



IHO Capacity Building Programme

The State of Hydrography and Nautical Charting in the Democratic Socialist Republic of Sri Lanka



January 2014

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Abbreviations

AtoN	Aids to Navigation
BA	British Admiralty [Chart]
Ed	Edition
EEZ	Exclusive Economic Zone
ENC	Electronic Navigational Chart
ICZM	Integrated Coastal Zone Management
IHB	International Hydrographic Bureau
IHO	International Hydrographic Organization
IMO	International Maritime Organization
MBES	Multi Beam Echo Sounder
MoU	Memorandum of Understanding
MSDI	Marine Spatial Data infrastructure
MSI	Maritime Safety Information
NARA	National Aquatic Resources Research and Development Agency
NHO	National Hydrographic Office (NARA)
NE	New Edition (of a navigational chart)
NtoM	Notice to Mariners
RHC	Regional Hydrographic Commission
RNC	Raster Navigational Chart
SBES	Single Beam Echo Sounder
SLPA	Sri Lanka Port Authority
SOLAS	[United Nations] Convention of the Safety of Life at Sea
ToR	Terms of Reference
TTW	Territorial Waters
UKHO	United Kingdom Hydrographic Office
UNCLOS	United Nations Convention on the Law of the Sea

Executive Summary

The National Aquatic Resources Research and Development Agency (NARA) is responsible for the national hydrographic and charting programme for the Democratic Socialist Republic of Sri Lanka. It is clear that NARA staff from the highest level downwards are fully aware of this national responsibility and take intense pride in its successful delivery. NARA ensures that through the country's membership of the International Hydrographic Organization (IHO) and the Regional Hydrographic Commission, the North Indian Ocean Hydrographic Commission, that it takes a full part in international hydrography. NARA is not, however, the SOLAS responsible ministry rather the Ministry of Ports and Highways holds this portfolio. There is no immediate liaison or connection between the two organizations which is a situation that should be corrected as early as possible

Under NARA, the National Hydrographic Office (NHO) was formed in 1984 and has made steady progress to its present position as a professional national surveying and charting authority. NARA has invested heavily in survey capability with its latest vessel, RV *Samuddrika*, commissioned in 2012. Experienced with single beam echo sounder surveying the NHO is now moving into the more complex world of swath surveys using a multi-beam echo sounder (MBES).

NHO has a well-established, professional hydrographic office producing paper nautical charts – both on its own and in active and effective cooperation with UKHO. Although NHO does not, as yet, produce electronic nautical charts (ENCs) it fully expects to assume this responsibility from UKHO within the next five years.

All national hydrographic offices continue to develop and face challenges in that development; Sri Lanka is not alone. Whilst a number of minor areas of improvement are noted in this report there are two which require particular and early attention: the development of MBES capability and the establishment and development of an electronic nautical chart (ENC) production and maintenance capability.

NHO staff have the potential to operate the MBES to the standards required; however, through limited training programme and an almost total lack of operational experience NHO's officers lack the specialist training, experience and above all confidence to operate their MBES system. Here lies NARA and NHO's greatest challenge. Having made a very significant capital commitment in a research vessel and modern survey equipment it is imperative that NARA urgently adopts a training programme such that this new equipment can be used effectively to gather survey data to full international standards in an effective manner for the benefit of the safety of navigation in Sri Lanka's waters.

The staff of the NHO produce and maintain a number of national charts but have yet to move into the modern world of ENC production and maintenance. As with the MBES situation above effective staff training is required to achieve an indigenous ENC capability and thus full national autonomy in ENCs.

The change to MBES technology and to ENCs will require major development in digital technology and storage at the NHO with specially trained staff to manage these systems and the data they contain.

Concurrent with the issues related to the introduction of new surveying and cartographic methods and equipment is the matter of staffing. The current recruiting programme and the planned retirement of senior staff over the next three years will put considerable strain on an organization already deep into change. It is for consideration that senior staff should be retained where possible until the NHO emerges from the next four years of upheaval.

The NARA should note that the IHB and the IHO do not provide training other than through CB requests. Where it cannot address its own training requirements internally it should raise training and assistance issues with the NIOHC for initial resolution or through existing cooperation or bilateral arrangements with other national hydrographic offices.

The NHO is a well led, manned and equipped national hydrographic service with a clear vision of its purpose and future and the will to attain it.

Recommended Actions

It is recommended that NARA consider the following actions:

- (1) To follow up on the agreements reached with the Secretary, Ministry of Fisheries and Aquatic Resources Development, the Director General of Merchant Shipping and Chairman NARA to establish formal links with NARA for SOLAS hydrographic issues. See 4.1
- (2) That the NARA should offer the assistance of the Head of NHO in the Director General of Merchant Shipping's preparations for the IMO VIMSAS audit. See 4.1
- (3) That the Director General of Merchant Shipping be invited on to the Board of NARA. See 4.3
- (4) That the Director General of Merchant Shipping, or his representative, be invited to be a member of NARA's Scientific and Technical Committee. See 4.3
- (5) That training be provided to the existing staff as a matter of priority particularly in view of the retirement of senior staff in the next few years. See 4.4
- (6) That training for new recruits is allowed for in future budgets or plans. See 4.4
- (7) That ways be found to maintain the senior staff in their present positions until at least the end of 2016 to allow the necessary staff training to be concluded and the NHO returned to a steady state. See 4.4
- (8) It is recommended that, due to retirement dates, a new recruitment programme should be developed over the next few years to maintain staffing levels. See 4.4
- (9) To request an established HO with good MBES experience to provide a two week in-country training and advisory visit as provided for Bangladesh. See 4.5
- (10) The value of earth observations for bathymetry, modern coastline data, and environmental and coastal management purposes was discussed and it is recommended that NARA as a whole review this technology as a cost-effective, multifaceted data gathering programme valuable to all its divisions. See 4.5
- (11) That an agreement is reached on the transfer of data from both SLPA and CFHC such that charts can be properly maintained. See 4.6
- (12) To request that UKHO archive data is transferred to NHO as additional MSDI data. See 4.7
- (13) To review an extension of 1:150,000 coverage of Sri Lanka. See 4.8
- (14) Notifying IHB of amendments to S11 page J23 and bring this to the attention of the NIOHC. See 4.8
- (15) That under the agreement with UKHO NHO request in-country training in ENCs and ENC maintenance. See 4.8
- (16) NHO to establish a national MSI system as a matter of priority. See 4.9
- (17) NHO to request through the NIOHC for an MSI course in Colombo for Sri Lankan officers. See 4.9
- (18) That NHO establish an MSI page on its website to carry MSI and Notices to Mariners. See 4.9
- (19) That NHO review published charts for potential chart corrections and where corrections are required to withdraw them and replace with New Editions. See 4.9
- (20) That as a matter of priority, NHO institute a chart correction system. See 4.9



REPORT



1 Introduction

The International Hydrographic Organization (IHO) is an intergovernmental technical organization, currently comprising 81 Member States. The IHO seeks to ensure that all States with coastlines and maritime interests provide adequate and timely hydrographic data, products and services, thereby advancing maritime safety and efficiency in support of the protection and sustainable use of the marine environment. The IHO is the recognised competent authority of the United Nations for hydrography and nautical charting. The International Hydrographic Bureau (IHB), based in Monaco, is the secretariat of the IHO.

A proposal for a technical and advisory visit to the Democratic Socialist Republic of Sri Lanka to help assess the current status of charting and hydrography in the country and to provide advice to the government and to stakeholders on a way ahead was raised at the 11th meeting of the NIOHC in March 2011. As a result the Capacity Building Sub Committee approved and funded a visit to Sri Lanka to assess the current status of hydrography and nautical charting.

The Technical Visit was conducted by Mr Bob WILSON, SONUS International Hydrographic Consultancy Ltd, on behalf of the IHO between 6 and 10 January 2014.

This resulting report has been written with the express intention of assisting the government of Sri Lanka to arrange and strengthen its hydrographic effort to meet its current and future needs and also its international maritime obligations under the UN Convention on the Safety of Life at Sea (SOLAS). The report comprises a description of the visit, a brief audit of the current situation and an analysis of the nation's hydrographic needs, major conclusions and a number of recommended actions for consideration by the relevant authorities.

2 Technical Visit Programme

Mr WILSON arrived in Colombo, Sri Lanka, on Monday 6 January and departed late the following Friday. In-country arrangements for the technical visit were arranged by Mr M. ARIYAWANSA, National Hydrographer.

Details of those attending the various meetings are shown in Annex A – *Recommendations*

It is recommended that NARA consider the following actions:

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- (20) That as a matter of priority, NHO institute a chart correction system. See 4.9

Annex B – List of Contacts whilst the visit programme is at

Annex C – *Technical Visit Programme*. A revision of the IHO Yearbook is at Annex F.

3 General Assessment

The following is a general assessment of the situation in Sri Lanka regarding hydrography and nautical charting services as it relates to National Hydrographic Office and the national hydrographic organization. A discussion of available options, several conclusions and recommended actions, supported by a number of Annexes then follows.

3.1 Sri Lanka's Economic Interests

Sri Lanka is experiencing strong economic growth with the government pursuing large-scale reconstruction and development projects in its efforts to spur growth in disadvantaged areas, develop small and medium enterprises and increase agricultural productivity. Economic growth was at 3.5% in 2009 rising to 8% growth in 2010-11 and moderated to about 6% in 2012.¹ Sri Lanka has a progressive and modern industrial economy with the highest per capita income in South Asia. The country is famous for the production of tea, coffee, coconuts and rubber. Its natural beauty makes it a very popular tourist destination.²

3.2 Sri Lanka's Ports and Harbours

The country's transport system is based on land and coastal sea traffic. Sri Lanka's total waterways extend to only about 160 km and are located in the south-west of the country. As an island nation Sri Lanka relies heavily on maritime trade and transportation; it is strategically located close to the major Indian Ocean sea lanes.³

The country has four ports at Colombo, Hambantota, Trincomalee and Galle along with two minor harbours located at Kankesanthurai and Oluvil. The country's main imports are petroleum, textiles, machinery and transportation equipment, building materials, mineral products and foodstuffs whilst its exports are primarily textiles and apparel, tea and spices, rubber manufactures, precious stones, coconut products and fish.



¹ <https://www.cia.gov/library/publications/the-world-factbook/geos/ce.html>

² http://www.spa.lk/country_information.asp?chk=1

³ <https://www.cia.gov/library/publications/the-world-factbook/geos/ce.html>

Figure 1 Ports in Sri Lanka⁴

- **Port of Colombo**

The Port of Colombo, the largest and busiest port in Sri Lanka as well as in South Asia, is located on the south-western shores on the Kelani River; it serves as an important terminal in Asia due to its strategic location on the Indian Ocean trade routes. During the 1980s, the port underwent rapid modernization and gained a capacity of 4.1 million TEUs. Today's upgrade will increase the ports capacity to 12 million TEUs by the end of 2014. The new port entrance channel and breakwater has been designed to allow a further extension northwards which would raise capacity by a further 4 million TEUs. Between 70 and 80 per cent of the TEUs handled by the port are transhipped to other ports in the region. The Port City of Colombo is being constructed on reclaimed land on the southern extremity of the port. Colombo port includes the naval base for Sri Lanka Navy's Western Fleet.

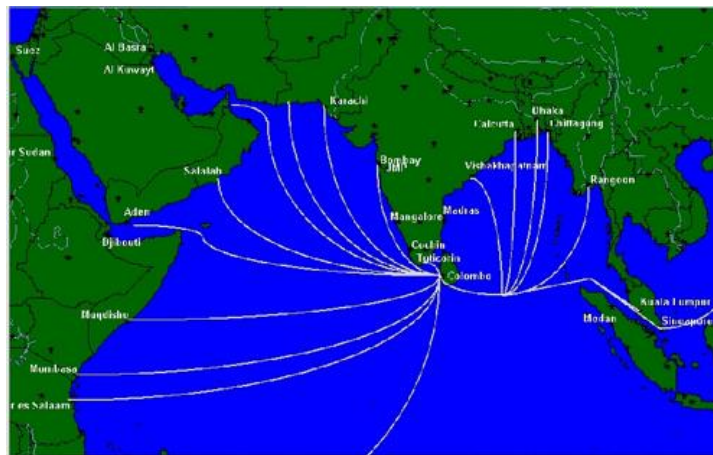


Figure 2 Port of Colombo Transshipment Routes

- **Galle Regional Port**

Galle Regional Port is primarily used for leisure purposes. The yacht facilities provided at the port were damaged during the 2004 tsunami and the current development is to provide a fully-fledged Yacht Marina. This development of the Port of Galle as a tourist destination is designed to act as a catalyst to economic growth of Southern Region of Sri Lanka. Phase I A of the project consists of development of basic facilities of Yacht Marina with berthing facility for 50 yachts of 15m in length up to 3m draft. Phase I B of the project will include extensions to yacht berthing facilities to accommodate 42 more yachts and facilities for yacht repair. Galle Regional Port is the only Sri Lankan port that provides facilities for pleasure yachts and is recognized by the International Yacht Society as one of the world's best attractions. Piracy in the Indian Ocean has seen a recent and dramatic fall in yacht arrivals as yacht owners avoid the region.

- **Port of Hambantota**

Hambantota Port, opened on 18 November 2010, is operated by the Sri Lanka Ports Authority. Construction of the port began in January 2008 and is planned to be Sri Lanka's largest port, after the Port of Colombo. The first phase of the port project provides bunkering, ship repair, ship building, and crew change facilities, later phases will raise capacity of the port up to 20 million TEUs per year.

Further port extension inland will produce significant fill which will be used to create an island for residential use to the southwest of the port.

- **Port of Kankesanthurai Harbour**

⁴ http://www.lib.utexas.edu/maps/sri_lanka.html

The Kankesanthurai port and its berthing piers were extensively damaged during the tsunami in 2004 and Cyclone Nisha in 2008. Besides damage to the existing infrastructure there were sunken ships inside the harbour in several locations which were a major hazard to the safe vessel movement. India and Sri Lanka signed a Memorandum of Understanding for the development of the Port of Kankesanthurai, surveying and wreck removal. The development of the port will lower transit times of goods from India, Bangladesh and other neighbouring countries.

- **Oluvil**

The government of Sri Lanka, to give impetus to economic development in the Eastern region, approved the build of a port at Oluvil. Under the "Nagenahira Navodaya" Programme, the port will form the south-eastern link in the developing chain of coastal harbours in the country and will provide more convenient and cost effective access to and from the south-eastern region for goods and cargo originating on the west coast. The project comprises the construction of a commercial harbour and a basin for the fishing vessels. The port suffers from siltation and has yet to become fully operational.

- **Trincomalee**

Trincomalee harbour is the second best natural harbour in the world and the available water and land area is about 10 times that of the Port of Colombo. Trincomalee is tentatively identified to cater for bulk and break bulk cargo and port related industrial activities including heavy industries, tourism and agriculture etc. At present SLPA is in the process of re-developing the port.

3.3 Offshore Oil and Gas

In August 2013 the Sri Lankan Government invited oil companies to bid for six new ultra-deep-water blocks of between 18,000km² and 26,000km² each around the country's coastline with a deadline of 29 November 2013.

On July 07, 2008 the Government of Sri Lanka, through the Minister of Petroleum and Petroleum Resources Development, signed a Petroleum Resources Agreement with Cairn Lanka (Private) Limited marking the beginning of petroleum exploration of Sri Lanka after a break of 25 years. The company is poised to make history in Sri Lanka with the first production from the country's offshore gas fields, in the Mannar Basin between Sri Lanka and India, starting as early as 2016. Upstream companies are also looking at potential offshore hydrocarbon prospects which would be offered in the first quarter of 2014.

3.4 Fishing

Fishing is an important national and international industry for Sri Lanka. Under the Ceylon Fishery Harbours Corporation, the government of Sri Lanka sponsors, builds and maintains twenty specialist fish harbours around Sri Lanka.



Figure 3 Sri Lankan Fishing Harbours

3.5 Maritime Boundaries and Areas

Sri Lanka claims a territorial sea limit of 12nms, a Contiguous Zone to 24nms and a 200nm EEZ. These limits provide the country with an EEZ of 530,684 km² and an inshore fishing area of 29,885 km².

Sri Lanka and India agreed in June 1974 to the delimitation of a boundary through the "historic waters" of Palk Bay. Two years later under UN Treaty 15804 the two countries agreed their maritime boundary in the Gulf of Mannar and the Bay of Bengal. A supplementary agreement on the extension of the maritime boundary between the two countries in the Gulf of Mannar to the injunction point between Sri Lanka, India and the Maldives was signed in Colombo on 22 November 1976.

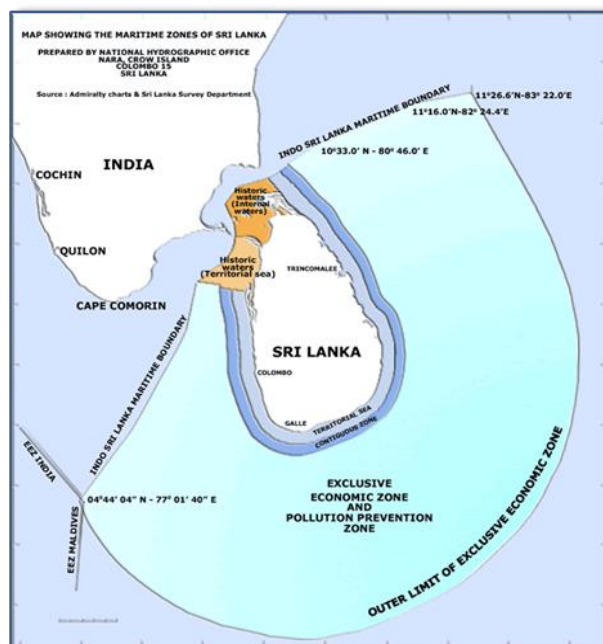


Figure 4 Sri Lanka's Maritime Boundaries

Sri Lanka, under NARA, has prepared and submitted an application under UNCLOS 76 for a continental shelf extension; no new bathymetric data was acquired during the preparation of Sri Lanka's submission.

4 Hydrographic Assessment

4.1 Hydrographic Awareness

The ministry responsible for SOLAS affairs is the Ministry of Ports and Highways; officials from this ministry represent Sri Lanka at IMO meetings in London. A meeting was arranged with the Director General of Merchant Shipping, a meeting which proved very valuable. The Director General was well aware of SOLAS and IMO VIMSAS audits; his previous meeting had been to discuss Sri Lanka's preparation for its VIMSAS audit later this year. He was not, however, aware of the navigational safety aspects of SOLAS, specifically hydrography, and his ministry's responsibilities. The meeting was joined by the Director General's predecessor and now the Maritime Advisor to the President. In the ensuing discussion it was discovered that, despite SOLAS responsibilities, hydrography was not included in the Ministry's remit nor was there any communication between the Director General of Merchant Shipping and NARA or NHO. It was agreed that such a link should be established and the Sri Lankan Hydrographer should be included in preparations for the VIMSAS audit. It is recommended that NHO follow up on the agreements reached with the Director General of Merchant Shipping.

The active ministry for hydrography in Sri Lanka is the Ministry for Fisheries which has as one of its departments the National Aquatic Resources and Development Agency (NARA). As a full member of IHO and the NIOHC Sri Lanka, through NARA and the National Hydrographic Office, takes a full part in international hydrography and maintains strong links with the UKHO.

NARA is established under the National Aquatic Resources and Development Agency Act No.54 of 1981 as amended by Act No.32 of 1996 (the NARA ACT). Under section 4(ee) of the NARA Act a function of NARA is:

to undertake the collection, processing and publication of hydrographic data and nautical information on the near shore and offshore areas and inland waters, and to have overall control of such activities in Sri Lanka.

and under section 5 has the powers to:

to establish standards and procedures for gathering, processing and presenting hydrographic data and nautical information;

to train personnel, conduct examinations, establish national professional standards and issue licences to persons to function as hydrographic surveyors;

to control and coordinate all hydrographic surveying and nautical charting activities in Sri Lanka.

It is further empowered to appoint a competent person to certify hydrographic surveys, hydrographic fair sheets, charts and nautical publications. NARA, therefore, is fully empowered to act in the nation's interests in all hydrographic matter and has within its organization the National Hydrographic Office to fulfil hydrographic responsibilities placed upon it by the NARA Act.

4.2 National Hydrographic Office

NARA was established in 1981 and is managed by a Board of Governors and Ex-officio members. In 1981 NARA's main objective was to face the challenges and opportunities presented by the nation's Exclusive Economic Zone. The National Hydrographic Office (NHO) was established in 1984 as a department of NARA. NARA is, by its very nature, primarily a research and development agency whereas NHO, within NARA, is very much an operational organization delivering services in the fulfilment of the nation's obligation under SOLAS. This important distinction should be noted by government agencies when dealing with or answering requests for support for NHO.

The NHO's principal task is to carry out hydrographic surveys to the limit of Exclusive Economic Zone of Sri Lanka; NHO is also tasked with surveying the nation's inland waterways. NHO produces and disseminates information in support of maritime navigation safety and marine environment preservation, defence, exploration, and research and management plans. The primary outputs of the NHO are nautical charts, thematic maps for fisheries and other user oriented hydrographic maps involving digital and analogue hydrographic data.

Hydrographic data obtained from surveys is used mainly for port and harbour development, coastal zone management, and delimitation of the limits of national maritime jurisdiction, control of marine pollution, provision of data for coast conservation and coastal engineering projects and provision of charts for navigation. Presently the NHO is capable of carrying out hydrographic surveys to a depth of 5000 m which allows surveys to the limits of the nation's EEZ.

In October 2010 NARA commissioned a new 25m purpose-built research vessel, RV *Samuddrika*. The vessel is equipped for fisheries and oceanographic research work as well as having a comprehensive hydrographic capability. For hydrographic work *Samuddrika* is equipped with a RESON Sea Bar 8101 MBES system, SES 2000 sub bottom profiler, SeaStar 8300HP/Omnistar GPS, DESO 30 dual frequency SBES, RESON SVP 40 sound velocity probe, Leica TCR 1202 Robotic Total Station, Wild TC 1600 Total Station, Caris GIS4.5, Hypack Gold, Leica GEO Office and PDS 2000 MBES processing software.



Figure 5 RV *Samuddrika*

4.3 National Hydrographic Committee

NARA is managed by Board of eight 'appointed members', appointed by the Minister, with a number of ex-officio members across the nation's maritime spectrum although does not include representative for offshore oil and gas; the Board meets at least once per month. NARA also has a standing committee, known as the Scientific and Technical Committee comprising:

- NARA's Chairman;
- NARA's Director-General;
- the Heads of Research Divisions;
- the Head of the National Hydrographic Office;
- two nominated ministry representatives;
- two representatives of the aquatic industry;
- two members of the scientific community; and
- two members of the Board.

Thus whilst not constituted as a National Hydrographic Committee (NHC), Sri Lanka has through the NARA Board and Standing Committee a de-facto NHC. For national hydrography and the discharge of SOLAS obligations there is one critical omission from the present structure; the SOLAS responsible ministry, the Ministry of Ports and Highways, is not represented and, therefore, has no knowledge of or influence in national hydrography as it applies to SOLAS. It is strongly recommended that this situation is rectified by including the Director General of Merchant Shipping on the Board of NARA and for a further ministry representative to be included within NARA's Scientific and Technical Committee.

4.4 NHO Personnel and Training

NHO is well manned with well-motivated, highly professional staff of mixed specializations, grades and experience. The current manpower available to NHO is summarized below.

Category	Numbers	Remarks
Hydrographic Surveyor Cat A	3	
Hydrographic Surveyor Cat B	6 (7)	One staff member equivalent Cat B through experience
Cartographic Staff	3	One staff member IHO Cat B
Information Technology	2	One staff member undergoing GIS training in Dehra Dun
Survey Assistants	7	
Survey Assistants	4	On secondment from the Sri Lanka Navy
Research Vessel Staff	4	
Support Staff	5	
Drivers	3	
Non-survey Technicians	3	

In addition to the above there is a recruitment process in operation to recruit, at graduate level, four hydrographers and three cartographers to bring the NHO staffing level to its allowed establishment. It is expected that these will be recruited and in post by the end of this year. Set against this is that Head NHO is past retirement and is being maintained in post whilst the senior cartographer retires in 2015 with the Chief System Analyst and the senior cartographic draughtsman following in 2016. NHO is thus going through a period of great change in staffing which, put together with the introduction of new technology in both the surveying and cartographic fields, is putting great pressure on the organization to deliver an effective service.

Training is a continuing issue for NHO with all of its technical training having, by necessity, to be conducted outside of Sri Lanka. To bring the current staff to a fully trained level requires the provision of one IHO Cat A Hydrographic course and one IHO Cat B Cartographic Course. These courses should be provided before the current senior members of staff are due for retirement which means that the one IHO Cat A Hydrographic course is need now with the IHO Cat B Cartographic Course by the end of 2016. The new recruits to NHO will also require training to IHO Cat B level in their respective disciplines. It is recommended that the training be provided to the existing staff as a matter of priority with that for new recruits allowed for in future budgets or plans.

Such upheaval in the manning of NHO requires some stability in management and experience to be maintained. It is strongly recommended that ways be found to maintain the senior staff in their present positions until at least the end of 2016 to allow the necessary staff training to be concluded and the NHO returned to a steady state. Given the pending retirement of senior staff it is recommended that NARA review the situation and develop a robust succession plan for NHO.

It is recommended that, due to retirement dates, a new recruitment programme should be developed over the next few years to maintain staffing levels.

4.5 Hydrographic Surveying

Hydrographic surveys in Sri Lanka are conducted by NHO outside of the immediate port entrances and within the nation's inland waters. The Sri Lanka Ports Authority is responsible for surveys within the port breakwaters for which it has a survey team equipped with a SBES. Survey priorities are set by the NHO after discussion in the Scientific and Technical Committee meetings. The survey plan for the coming year is set, generally, in the previous September. The current survey programme and state of surveys is shown in the figure below. It should be noted that the green areas do not signify charts published but surveys completed.

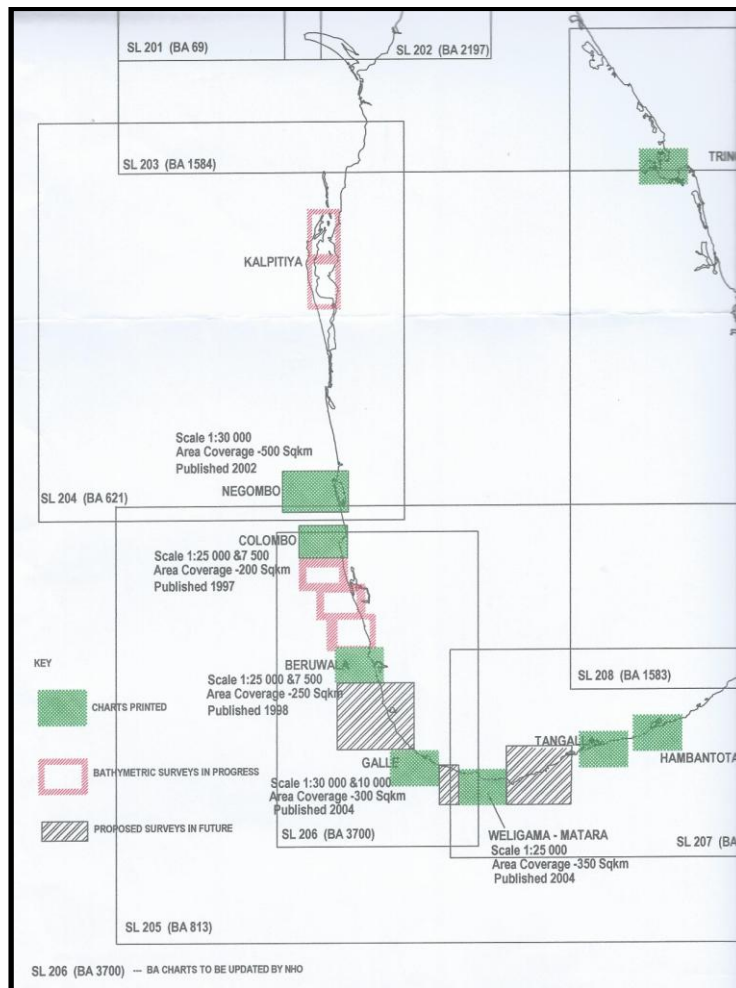


Figure 6 Sri Lanka Survey Programme

The current state of surveys as shown in IHO C-55 is shown below with percentages supplied by NHO at the time of the last NIOHC meeting in Myanmar. NHO provides update data for C-55 at each NIOHC meeting.

Area Code	Definition	C-55 (%)
A1	Area adequately surveyed (<200m)	8.6
A2	Area adequately surveyed (>200m)	2
B1	Area requiring resurvey at larger scale or to modern standards (<200m)	5
B2	Area requiring resurvey at larger scale or to modern standards(>200m)	0
C1	Area which has never been systematically surveyed (<200m)	91.4
C2	Area which has never been systematically surveyed (>200m)	98

Figure 7 IHO C-55 Sri Lanka - Status of Hydrographic Surveys

The NHO, through its page on the NARA website (<http://www.nara.ac.lk/12/nautical%20charts/nautical.html>) publishes details of all surveys undertaken and available for use by government and private agencies. Survey data is provided free of charge to government departments and sold to the private sector.

The NHO was, for a short time, equipped with an MBES system in its survey vessel which was lost in the 2004 tsunami. From 2004 until the commissioning of RV *Samuddrika* in late 2010 the NHO reverted to using SBES systems. NHO hydrographic staff have a mixed experience with MBES operation, data processing and data analysis; this is preventing the effective use of both NHO's MBES system and RV *Samuddrika*. It is strongly recommended that an established HO with good MBES experience is requested to provide a two week in-country training and advisory visit. This visit would provide a short explanation of MBES and its operation, review current

MBES operations, acquire a test data set, process the test data set and analyse it for errors. A similar package was run most effectively by UKHO for the Bangladesh Navy following a similar IHO Technical Visit – see 4.1.

All of NHO's surveys are, at present, being conducted to IHO Order 1b.

RV *Samuddrika* is a well found and equipped vessel designed for the use of all of NARA's departments: it is not a dedicated hydrographic vessel. Discussion with, for example, the Oceanography Division, revealed that whilst they have not as yet planned any oceanographic cruises they will be in the near future and at the hoped for rate of one every two months. The vessel's oceanographic capability is due to be enhanced under an aid programme which will include modifications to the layout of the after deck. This multiple use of the vessel will require close coordination of its programme if all users are to gain their fair allocation of vessel time. As NHO will have to share vessel time more than at present it is even more imperative that the hydrographic data gathering productivity is increased by the introduction into operational use of the MBES system.

The bathymetric data covering Sri Lanka's close inshore waters is both sparse and very old; NHO requires to survey within the 5 metre contour but recognizes the difficulty of doing so along a coastline over 1000kms in length. The use of satellite derived bathymetry was discussed as one NHO staff member was about to travel to India for a two month remote sensing course and had been tasked with reviewing SDB as part of the course work. The value of earth observations for bathymetry, modern coastline data, and environmental and coastal management purposes was discussed and it is recommended that NARA as a whole review this technology as a cost-effective, multifaceted data gathering programme valuable to all its divisions.

4.6 National Hydrographic Resources

Two other government hydrographic capabilities were identified during the Technical Visit. The Sri Lanka Ports Authority (SLPA) has a survey team to conduct both land and hydrographic surveying within the immediate port limits; for hydrography this means the enclosed harbour area only, NHO is responsible for and conducts all surveys outside of the harbour entrance. The Ceylon Fishery Harbours Corporation (CFHC) operates in a similar manner by conducting routine resurveys in its 20 harbours but does not extend surveys beyond the harbour entrance. NHO maintains good relations with both SLPA and CFHC hydrographic staff.

The Sri Lanka Navy has trained survey personnel and it is believed to have a limited survey capability. Training for these personnel comes from a variety of sources including NHO and the Indian Navy. Junior Sri Lanka Navy survey personnel are seconded to NHO for periods of one year. It was not possible to visit the Sri Lanka Navy during the Technical Visit.

Data arising from SLPA surveys are routinely made available to NHO for charting. Data arising from CFHC surveys is not always made available and thus charted depths in the fishery harbours may not always be correct. It is recommended that an agreement is reached on the transfer of data from both SLPA and CFHC such that charts can be properly maintained.

4.7 Marine Spatial Data Infrastructure Development

Sri Lanka requested that IHO/NIOHC sponsor an MSDI workshop which was held in Colombo in February 2012; the request followed Sri Lanka's own desire to establish an MSDI. Since the workshop the NHO has developed a pilot project to develop and populate a MSDI with its own data. Amongst other layers, most obviously bathymetry, a wrecks layer has been incorporated with the intention of exploiting the data for recreational diving through the Ministry of Tourism, Hotel Corporation, etc. The pilot MSDI will take two years to develop with the project now at the midway point. It is considered that such a use of hydrographic data can only raise the NHO's profile and demonstrate the value of hydrographic data to non-navigational users.

Whilst accepting that most UKHO archive data is very old it is recommended that NHO request UKHO transfer archive survey data to NHO as additional MSDI data.

With the development of MSDI at NHO, the current training of one NHO staff member in remote sensing, and the interest that NHO has in earth observation techniques for bathymetry it is recommended that NHO consider the establishment of a GIS section covering all of the headings discussed here.

4.8 Nautical Charting

Chart coverage for Sri Lankan waters is provided under a partnership arrangement between the NHO and UKHO. The NHO, whilst being a well-established professional hydrographic office does not yet produce full paper chart coverage of Sri Lankan waters and relies heavily on UKHO to fulfil this requirement.

NHO staff have stated quite categorically that their main issue with a national paper series is the establishment of a wide distribution network. It was pointed out to NHO that whilst the UKHO arrangement is a pragmatic and efficient means of discharging SOLAS responsibilities, UKHO might not, for a variety of reasons, always be able to provide full national coverage of Sri Lanka. The dormant Sri Lankan chart series almost exactly mirrors the UKHO chart coverage. Whilst in Fig 6 the NHO shows a mirror image of UKHO charting, with Sri Lankan chart numbers against the BA Chart number, Sri Lanka does not and will not print these charts unless by force of circumstance at a later date. NHO currently has six local charts published with a further two charts planned once new survey data has been acquired. There is a strong case for extending the NHO's 1:150,000 scale coverage in support of national use even if these charts are only made available in Sri Lanka and it is recommended that NHO consider this matter, possibly in collaboration with the Sri Lanka Navy and Coast Guard.

Sri Lanka does not, as yet, produce ENC's. However, it is the stated intention to rectify this during the next five years to the point where Sri Lanka will take responsibility for all its ENC's and no longer require UKHO's assistance. Due to the nature of ENC distribution, Sri Lanka will not suffer the same disadvantages with ENC's as it currently does with paper products. Following discussions regarding the transfer of ENC's to NHO it is recommended that under the agreement with UKHO NHO request in-country training in ENC's and ENC maintenance.

Sri Lankan charts produced by the NHO and UKHO rely heavily on new survey data obtained by NHO and port surveyors. The national practice is to survey, where possible, to the limits of the chart thereby minimizing the number of data sources used to compile or update the chart. The following table shows the current publication date of NHO charts covering Sri Lanka not also produced by UKHO.

Chart No	Name	Scale
102	Approaches to Beruwala	1 : 25000
104	Weligama to Matara	1 : 25000
105	Negombo Lagoon	1 : 15000
106	Negombo	1 : 30000
108	Approaches to Tangalle	1 : 30000
110	Approaches to Dikowita Fishery Harbour	1 : 10000
111	Kalpitiya Lagoon Upper part	1 : 30000
112	Kalpitiya Lagoon Lower part	1 : 30000

As discussed above the primary nautical charts of Sri Lanka are, as a result of history, still published and maintained by the UKHO, as the primary charting authority (PCA). All the UK charts covering the waters of the Sri Lanka have been metricated (in essence recompiled to show depths in metres and using modern chart symbology) and brought on to a satellite datum (WGS84) such that they can be used with global navigation satellite systems (GNSS).

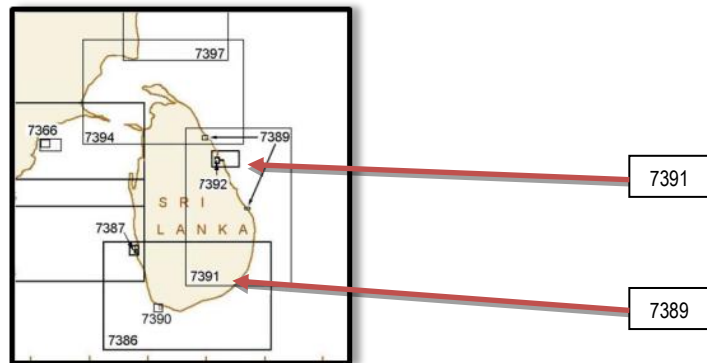
The following table shows the current publication date of UKHO charts covering Sri Lanka, the reference of the last notice to mariners (NtoM) and the total number of NtoMs affecting the chart since publication; table correct to 10 January 2014. It can be seen that UKHO has committed a great deal of effort to the charting of Sri Lanka's waters with only three of the 13 charts listed more than six years old with three published in the latter half of 2013.

BA Chart	Title	Published (Last NtoM/Year)	NtoMs issued since Publication
813	Colombo to Sangama Kanda Point	5 Nov 2009 NM 2706/13	5
815	Approaches to Trincomalee	5 Nov 2009	0
816	Trincomalee Harbour	5 Nov 2009	0
819	Galle Harbour and Approaches; Galle Harbour	29 Mar 2007 NM 4375/08	1
1583	Little Basses Reef to Pulmoddai Roads; Pulmoddai Roads; Batticaloa Roads	12 Nov 2009 NM 5164/11	1
1584	Trincomalee to Point Calimere	19 Nov 2009 NM 5984/10	4

1586	Pamban to Cape Comorin	13 Dec 2001 NM 1753/13	38
1587	Colombo to Cape Comorin	20 Oct 1995 NM 2706/13	36
1655	Colombo and Approaches; Colombo Harbour	20 Jun 2013	0
2197	Palk Strait and Palk Bay Eastern Part; Kankesanturai Harbour	23 Oct 1987 NM 3565/12	21
3264	Hambantota and Approaches	19 Dec 2013	0
3265	Weligama to Little Basses Reef	19 Dec 2013	0
3700	Weligama to Colombo; Weligama Bay	19 Nov 2009 NM 2706/13	4

Figure 8 BA Chart Update Data

In reviewing IHO publication S11, Part B, Region J, dated March 2013 it was seen that the chart numbering for Sri Lanka is partly in error; an extract of the INT Chart scheme diagram is reproduced below. INT 7391 should read INT 7389 and the chart area surrounding INT 7392, currently unnumbered should read INT 7391.



4.9 Maritime Safety Information

Maritime safety information (MSI) is considered under the headings of navigational warnings and chart correction notices to mariners (NtoMs).

Sri Lanka lacks any coordinated national MSI structure. The point of contact for the NAVAREA VIII Coordinator is the Harbour Master at Colombo Port using his direct email address. It is unclear if information comes from other ports or organizations within Sri Lanka to the Harbour Master but it is felt unlikely. NHO does not have a clear picture of MSI data within Sri Lanka nor is it certain that communication between the Harbour Master and the NAVAREA VIII Coordinator is copied to NHO. This is a serious fault in Sri Lanka's national hydrographic structure which, it is strongly recommended, should be rectified at the earliest opportunity. Sri Lanka would benefit from in-country MSI training at an early date and it is recommended that through the NIOHC application is made for an MSI course in Colombo. It is recommended that NHO establish an MSI page on its website to carry navigational warning information. A possible MSI structure for Sri Lanka is discussed at Annex E.

The NHO has published six charts all of which are in current use. Unfortunately the NHO has not established a Notices to Mariners system and the charts remain uncorrected. Given the NtoMs issued by UKHO to correct its charts of Sri Lanka, it can be seen that on average six chart correcting notices are published for Sri Lankan charts in any year. For published charts it is strongly recommended that NHO review them for potential chart corrections and where corrections are required to withdraw the current charts and replace a New Edition or New Editions. For the future an abbreviated and viable chart correction system, based on the assumption of a low number of notices and charts produced using 'print-on-demand', was discussed with NHO during the visit and is summarized below. It is recommended that NHO institute the system described, or similar, at the earliest opportunity.

- NHO should establish a web page on its site to display MSI data, both NtoMs and navigational warnings.
- All charts to carry a note such as '*Corrections for this chart issued by the NHO can be found on the NHO's website at [web link]. Users should refer to the website at frequent intervals to ensure that they have the necessary chart correcting information*'.
- All charts should show the edition number and date of publication in the bottom left-hand corner of the chart where NtoM data is customarily located.
- NHO should establish an NtoM cell within NHO to assess chart correcting information and produce chart correcting notices for publication on the website.
- Given the difficulty of printing and issuing block corrections, corrections requiring more than the plotting of 12 positions should automatically trigger a New Edition.
- Where New charts or New Editions are published users should be informed by the issue of an NtoM stating that chart number 'xxx' has been published or that chart number 'xxx' dated dd/mm/yyyy has been withdrawn and replaced by a New Edition dated dd/mm/yyyy.

4.10 Future Sri Lankan Nautical Chart Programme

Charts applicable to the discharge of SOLAS obligations are produced by UKHO in close collaboration with NHO. IHO does not, at this stage, consider it practicable for Sri Lanka to assume this responsibility with a national chart series. It is recommended that UKHO remains Sri Lanka's primary charting authority with the Sri Lanka ensuring a steady supply of new data to keep the charts well maintained. It is considered that the following should be considered in the future charting programme for Sri Lanka:

- *Chart Production Plan.* Where possible to coordinate the production of new charts with the survey programme.
- *International (INT) Scheme Charts.* NHO should review the INT chart scheme covering Sri Lanka.
- *Coastal Charting.* NHO should consider the extension of 1:150,000 scale charting for national purposes around the whole coast of Sri Lanka.
- *Local Specialist Charts.* The local production of specialist nautical charts and other geo-spatial data for use by either civil or military authorities is well within the capability of the NHO and should be continued as required by national authorities. Development of fishery harbour charts or the inclusion of fishery harbour plans on current charts is particularly relevant.

5 Technical Visit Conclusions

Based on discussions and the facts obtained, the following principal conclusions have been reached:

- (1) The Sri Lank government and in particular NARA under the Ministry of Fisheries has committed significant resources to the development and maintenance of the National Hydrographic Office (NHO) for the safety of navigation in Sri Lanka's waters and the economic development and the marine environmental protection of the nation.
- (2) NHO is staffed by a professional, dedicated and predominantly well trained personnel producing surveys and charts in support of the safety of shipping in Sri Lanka's waters and the economic development and the marine environmental protection of the nation.
- (3) NARA has a well manned, maintained and equipped survey vessel capable of meeting all of the nation's hydrographic immediate requirements.
- (4) The new multi-beam echo sounder system (MBES) is not being used through a need for training and the gaining of experience: **this is the most serious issue facing NHO**. Without staff trained to operate the MBES system properly the NHO will be wasting time and effort on gathering hydrographic data that cannot meet international standards. If the MBES issue is addressed then NHO's surveys will meet international standards and be conducted at a much greater rate than at present. NHO urgently requires training in MBES system operation and survey data appraisal to gain value from NARA's considerable investment in hydrography.
- (5) The NHO is an effective organization.
- (6) The NHO publishes national paper charts to the accepted international standards by well trained and motivated staff. NHO, in partnership with UKHO, produces effective chart coverage of Sri Lanka as required under SOLAS.
- (7) Although aspiring to do so the NHO does not produce or maintain ENC's but expects to take this responsibility from UKHO within five years.
- (8) NHO is going through a period of staff and equipment change which will need careful handling to allow the organization to maintain its output and prepare for the future.

Annex A – Recommendations

It is recommended that NARA consider the following actions:

- (21) To follow up on the agreements reached with the Secretary, Ministry of Fisheries and Aquatic Resources Development, the Director General of Merchant Shipping and Chairman NARA to establish formal links with NARA for SOLAS hydrographic issues. See 4.1
- (22) That the NARA should offer the assistance of the Head of NHO in the Director General of Merchant Shipping's preparations for the IMO VIMSAS audit. See 4.1
- (23) That the Director General of Merchant Shipping be invited on to the Board of NARA. See 4.3
- (24) That the Director General of Merchant Shipping, or his representative, be invited to be a member of NARA's Scientific and Technical Committee. See 4.3
- (25) That training be provided to the existing staff as a matter of priority particularly in view of the retirement of senior staff in the next few years. See 4.4
- (26) That training for new recruits is allowed for in future budgets or plans. See 4.4
- (27) That ways be found to maintain the senior staff in their present positions until at least the end of 2016 to allow the necessary staff training to be concluded and the NHO returned to a steady state. See 4.4
- (28) It is recommended that, due to retirement dates, a new recruitment programme should be developed over the next few years to maintain staffing levels. See 4.4
- (29) To request an established HO with good MBES experience to provide a two week in-country training and advisory visit as provided for Bangladesh. See 4.5
- (30) The value of earth observations for bathymetry, modern coastline data, and environmental and coastal management purposes was discussed and it is recommended that NARA as a whole review this technology as a cost-effective, multifaceted data gathering programme valuable to all its divisions. See 4.5
- (31) That an agreement is reached on the transfer of data from both SLPA and CFHC such that charts can be properly maintained. See 4.6
- (32) To request that UKHO archive data is transferred to NHO as additional MSDI data. See 4.7
- (33) To review an extension of 1:150,000 coverage of Sri Lanka. See 4.8
- (34) Notifying IHB of amendments to S11 page J23 and bring this to the attention of the NIOHC. See 4.8
- (35) That under the agreement with UKHO NHO request in-country training in ENC's and ENC maintenance. See 4.8
- (36) NHO to establish a national MSI system as a matter of priority. See 4.9
- (37) NHO to request through the NIOHC for an MSI course in Colombo for Sri Lankan officers. See 4.9
- (38) That NHO establish an MSI page on its website to carry MSI and Notices to Mariners. See 4.9
- (39) That NHO review published charts for potential chart corrections and where corrections are required to withdraw them and replace with New Editions. See 4.9
- (40) That as a matter of priority, NHO institute a chart correction system. See 4.9

Annex B – List of Contacts

Name	Post	Contact No	
		Direct	Mobile
		Postal Address	
		Email Address	
Dr S.G. Samarasundara	Chairman of NARA	+94 11 25211881	NARA, Crow Island, Colombo 15. chairman@nara.ac.lk
Justice Ratnayake	Maritime Advisor to the President		
Mr Ajith Wickrama Seneviratne	Director General of Merchant Shipping	+94 11 2388376	Ministry of Ports and Highways Director General's Office of Merchant Shipping, 45-89 Bristol Building, York Street, Colombo 1. dgma@sltnet.lk
Capt Ravi A. Jayawickreme	Harbour Master, Colombo	+94 11 238 5401 +94 (0) 71 868 8318	Navigation Division Sri Lanka Ports Authority Colombo 1 ravi@slpa.lk
Capt Althula Hewavitharana	Senior Deputy Harbour Master, Colombo	+94 11 243 4120 +94 (0)71 248 2212	Navigation Division Sri Lanka Ports Authority Colombo 1 athulahewa@slpa.lk
Theja Wedaarachchi	Engineering Manager Civil, Ceylon Fishery Harbours Corporation	+94 11 252 9391 +94 (0)71 416 1893	Office No 15 Rock House Lane Colombo 15 cem@ceyfhc.com
Dr D M R B Dissanayake	Secretary, Ministry of Fisheries & Aquatic Resources Development	+94 11 233 3945	Ministry of Fisheries & Aquatic Resources Development, 10 New Secretariat, Maligawatta, Colombo secretary@fisheries.gov.lk
Mr P M P Udayakantha	Surveyor General	+94 11 236 9027	Surveyor General's Office Sri Lanka Survey Department Kirula Road Colombo sgaddtr@gmail.com
Mr Bob Wilson	SONUS International Hydrographic Consultancy Ltd	+44 (0) 7815 911 337	bob@sonusihc.com

Annex C – Technical Visit Programme

Monday 6 January

Mr Bob WILSON arrived in Colombo. Transferred to the Pegasus Reef Hotel.

Tuesday 7 January

Meetings with NHO staff at NHO – meeting with the Chairman deferred on compassionate grounds

Visit to the survey vessel RV *Samuddrika*

Wednesday 8 January

Meeting with the Harbour Master and Deputy Harbour Master, Colombo Port

Meeting with the Marine Advisor to the President and the Director General of Merchant Shipping

Meeting with staff of the Ceylon Fishery Harbours Corporation

Discussions at NHO

Thursday 9 January

Meeting with the Secretary, Ministry of Fisheries and the Chairman NARA

Meeting with the Surveyor General

Dinner with the Minister, Ministry of Fisheries and senior staff officers

Friday 10 January

Final discussions at NHO and clarify the draft IHO report

Saturday 11 January

Mr WILSON departed for UK

Annex D – Charting Analysis of Sri Lanka’s Waters

Sri Lanka Chart Coverage

The Republic of Sri Lanka has a limited chart production capability and relies mainly on the UKHO to fulfil this function. The résumé of chart coverage for Sri Lanka shown in IHO Publication C-55 - *Status of Nautical Charting* (updated 1 February 2011) is shown in the table below. The figures in brackets show revised values as supplied by the PCA (UKHO) for this report.

Chart Type	% Covered by INT Charts	% Covered by RNCs	% Covered by ENCs
Small Scale:			
Offshore Passage	100 (0)	100 (100)	70 (70)
Medium Scale:			
Landfall, Coastal Passage	100 (0)	100 (100)	30 (65)
Large Scale:			
Approaches and Ports	70 (20)	100 (100)	15 (45)

IHO C-55 Status of Chart Coverage

While C-55 shows that Sri Lanka is reasonably well covered by charts, it must be noted that the majority of charts are those produced by the PCA (UKHO) of which the quality of the data of some of those charts is often old, inadequate and of variable accuracy.

British Admiralty Charts

For historical reasons the United Kingdom, through the United Kingdom Hydrographic Office (UKHO) remains the Primary Charting Authority (PCA) for Sri Lanka. Nine of the twelve charts produced by the PCA (UKHO) are referred to WGS 84, the others are on varying reference systems such that making the transfer of positions from chart to chart difficult and possibly inaccurate. The data from which the charts are compiled is noted as being in many cases old, imperfect and on undefined reference systems such that some charts carry the note:

CHART ACCURACY

Owing to the age and quality of the source information, some detail on this chart may not be positioned accurately. Particular caution is advised when navigating in the vicinity of dangers, even when using an electronic positioning system such as GPS.

Six of the charts carry warnings regarding positions as, for example, on BA813:

CHART 1587: POSITIONS

Positions on chart 813 differ from those on chart 1587 by varying amounts; positions should be transferred by bearing and distance from common charted objects, not by latitude and longitude.

The current state of charts and data from which they are compiled is given in the table below.

BA Chart	Title	Remarks
813	Colombo to Sangama Kanda Point	This chart, covering the southern coast of Sri Lanka, is based solely on lead line surveys; the coastal waters were surveyed in 1905-7 at 1:72,600 whilst the offshore waters were surveyed between 1887 and 1902 at scales from 1:72,960 to 1:300,000
815	Approaches to Trincomalee	Trincomalee Bay and the waters inshore of the bay rely on surveys dating from the 1940s at scales from 1:9,000 to 1:42,000. The immediate inshore waters are also from the same period at 1:42,000. The remainder of the chart is based on miscellaneous lines of sounding.
816	Trincomalee Harbour	This plan is partly almost entirely on large scale survey data from 1938-44
819	Galle Harbour and Approaches Galle Harbour	The approach chart is based on a mixture of Sri Lankan data to 2002 and British government data from 1907. The harbour plan is based largely on Sri Lankan data to 2004 with some data from 2005.
1583	Little Basses Reef to Pulmoddai Roads Pulmoddai Roads Batticaloa Roads	This chart, covering part of the east coast of Sri Lanka, is based primarily on lead line surveys; the coastal waters were surveyed in 1887 small scale whilst the remainder of the chart is based on miscellaneous lines of sounding.
1584	Trincomalee to Point Calimere	This chart, covering the north and north-eastern waters of Sri Lanka and the coast of India is, in Sri Lankan waters based on small scale surveys by the Marine Survey of India, 1838-45, and British government surveys between 1937 and 1945.
1586	Pamban to Cape Comorin	This chart, covering the north-west coast of Sri Lanka – the Gulf of Mannar - is largely unsurveyed in Sri Lankan waters.
1587	Colombo to Cape Comorin	This chart, covering part of the west coast of Sri Lanka, is based primarily on miscellaneous lines of sounding with the inshore waters from small scale lead line surveys between 1845 and 1907.
1655	Colombo and Approaches Colombo Harbour	Both the approach and port chart are compiled largely from modern Sri Lankan data post 2005.
2197	Palk Strait and Palk Bay Eastern Part Kankasanturai Harbour	The Sri Lankan areas of Palk bay and Palk Strait are derived primarily from Marine Survey of India lead line data pre-1900 and small scale British government surveys between 1937 and 1944. The plan of Kankasanturai Harbour is primarily from a large scale survey from 1982 by the Ceylon Fishery harbours Corporation.
3265	Weligama to Little Basses Reef Hambantota	This chart, covering part of the south-east coast of Sri Lanka, is based primarily on miscellaneous lines of sounding in the offshore waters and leadline surveys from 1906-08 in the inshore waters. Data for the plan of Hambantota comes from the same 1906-08 surveys
3700	Weligama to Colombo Weligama Bay	This chart, covering part of the south-west coast of Sri Lanka, is based primarily on miscellaneous lines of sounding in the offshore waters and leadline surveys from 1906-08 in the inshore waters. Data for the plan of Weligama Bay comes from the same 1906-08 surveys

Summary of UKHO Charting

Annex E – An MSI Model for Sri Lanka

1. Maritime safety Information (MSI) comes in two main forms, immediate safety critical information requiring transmission by radio navigational warning to ships at sea, and routine information for the correction of charts and publications. MSI data requires carefully logging, assessment, action, archiving, and most importantly with regard to navigational warnings, monitored such that the warning can be cancelled when the danger no longer exists or the situation alters.

2. There should be one focal point to gather national MSI data and forward it to the appropriate authority for use by the mariner; for Sri Lanka it is considered this should be NHO. Within NHO a competent officer should be nominated as the MSI officer who can be either a hydrographer or a nautical Cartographer. He or she should be assisted by a small team to handle information and have a deputy able to take full charge of the organisation during their absence.

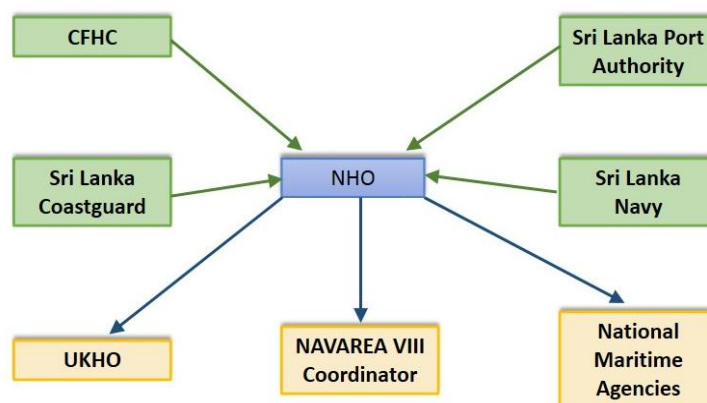
3. MSI data received and assessed needs to be transmitted by the most appropriate means to the authorities with the responsibility or capability to pass it to the mariner in the most effective manner. In the case of Sri Lanka all information for radio navigational warnings should be passed to the NAVAREA VIII co-ordinator at Dehradun; information for charts and publications should in the first instance be passed to the UKHO, other charting authorities may be informed at the discretion of the NHO. An effective electronic data basing facility is essential to archive and monitor all MSI data. It is strongly recommended that a page on NHO's web site should be established for dissemination of MSI to the widest possible audience in the most efficient modern manner. It is suggested that NHO send a monthly routine message to the NAVAREA VIII Coordinator, even if it only says that there are no MSI issues to be reported, to maintain regular contact.

5. MSI data must be sent out of the country by the quickest and most efficient manner. In doing so all of the agencies responsible for this data must have the explicit authority to liaise directly with foreign agencies without reference to a higher authority. In doing so they must be able to forward data, including survey data, as required to discharge the state's international responsibility for ensuring safe navigation in its waters. NHO has this authority.

6. A brief assessment of responsibilities in Sri Lanka revealed the following:

Organisation	Responsibility
NARA/NHO	Responsibility for MSI within Sri Lanka and liaison with NAVAREA VIII and UKHO
SLPA	The area within established port limits for each port in Sri Lanka.
CFHC	The area within established harbour limits for each fishery harbour in Sri Lanka.
Sri Lanka Navy	General information from routine patrols and SAR activity.
Sri Lanka Coastguard	General information from routine patrols and SAR activity.

7. It is important that staff nominated for this task should be well acquainted with the organisations likely to provide MSI data and to maintain good working relationships with these organisations. The proposed structure of the MSI organisation and the flow of information are shown in the diagram below.



Annex F – IHO Yearbook

**SRI LANKA (THE DEMOCRATIC SOCIALIST REPUBLIC OF)
REPUBLIQUE DEMOCRATIQUE SOCIALISTE DU SRI LANKA**

Official Representative to IHO (as designated by Member Government)
Représentant officiel à l’OHI (tel que désigné par le Gouvernement Membre)

NATIONAL HYDROGRAPHIC OFFICE NATIONAL AQUATIC RESOURCES RESEARCH AND DEVELOPMENT AGENCY Crow Island, Mattukkuliya COLOMBO 15	
Department of which the Hydrographic Office is part - <i>Ministère dont dépend le Service Hydrographique – Ministerio del que depende el Servicio Hidrográfico</i>	National Aquatic Resources Research and Development Agency under the Ministry of Fisheries & Aquatic Resources Development.
Principal functions of the H.O. - <i>Attributions principales du S.H. - Principales funciones del S.H.</i>	<ul style="list-style-type: none"> • Control and co-ordination of all hydrographic surveying and nautical charting activities in Sri Lanka. • Collection, processing and publication of hydrographic data and nautical information. • Establishment of standards and procedures for gathering, processing and display of hydrographic data and nautical information. • Training of personnel.
National day - <i>Fête nationale – Fiesta nacional</i>	4 February
Telephone : Fax : E-mail : WEB Site :	+ 9411 2521705 + 9411 2521699 nho@sltmet.lk www.nara.ac.lk
Date of establishment and Relevant National Legislation - <i>Date de fondation et législation nationale concernée - Fecha de establecimiento y Leyes nacionales de referencia</i>	13 March 1984
Name and rank of the Director or Head - <i>Nom et grade du directeur - Apellidos y graduación del Director</i>	Mr M. A. ARIYAWANSA , B.Sc., M.Sc., Cat A (Hydrography)
Tonnage – Tonelaje	
Total Budget - <i>Budget total – Presupuesto Total</i>	15 000 000 (Rupees)

<p>Staff employed - Effectifs – Plantilla - Hydrographers (Name and rank of managing staff) - Hydrographes (Nom et grade du personnel de direction) - Hidrógrafos (Apellidos y graduación del personal directivo)</p> <p>- Cartographers (Name and rank of managing staff) - Cartographes (Nom et grade du personnel de direction) - Cartógrafos (Apellidos y categoría del personal directivo)</p> <p>- Administrators (Name and rank of managing staff) - Responsables administratifs (Nom et grade du personnel de direction) - Personal administrativo (Apellidos y categoría del personal directivo)</p> <p>Other staff - Autres effectifs - Otro personal</p>	<p>Senior Hydrographic Surveyors: Head of NHO Mr. S.N.S. AMASARINGHE, B.Sc, Cat B (Hydrography)</p> <p>Mr. A.N.D. PERERA, B.Sc Cat B (Hydrography)</p> <p>Chief Systems Analyst: Mr. S.W.S. WEERASINGHE , B.Sc, MACS Chief Land Surveyor: Mr. P.N. KODIKARA, Dip. In Surveying & Levelling Senior Cartographer: Mr. O.V. PREMACHANDRA, Dip. In Cartography</p> <p style="text-align: right;">40 persons</p>						
<p>N° of charts published - Nombres de cartes publiées - N° de cartas publicadas.</p>	<p style="text-align: center;">7</p>						
<p>Surveying vessels/ Aircraft – Bâtiments hydrographiques/aéronefs – Buques hidrográficos/ Aeronaves RV Samudrikka</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Displacement</th> <th style="text-align: left;">Date Launched</th> <th style="text-align: left;">Crew</th> </tr> </thead> <tbody> <tr> <td>25 MT</td> <td>2012</td> <td>7</td> </tr> </tbody> </table>	Displacement	Date Launched	Crew	25 MT	2012	7
Displacement	Date Launched	Crew					
25 MT	2012	7					
<p>Other information of interest - Autres informations utiles - Otra información de interés.</p>	<p>Production of maps on Fishery Resources. Providing of Hydrographic data for Coastal Zone Management, Environmental Pollution, Coastal Line Protection, Harbour Development, Mineral Sand Exploration & Exploitation, etc.</p>						