHO) produces 334 Nautical Charts and 10 publications of the Indian Ocean Region. These are being distributed through a network of 12 Indian and 07 foreign chart agents/ distributors. These charts and publications are being updated regularly through fortnightly editions of 'Indian Notices to Mariners'.

3.5 **Identification of Producer Nation.** India is the producer nation of small scale INT Charts, ENC's viz IN17705a & IN17706b for which its ENC production has already been completed. As regards to producer nation status, India is the producer nation of all ENC's covering the National Waters.

#### 4. **New Publications & Updates**

4.1 **New Publications.** The following new Books/Publications were published during the last year:-

4.1.1 Notices to Mariners – Annual Edition

4.1.2 Nautical Almanac 2011

4.1.3 Tidal Predictions 2011 Indian and selected Foreign Ports.

4.2 **Updated Publications.** The following Publications were updated during the last year:-

4.2.1 Symbols and Abbreviations used on chart

4.2.2 Catalogue for Indian charts, ENC's and publications

4.2.3 List of Lights and Fog Signals Vol D and E

4.3 **Means of Delivery e.g. Paper, Digital.** The publications and updates are delivered both in paper and digital form.

4.4 **Problems encountered.** Nil

#### 5. **Marine Safety Information**

5.1 **Existing Infrastructure for Transmission.** All Radio Navigational Warnings for NAVAREA-VIII are issued by the Chief Hydrographer to the Government of India. The Naval Chart Depot at Mumbai coordinates the broadcasting of all Navigational Warnings. Reports/ Information are directly sent to Naval Chart Depot by various authorities with a copy of information to National Hydrographic Office, Dehradun. This office closely monitors all broadcasts. Apart from this, information received directly in the office is also communicated to

Naval Chart Depot for transmission. The Navigational Warnings (NAVAREAS) are forwarded to the Earth Station located at Pune, for transmission which is received through INMARSAT 'C' terminals. The schedule of transmission of Navigational and Met warnings through Safety Net is as follows:-

5.1.1 **Navigational Warnings.**

LES Pune - at 1000 and 2200 UTC

5.1.2 **Meteorological Warnings.**

(a) LES Pune - 0900 & 2200 UTC for area N of Equator

(b) Aussaguel- 0130 1330 UTC and at 0000 0600 1200 1800 UTC in case of cyclone warnings for area S of Equator

(c) Australia – Tropical cyclone warnings, if any are prepared and issued by Australia as unscheduled broadcasts for area South of Equator and East of 90<sup>0</sup> via Burum.

5.1.3 **NAVTEX Coverage.**

(a) Chennai - Operational (Transmitting with reduced power)

(b) Mumbai - Under repair/ replacement.

(c) Mauritius - Operational

5.2 Furthermore, all the updated warnings including the Notices to Mariners are available on the INHO website **[www.hydrobharat.nic.in](http://www.hydrobharat.nic.in)**.

5.3 **New Infrastructure in accordance with GMDSS Master plan.** Seven new NAVTEX stations planned to be set up in the near future. Three stations on the West Coast of India, three on the East Coast of India and one in the Andaman and Nicobar Islands as follows:-

5.3.1 Veraval (Gujarat)

5.3.2 Vengrula (Maharashtra)

5.3.3 Muttam Point (Tamil Nadu)

5.3.4 Porto Novo (Tamil Nadu)

5.3.5 Vakalpudi (Andhra Pradesh)

5.3.6 Balasore (Orissa)

5.3.7 Keating Point (Andaman and Nicobar Islands)

5.4 **Problems Encountered.** Nil.

6. **C-55 (Updated Table).** The updated C-55 table is placed at Annexure 'A' to this National Report.

7. **Capacity Building**

7.1 **Indo-Maldives.** India has undertaken three surveys of Maldives in 2006, 2007 and 2009. Subsequently, navigational charts of the areas namely; Male Atoll (Chart No. 2099) and North Male Atoll and Approaches (Chart No. 2501) have been published. On further request of the Maldivian Government, a ship is presently deployed for undertaking CLCS claim survey of Maldives and is likely to return by mid Feb 11.

7.2 **Indo-Mauritius.** An MoU on co-operation in the field of hydrography was renewed in October 2010 for a period of five years for Indian assistance in hydrographic survey of ports, harbours, sea lanes in Mauritian waters and training of Mauritian personnel at National Institute of Hydrography (Goa). Subsequently, the 6<sup>th</sup> Indo-Mauritian Joint Committee meeting was held on 11-14 Jan 11 at Dehradun. In the last four years IN survey ships have completed five survey deployments during which fourteen hydrographic surveys have been successfully completed and six navigational charts have been published namely; Agalega Island (Chart 2084), Approaches to Port Louis, Port Louis (Chart 2086), Approaches to Cargados Carajos Shoals (Chart 2503), Mathurin Harbour (Chart 2504), Approaches to Mathurin Harbour (Chart 2505) and Grand Bay and Grande Rivier Noire Bay (Chart 2506). A survey ship is presently deployed to Mauritius for undertaking hydrographic survey as mutually decided by the 6<sup>th</sup> Indo - Mauritian Joint Committee. The 7<sup>th</sup> Joint Committee meeting would be held in Oct/Nov 11 in Mauritius.

7.3 **Indo-Sri Lanka.** A multidisciplinary delegation from India visited Sri Lanka in early May 10 to assess various activities required for rehabilitation of Kankasanturai harbour. Consequently, I.N. Ship Nirupak was deployed from May – Jun 10 to undertake the

hydrographic survey of the harbour. The navigational chart of the harbour is under final stage of production.

7.4 **Indo-Seychelles.** Joint surveys have been undertaken with the Seychellois authorities in 2003 (Approaches to Praslin), 2006 (Approaches to Mahe, Approaches to Port Victoria, Coetivy Island), 2008 (Off Mahe) and 2010 (Assumption Island). So far three navigational charts have been published namely; 2085 Coetivy Island, 2087 Port Victoria and 2502 Western Approaches to Mahe Island.

7.5 **Indo-Mozambique.** During the discussions in 2<sup>nd</sup> Indo - Mozambique Joint Defence Working Group meeting held at New Delhi on 16 Jun 10, a requirement of hydrographic survey has been projected off Mozambique and the same has been planned in May – Jun 11.

7.6 **Indo-South Africa.** A delegation lead by the Chief Hydrographer will visit the Republic of South Africa for deliberations on hydrographic co-operation and training.

7.7 **Safety of Navigation and Environment Protection in Straits of Malacca and Singapore.**

7.7.1 To deal with issues pertaining to safety of navigation and environmental protection in the straits, six projects were identified by the littoral states, wherein they sought assistance all stake holders. India committed itself to provide assistance in two projects (Project I and Project IV).

7.7.2 In Project I, India offered to conduct a free course on bathymetry with special emphasis on wreck investigation/monitoring and wreck removal for the three participants each from the littoral states. India has already conducted the four weeks tailor made course on the bathymetry survey and wreck related aspects for three personnel each from Indonesia & Malaysia and two persons from Singapore at National Institute of Hydrography (NIH), Goa.

7.7.3 In Project IV, India committed funds to the tune of US \$ 1.687 mn. to set up a network of six tide gauges, current meters and wind sensors each along with information delivery systems in the first year followed by running and maintenance of the project for next three years. India also assisted in carrying out feasibility study/site

survey, drawing out technical specifications and finalising of tender documents in respect of the said Project.

7.8 **Workshop on Multibeam Bathymetry**. A workshop on multibeam bathymetry was conducted onboard INS Sarvekshak under the aegis of IOC/UNESCO COAST- MAP- IO project from 12 to 22 Dec 10. This workshop was attended by nine delegates from Myanmar, Mozambique, Srilanka and Thailand.

8. **Oceanographic Activities**. The Indian Naval Survey Ships equipped with oceanographic equipment have collected the various oceanographic data while undertaking hydrographic surveys.



**Staff employed - Effectifs - Plantilla**

Rear Admiral SK Jha, NM  
Joint Chief Hydrographer

Commodore KM Nair, NM  
Principal Director

Commodore TK Ashokan, NM  
Principal Director

Commodore Vinay Badhwar, NM  
Additional Principal Director (Chart Branch)

Commander LS Pathania  
Joint Director of Hydrography(Territorial Waters)

Commander TP Mahato  
Joint Director of Hydrography (Operations)

Commander R Bargoti  
Joint Director of Hydrography (Coordination)

Commander SK Nair  
Joint Director of Hydrography (Personnel & Training)

Commander Deepak Sharma  
Joint Director of Hydrography (Chart Sales & Distribution)

Commander HS Avatar  
Joint Director of Hydrography (Administration)

Commander HA Hardas  
Joint Director of Hydrography - I (Materials)

Commander J Gurumani  
Joint Director of Hydrography (Hydrographic Data Management)

Commander RB Menon  
Joint Director of Hydrography (International Affairs)

Commander Anand Narayanan  
Joint Director of Hydrography (Maritime Safety Services)

Commander AV Ramani  
Joint Director of Hydrography (Class Authority)

Commander Mahendra Kumar  
Joint Director of Hydrography – II (Materials)

Commander S Kestwal  
Staff Officer to the Chief Hydrographer

	<p>Commander Sanjeev Sharma Joint Director of Hydrography (Tides)</p> <p>Mr. SS Chauhan Asst Civilian Chief Hydrographic Officer</p> <p>Mr. Rajesh Kumar Asst Civilian Chief Hydrographic Officer</p>																											
<b>N° of charts published</b> - <i>Nombres de cartes publiées - N° de cartas publicadas.</i>	334																											
<b>N° of INT charts published</b> - <i>Nombres de cartes INT publiées - N° de cartas INT publicadas.</i>	(a) Small scale 2 (b) Medium & Large Scale 48																											
<b>N° of ENC cells published</b> - <i>Nombres de cellules ENC publiées - N° de células ENC publicadas.</i>	245																											
<b>Type of publications produced (e.g; Tide Tables, Sailing Directions, List of Lights etc.)</b> - <i>Type de publications produites (par ex: Tables des marées, Instructions nautiques, Livres des Feux, etc. -Tipo de publicaciones producidas (por ej: Tablas de mareas, Derroteros, Libros de Faros etc)</i>	<ol style="list-style-type: none"> <li>1. List of Lights</li> <li>2. Sailing Directions</li> <li>3. Nautical Almanac</li> <li>4. Symbols and Abbreviations</li> <li>5. Notices to Mariners</li> <li>6. Oceanographic data</li> <li>7. Supplement to Indian Tide Tables</li> <li>8. Catalogue of Charts</li> <li>9. List of Radio Signals</li> <li>10. Tidal Predictions for Minor Ports</li> </ol>																											
<p><b>Surveying vessels/ Aircraft – Bâtiments hydrographiques/aéronefs - Buques hidro-gráficos/ Aeronaves</b></p> <p><b>SANDHAYAK</b></p> <p><b>NIRDESHAK</b></p> <p><b>NIRUPAK</b></p> <p><b>INVESTIGATOR</b></p> <p><b>JAMUNA</b></p> <p><b>SUTLEJ</b></p> <p><b>DARSHAK</b></p> <p><b>SARVEKSHAK</b></p>	<table border="1"> <thead> <tr> <th>Displacement</th> <th>Date Launched</th> <th>Crew</th> </tr> </thead> <tbody> <tr> <td>1820</td> <td>1981</td> <td>200</td> </tr> <tr> <td>1820</td> <td>1983</td> <td>200</td> </tr> <tr> <td>1820</td> <td>1985</td> <td>200</td> </tr> <tr> <td>1820</td> <td>1990</td> <td>200</td> </tr> <tr> <td>1820</td> <td>1991</td> <td>200</td> </tr> <tr> <td>1820</td> <td>1993</td> <td>200</td> </tr> <tr> <td>1820</td> <td>2001</td> <td>200</td> </tr> <tr> <td>1820</td> <td>2002</td> <td>200</td> </tr> </tbody> </table>	Displacement	Date Launched	Crew	1820	1981	200	1820	1983	200	1820	1985	200	1820	1990	200	1820	1991	200	1820	1993	200	1820	2001	200	1820	2002	200
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<b>Outsourcing strategy</b> - <i>Stratégie en matière de travail exécuté sous contrat à l'extérieur -estrategia de contratación de trabajos.</i>	<ol style="list-style-type: none"> <li>1. Nil on Survey</li> <li>2. Nil on ENC Production</li> </ol>																											

**Other information of interest** -*Autres informations utiles*  
- *Otra información de interés.*

1. National Institute of Hydrography is the Institute for Hydrographic Training. The Long Hydrographic Course and Basic "H" Course conducted by National Institute of Hydrography have been awarded CAT "A", CAT "B" accreditation by FIG/IHO Advisory Board on Standards of Competence for Hydrographic Surveyors. In April 2006 the accreditation has been renewed for a further period of six years.

2. ENC's of 100 % of National Water have been produced. Regular updates of ENC's are promulgated fortnightly.

3. Out of 54 INT Charts to be produced by India, 50 have already been published.

4. The Hydrographic Department of India has the required resources, Infrastructure and technical expertise to assist littoral states in the following areas:

(i) Conduct of Hydrographic, Oceanographic and Coastal Zone Regulation Plan Surveys.

(ii) Training in Hydrography and Cartography.

(iii) Setting up of hydrographic infra-structure and Hydrographic Office.

(iv) Exchange of personnel.

(v) Production of Electronic Navigational Charts (ENCs).

(vi) EEZ/Continental Shelf Surveys.

## 1. HYDROGRAPHIC SURVEYING

1.1 **Status of Hydrographic survey of all Navigable Waters, including internal waters, out to the limits of the EEZ** : (Please refer to the guidance given in the introductory text "Analysis of the Status of Surveys".)

Survey Coverage, where :

A = percentage which is adequately surveyed.

B = percentage which requires re-survey at larger scale or to modern standards.

C = percentage which has never been systematically surveyed.

	<b>A</b>	<b>B</b>	<b>C</b>
Depths<200 m	100	0	0
Depths>200 m	88	12	0

### **Amplifying Information:**

(a) The entire navigational area in depths less than 200 meters has been adequately surveyed. There are few small areas where the charted data is based on old surveys. These areas are well away from the shipping routes and are of no interest to the Mariners.

(b) There are some areas in Indian Waters like Gulf of Kachch & Khambat, Sandheads etc where the seabed is unstable. A cautionary note to this effect is printed on Navigational Charts.

1.2 Significant shortfalls in sea areas of high priority for maritime traffic:

a. Maritime Shipping Routes:

(1) International (i.e. between hub ports): **NIL**

(2) Regional (i.e. between hub ports and feeder ports): **NIL**

(3) Internal (i.e. from feeder ports to other national ports; cruise liner routes): **NIL**

b. Ports and approaches: **NIL**

c. Other (fisheries; offshore industry): **NA**

1.3 Status of Hydrographic survey of all Navigable Waters, including internal waters, out to the limits of the EEZ of dependent territories:

**NA**

1.4 Status of Hydrographic survey of all Navigable Waters, including internal waters, out to the limits of the EEZ of developing countries where surveys have been, or are being carried out by your hydrographic service:

**NA**

## 2. NAUTICAL CHARTING

### 2.1 Status of Nautical Charting within the limits of the EEZ

Coverage of charts published by your organisation, where:

A = percentage covered by INT series, or a paper chart series meeting the standards in M-4.

B = percentage covered by Raster Navigational Charts (RNCs) meeting the standards in S-61.

C = percentage covered by ENCs meeting the standards in S-57.

<b>Purpose/Scale</b>	<b>A</b>	<b>B</b>	<b>C</b>
Offshore passage/small	100	0	100
Landfall and Coastal passage/Medium	100	0	100
Approaches and Ports/Large	100	0	100
Percentage of Group A showing depths in meters	100		
Percentage of Group A referenced to a satellite datum	50		

Amplifying notes : Nil

Significant gaps in coverage : Nil

### 2.2 Status of Nautical Charting within the limits of the EEZ of dependent territories

**NA**

### 2.3 Status of Nautical Charting produced by mutual agreement within the limits of the EEZ of other coastal states

**NA**

## 3. MARITIME SAFETY INFORMATION (MSI)

### NAVIGATIONAL INFORMATION (S-53)

<b>Service</b>	<b>Yes</b>	<b>No</b>	<b>Partial</b>	<b>Notes</b>
Local Warnings	√			
Coastal Warnings	√			
Navarea Warnings	√			
Information of Ports and Harbours	√			

### GMDSS IMPLEMENTATION (IMO Publication 970 - GMDSS Handbook)

<b>Service</b>	<b>Yes</b>	<b>No</b>	<b>Partial</b>	<b>Notes</b>
Master Plan	√			
A1 Area	√			
A2 Area	√			
A3 Area	√			
NAVTEX	√			
Safety NET	√			

**4. NATIONAL PRIORITIES FOR INTERNATIONAL AND OR REGIONAL CO-OPERATION OR ASSISTANCE**

4.1 If international or regional projects are underway in your waters, please indicate here :

**NA**

4.2 Indicate below any priorities for co-operation or assistance:

(a) Projects meriting IHO liaison with international funding agencies:

(i) Regional co-operative projects : **NA**

(ii) National Projects : **MoU on hydrographic cooperation with Mauritius renewed in Oct 10 for a period of 5 years.**

(b) Requirements for training assistance: **NIL**

(c) Requirements for assistance with procurement of equipment: **NIL**

**5. GENERAL COMMENTS OR ADDITIONAL INFORMATION**

**NIL**

Signature: **Commander RB Menon  
Joint Director of Hydrography  
(International Affairs)**

Date: **15 Feb 2011**