

# Hydrographic Division

## National Hydrographic Office of Sri Lanka

### Overview

The **Hydrographic Division** serves as Sri Lanka's **National Hydrographic Office**, accredited to the International Hydrographic Organization (IHO) as the focal point for hydrography in the country. Established in 1984, the division conducts systematic hydrographic surveys essential for maritime safety, national security, and sustainable development of coastal and marine resources.

As the official hydrographic authority, the division is responsible for all aspects of marine surveying, nautical chart production, and hydrographic data management for Sri Lanka's vast maritime domain, including the 517,000 square kilometer Exclusive Economic Zone (EEZ).

### Leadership & Contact

#### Chief Hydrographer

- **Name:** Mr. S.R.C. Ranaweera
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#### Professional Staff

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## Key Functions & Responsibilities

### Hydrographic Surveying

#### Survey Coverage:

- **Inshore Areas:** Ports, harbors, anchorages, and coastal waters
- **Nearshore Areas:** Continental shelf and coastal approaches
- **Offshore Areas:** Deep waters within the Exclusive Economic Zone (EEZ)
- **Inland Water Bodies:** Lakes, reservoirs, and major rivers

#### Survey Depth Capability:

The division has the technical capacity to conduct surveys to depths of **5,000 meters**, well within Sri Lanka's continental margin, enabling comprehensive mapping of the nation's underwater territory.

#### Survey Methods:

- Multibeam echo sounding for detailed seabed mapping
- Single-beam echo sounding for navigation channels
- Side-scan sonar for seabed feature identification
- Sub-bottom profiling for sediment characterization
- GPS positioning for precise horizontal control
- Tidal observations for vertical datum establishment

### Nautical Chart Production

#### Chart Types Produced:

- **Navigational Charts:** For safe maritime navigation
- **Harbor Plans:** Detailed plans of ports and harbors
- **Coastal Charts:** For coastal navigation and fishing
- **Electronic Navigational Charts (ENC):** Digital charts for ECDIS systems
- **Thematic Maps:** Specialized maps for fisheries and resource management

#### Chart Updates:

- Regular updates based on new surveys
- Notice to Mariners publication
- Wreck and obstruction marking
- Navigation aid position verification
- Depth changes due to sedimentation or dredging

## **Digital & Analogue Data Management**

### **Digital Products:**

- Electronic Navigational Charts (ENC) compliant with international standards
- Bathymetric data in digital formats
- GIS-compatible spatial data layers
- 3D terrain models of seabed
- Digital elevation models (DEM) for coastal areas

### **Analogue Products:**

- Traditional paper charts for navigation
- Harbor approach plans
- Coastal profiles and views
- Navigation aids diagrams

## **Maritime Boundary Delimitation Support**

### **Technical Services for:**

- Baseline determination for maritime zones
- Territorial sea boundary coordinates
- Contiguous zone definition
- Exclusive Economic Zone (EEZ) delimitation
- Continental shelf extent determination
- Dispute resolution technical support

## **Services Offered**

### **Chart & Data Products**

#### **For Maritime Navigation:**

- Nautical charts for all Sri Lankan waters
- Harbor and port plans
- Electronic Navigational Charts (ENC)
- Navigation publications and sailing directions
- Tide tables and tidal predictions

#### **For Development Projects:**

- Bathymetric data for coastal engineering
- Seabed characteristics for infrastructure planning

- Route surveys for submarine cables and pipelines
- Site surveys for offshore structures
- Coastal erosion monitoring data

**For Research & Education:**

- Scientific data for marine research
- Educational materials on hydrography
- Collaboration with university research projects
- Student training opportunities

**Survey Services**

**Port & Harbor Development:**

- Pre-dredging surveys for depth assessment
- Post-dredging surveys for verification
- Berth construction support surveys
- Harbor approach surveys
- Anchorage area surveys

**Coastal Management:**

- Shoreline change detection surveys
- Beach erosion monitoring
- Coastal zone mapping
- Sediment transport studies
- Navigation hazard identification

**Marine Pollution Control:**

- Baseline surveys for environmental monitoring
- Wreck location and characterization
- Oil spill response trajectory data
- Dumpsite monitoring surveys

**Coast Conservation:**

- Coastal engineering project surveys
- Shore protection structure design support
- Beach nourishment planning data
- Coastal vulnerability assessment

## **Support to Defense Organizations**

### **Naval Wing of National Hydrographic Office (Established 2017)**

Provides specialized hydrographic services to:

- **Sri Lanka Navy:** Operational support for maritime security
- **Sri Lanka Coast Guard:** Coastal patrol and search and rescue operations
- **Other Defense Organizations:** Maritime domain awareness

#### **Services Include:**

- Classified hydrographic products for military operations
- Special purpose surveys for defense infrastructure
- Navigation safety information for naval vessels
- Training for naval hydrographic personnel
- Operational planning support

#### **Objectives of Naval Wing:**

- Provide high-quality hydrographic services to defense sector
- Develop professional workforce in hydrography for naval operations
- Achieve organizational excellence in military hydrography
- Enhance national maritime security through hydrographic support

## **Applications of Hydrographic Data**

### **Port & Harbor Development**

- Site selection for new ports
- Harbor design and configuration
- Channel alignment and depth determination
- Berthing facility planning
- Navigation safety assessment

### **Coastal Zone Management**

- Coastal development planning
- Marine spatial planning
- Resource exploitation zoning
- Protected area management
- Tourism infrastructure planning

## **Maritime Jurisdiction**

- Delimitation of national maritime boundaries
- Territorial sea definition
- EEZ and continental shelf claims
- International boundary negotiations
- Baseline determination

## **Marine Pollution Control**

- Spill response planning
- Monitoring of pollution dispersal
- Identification of sensitive areas
- Cleanup operation support
- Environmental impact assessment

## **Coast Conservation**

- Coastal erosion monitoring and prediction
- Shore protection structure design
- Beach nourishment project planning
- Habitat restoration projects
- Climate change adaptation planning

## **Coastal Engineering Projects**

- Bridge and causeway design
- Reclamation project planning
- Submarine pipeline routing
- Underwater cable laying
- Offshore structure placement

## **Facilities & Equipment**

### **Survey Vessels**

- Specialized hydrographic survey vessels
- High-speed survey boats for coastal work
- Echo sounding systems (multibeam and single-beam)
- Side-scan sonar equipment
- Sub-bottom profilers

## **Positioning & Navigation Systems**

- Differential GPS (DGPS) for precise positioning
- Total stations for land surveying
- Electronic positioning systems
- Tide gauges for tidal observations
- Current meters for water movement

## **Data Processing & Analysis**

- Hydrographic data processing software
- GIS systems for spatial analysis
- Cartographic production software
- Electronic chart production tools
- 3D visualization systems
- Quality control software

## **Laboratory & Office Equipment**

- High-performance computers
- Large-format plotters for chart production
- Scanning and digitization equipment
- Data storage and backup systems
- Chart printing facilities

## **International Accreditation & Standards**

### **International Hydrographic Organization (IHO)**

- **Accreditation:** National Hydrographic Office of Sri Lanka
- **Membership:** Active member nation
- **Standards Compliance:** International standards for hydrographic surveys and chart production
- **Publications:** Contributions to IHO publications and standards development

### **International Standards Adopted**

- IHO S-44 Standards for Hydrographic Surveys
- IHO S-57 Electronic Navigational Chart (ENC) standard
- IHO S-100 Universal Hydrographic Data Model
- Safety of Navigation (SOLAS) Convention compliance
- International Chart specifications

## Major Achievements

- Establishment as nationally and internationally recognized hydrographic office
- Comprehensive surveys covering major ports and harbors
- Production of electronic navigational charts for Sri Lankan waters
- Opening of Naval Wing providing defense support (2017)
- International collaboration with leading hydrographic offices
- Capacity building of skilled hydrographic professionals
- Contribution to maritime safety through chart updates
- Support for major coastal development projects

## Training & Capacity Building

### Professional Development

- International hydrographic courses (Category A & B programs)
- Specialized training in survey techniques
- Cartographic production training
- Electronic chart production expertise
- GIS and remote sensing applications

### Collaboration for Training

- International Hydrographic Organization training programs
- Exchange programs with regional hydrographic offices
- In-house training for junior staff
- University collaboration for student training
- Naval personnel hydrographic training

## Regional & International Collaboration

### Neighboring Hydrographic Offices

- **India:** Hydrographic cooperation in shared maritime areas
- **Maldives:** Technical assistance and knowledge sharing
- **Other IHO Members:** Best practices exchange



## **International Organizations**

- International Hydrographic Organization (IHO)
- International Maritime Organization (IMO)
- United Nations Division for Ocean Affairs and the Law of the Sea (UNDOALOS)

## **Future Development Plans**

### **Technology Enhancement**

- Acquisition of advanced multibeam echo sounders
- Autonomous surface vehicles (ASVs) for surveys
- Airborne LiDAR bathymetry systems
- Satellite-derived bathymetry integration
- Artificial intelligence for data processing

### **Survey Expansion**

- Complete coverage of Sri Lankan EEZ
- High-resolution port and harbor surveys
- Resurveys of dynamic coastal areas
- Inland water body comprehensive mapping
- Deep-sea surveys beyond continental shelf

### **Product Development**

- Expansion of ENC coverage
- 3D bathymetric products
- Web-based chart distribution
- Mobile applications for mariners
- Real-time navigation warnings

### **Capacity Building**

- Training of additional hydrographic surveyors
- Specialization in emerging technologies
- Research and development capabilities
- International certification of personnel

## Safety of Navigation

The Hydrographic Division plays a critical role in ensuring safety of navigation in Sri Lankan waters through:

- **Accurate Charts:** Up-to-date navigation charts preventing groundings and collisions
- **Depth Information:** Precise depth data for safe vessel passage
- **Hazard Identification:** Location of wrecks, rocks, and obstructions
- **Navigation Aids:** Verification of lighthouse, buoy, and beacon positions
- **Tidal Predictions:** Tide tables for safe harbor entry and departure

## Contribution to National Economy

- **Shipping Industry:** Safe navigation enabling efficient maritime trade
- **Fishing Industry:** Hydrographic data supporting fishing operations
- **Port Operations:** Surveys enabling optimal port utilization
- **Coastal Tourism:** Safe waters for recreational boating and water sports
- **Offshore Industries:** Support for oil and gas exploration, renewable energy projects
- **Maritime Security:** Enhanced domain awareness and security operations

## Contact Information

### Hydrographic Division

### National Hydrographic Office

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*For chart purchases, survey services, or hydrographic data inquiries, please contact the division directly.*