DATED 29 JANUARY 2013

SOUTHERN AFRICA AND ISLANDS HYDROGRAPHIC COMMISSION (SAIHC)
TECHNICAL VISIT REPORT: **MOZAMBIQUE**

INTRODUCTION

1. RHC Involvement. MOZAMBIQUE is an IHO member and has participated actively in the Southern Africa and Islands Hydrographic Commission (SAIHC) since the establishment in 1996. Mozambique was represented at the 9th SAIHC Conference in September 2012 and a National Report was available to the SAIHC Technical Visit Team (TVT).

2. Preliminary Liaison. Mr Herminio Chavango, International Relations, Instituto Nacional de Hidrografia e Navigação (Inahina), assisted with co-ordination of the visit and compiled the visit programme. The suggested programme was followed apart from a few minor modifications. The effectuated programme is attached in Appendix 1

3. Points of Contact. Inputs for updating of the IHO Year Book did take place for most countries during the 9th SAIHC Conference, but not for Mozambique/Inahina. *Updating the Yearbook was identified as an action to be taken by Inahina as soon as possible.*

4. Organization. Inahina has totally approximately 380 employees, spread over the main office in Maputo (160 employees), 4 districts office, crew of buoy tender vessel "Bazaruto" and lighthouse keepers. A schematic illustration of the organization is attached in Appendix 2.

MEETINGS WITH EXTERNAL STAKEHOLDERRS

5. Meeting with government representative. The team had an informative meeting with the Permanent Secretary of the Ministry of Transport and Communications. His knowledge and understanding of maritime affairs was impressing and he had a clear opinion of the challenges for Inahina related to fulfil the attributed responsibilities. The team called attention to the obligations for Mozambique related to the SOLAS convention, especially chapter V. A copy of the publication M-2 was left with the Permanent Secretary. Mozambique has not yet ratified the new IHO convention and this issue was addressed.

6. Discussions with Stakeholders. Inahina had identified and invited 15 stakeholders (governmental institutions and private companies). Unfortunately only seven institutions were represented at the meeting. On the other hand the delegates present contributed in a constructive way. The stakeholders' requirements and expectations to the services under the responsibility of Inahina was the main subject at the meeting. All agreed on the importance of having an HO with the necessary resources to fulfil the attributed responsibilities and the necessity for the respective intuitions to collaborate with Inahina in a constructive way. A separate meeting with the deputy director at the Fishery Research Institute was also arranged.

The list of institutions participating and their main areas of activities is attached as Appendix 3. Views expressed during the meeting contributed well to the TVT overall understanding of the actual situation for safety at sea and protection of the environment.

Participants for the stakeholder's meeting and other internal meeting is given in Appendix 4

REVIEW OF 2006 IHO/SAIHC TECHNICAL VISIT REPORT

7. The recommendations from the previous Technical Visit (TV) were reviewed. The review was done with the Director, all Head of Services and all Heads of Departments present. Below some comments made during the review, and discussions later on during the visit, are pointed out.

a. **The recommendation 14b** refers to The National Hydrographic Committee (NHC). It was reported that Mozambique has not established a NHC. On the other hand Inahina and the Ministry of Transport and Communication (MTC) have initiated a process of creating a Conselho Maritimo Tecnico e Cientifico (Maritime Technical and Scientific Board) with the purpose of bringing together different institutions involved in maritime affairs. Inahina will be the Chair of the Board. This Board most likely will be close to a NHC.

Recommendation 1:
Include hydrography on the agenda for the Maritime Technical and Scientific Board and in this way make a National Hydrographic Commission (NHC) redundant.

b. **The recommendation 14c** underlines the option of using Side Scan Sonar (SSS) in addition to echo sounders (either Single Beam or Multi Beam) during surveying to meet the S-44 requirements in areas where under keel clearance is critical. The former recommendation on using SSS was based on its high coverage in shallow waters. Inahina has not bought or hired any SSS so far and had no plan to do so. Inahina clearly stated that obtaining Multibeam Echo Sounder (MBES) has high priority.

The TVT made the following comments during the presentation of preliminary recommendation at the end of the stay: It is recognized that Inahina has launched the idea of introducing MBES for collection of bathymetric data. The operation of a MBES is much more demanding than the single beam echo sounder (SBES) and necessitates inclusion of several additional tools (motion sensors, navigational system, sound velocity profiler, software for operation, data processing software, etc). The total cost of a complete system will be quite high. In addition a MBES requires trained and experienced personnel capable of installing and integrating the system and all belonging equipments, properly calibration of the system, plan and execute the survey and, in the end, process the acquired data in a proper way. On the other hand a MBES allows the full seafloor search providing high resolution data.

Recommendation 2:
Given the complexity of operating a multibeam system it is strongly recommended that

Inahina, if introducing such a system, enters into a long term agreement of assistance with a recognized HO or private company.
A different option would be to cooperate with a private company whenever multibeam surveying is required (contracted surveying).

c. **Recommendation 14d** is related to give less priority to survey areas deeper than 50 meters. No analyses have been done by Inahina or others since this recommendation was put forward. The general response was that the proposal still had relevance. On the other hand more recent development, especially in relation to identified offshore gas/oil deposits, makes it likely that more detailed bathymetric information will be required for deeper waters. Surveying in deeper areas might be done by others than Inahina (international projects, industry etc), but no matter of how or by whom the collected information should be available to Inahina. This subject is more closely discussed later on in relation to establishing a national Hydrographic and Navigational Services Database, see item 8.

d. **Recommendation 14e** suggests an approach to create a WGS84 geo-referenced coastline. Inahina reported that this has taken place, in cooperation with Cenacarta (Land Mapping Authority), as part of a national project related to transformation of location data.

It was confirmed during the meeting with the stakeholders that Inahina already has some cooperation with Cenacarta. As both institutions are working with geo-referenced data (location data) it is likely that exchange of knowledge and tools might be beneficial to both institutions.

Recommendation 3:
Inahina should take necessary steps to identify any advantages of utilize the services from Cenacarta, especially in relation to positioning.

e. **Recommendation 14f** relates to the possibility of undertaking surveys using a LIDAR system (laser measurements from aircraft). The proposal of doing Secchi disk measurement along the coast to obtain water visibility information has not been initiated. The option of utilizing LIDAR technology is still valid and might speed up the surveying of coastal waters down to 30-40 meters in clear waters. The main constraint is the availability of funding. In addition to the daily costly operation of an aircraft and the processing of data, the mobilization and demobilization cost is quite high (operational LIDAR systems not available in Africa). A LIDAR surveying project will be cost-effective only if a quite comprehensive project can be launched. The present financial situation for Inahina does not allow such an operation to be initiated. For any future project Inahina should identify the interest of Cenacarta to participate in a bathymetric/topographic LIDAR survey project. Any LIDAR project is likely only if external donor(s) and/or an international project(s) contribute with funding.

f. **Recommendation 14h** proposes to consult UKHO on further development of the Mozambique Pilot. Inahina has started the process of renewal of the book on its own. No final timeframe for finalization was presented.

g. **Recommendation 14i** suggests doing investigation for the contracting of a project management organisation to oversee outsourcing the surveying of the near shore coastal zone area. The recommendation was related to the experience of contracting a private company occasionally in the period 2003-2005 for some minor multibeam surveying projects. The recommendation has not been followed up as only one rather limited job has been outsourced after 2006 (surveying in Lake Niassa). The main impediment for contracted surveying is the financial situation at Inahina.

To prepare an adequate contract for surveying with a multibeam system is quite challenging. Several of the modern Hydrographic Offices have experiences in this field and might assist developing countries in the basic work for a contract and for the implementation. This is likely to be much cheaper than using a non-governmental organisation.

Recommendation 4:
Inahina should aim at interacting with a recognized HO for the preparation and implementation of any contracted surveying.

h. **Recommendation 14j** is related to the continuation of the investment in the internal training of personnel for conducting survey operations. At present Inahina have 7 employees that have attended a hydrography Cat A programme and one on a Cat B programme. One person is undergoing training in a cat. B programme in the Netherlands. Some hydrographers have also attended MBES system training courses.

The level of formal professional education related to surveying is in fact quite satisfactory. This is also the case in the field of oceanography. The main challenge to Inahina related to field work seems to be the continuously maintenance of activities. The total yearly data acquisition is quite low, indicating a sub-optimal utilization of the assets available. To secure access to skilled and efficient field-workers with a strong commitment to high quality data acquisition, more regular and persistent field operations should take place. *The situation related to internal training stated in the former report continues to be valid.*

8. Development of a national hydrographic database

Annex B of the former report outlined the development of a shared database; quote: "*It is strongly recommended that INAHINA, as the body charged with the responsibility for the provision and maintenance of aids to navigation, and for hydrographic surveys, be directed to establish a National Hydrographic and Navigation Services Database (NHNSDB).*"

This recommendation has not been effectuated so far. Through the IOC funded project COAST-MAP-IO Inahina has quite recently received a data management tool. This is the *Bathy database*, which is a complementary part of the chart production package used at Inahina (delivered by Caris). The new tool has enabled Inahina to partly meet the recommendation above, if utilized in

a proper way. Caris assisted in the installation and provided some training, but it is still comprehensive work to be done before all existing data can be accessed and managed through the database.

The management of bathymetric data is far from satisfactory at a national level in general and at Inahina especially. Only a minor part of data available at Inahina is stored and managed in a proper way. It was identified during the TV that several other institutes/donors/projects have contributed to surveying in Mozambican waters during the last couple of years. The US Navy has done surveying with MBES in Maputo harbour and part of the approach channel (intends to do one or more ports later on), the WIO Marine Highway project has done surveying along the Mozambique Channel and also in the approach to Maputo, the Norwegian R/V "Dr. Fridtjof Nansen" surveyed a few minor areas in the north, a private company surveyed the harbour of Nacala, the Indian Navy has done some surveying in Beira area (SBES). **None of the data sets mentioned above is so far available at Inahina**. This clearly demonstrates that the role of Inahina as The national manager of bathymetric data is not deeply rooted among other national bodies. As there is no other relevant institution to take the position as bathymetric data manager, Inahina should give high priority to make the Bathy database fully operational.

If moving into the use of MBES for surveying, the amount of data will increase dramatically compared to what is available through a SBES system. An operational database management system will be an essential tool for keeping track on all information collected.

Recommendation 5:
Inahina should head for the role as the only national manager of bathymetric data and notify the stakeholders about its ambitions.

Recommendation 6:
At present anyone might carry out surveying in Mozambican waters without any prior notification. Inahina should request the Government/Ministry to introduce an authorization system, requiring that data collected by others should be made available to Inahina for further utilization.

Recommendation 7:
Any enterprise involved in hydrographic surveying in Mozambican waters, and obliged to supply data, should deliver the information according to specified requirements. Inahina should take the responsibility to outline the necessary specifications.

Recommendation 8:
It is strongly recommended giving the highest priority to make the Bathy database fully operational by including all surveying done by Inahina and start/continue the process of collecting data available from other agencies.

9. The further development of the Marine Safety Information (MSI) system
Annex C in the former report make it clear that Mozambique has selected Inahina as the central agency for gathering of MSI data and forwarding it to the appropriate authorities for use by the mariner. The report also suggests a MSI structure, included the identified cooperating agencies.

According to new information some changes to this structure exist, see drawing below.

At present the responsibility for promulgation of navigational warnings is placed in the Hydrographic Service of Inahina. It is decided to transfer the responsibility to a planned new department (Navegação) belonging to the Aids to Navigation Service (Serviço de Ajudas à Navegação).

Notice to Marines (NtM) is distributed monthly as a paper version. No information is published on the Internet. NAVAREA warnings are sent to the coordinator in South Africa. Urgent matters are to be promulgated through the Radio National and to be sent directly to Pilots. It was revealed during the visit that the broadcasting of local national navigational warnings was temporarily interrupted due to the end of the respective contract with National Radio.

Recommendation 9:
Immediate action must be taken to resume broadcasting of navigational warnings.

Recommendation 10:
The capacity building programme of IHO includes MSI training courses. Inahina should nominate at least one relevant person to the course planned to take place in the SAIHC region in 2013.

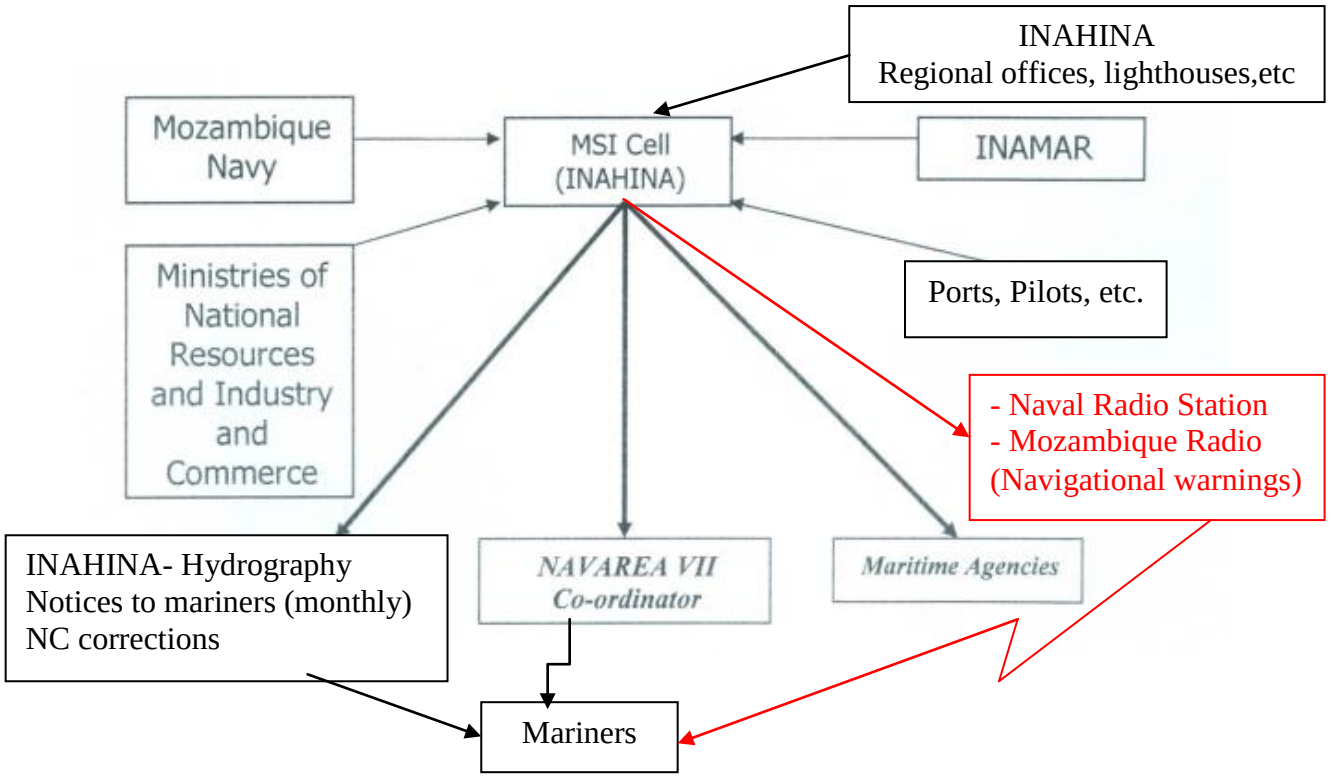


Figure: The proposed MSI structure for Mozambique

THE NATIONAL REPORT PRESENTED AT 9TH SAIHC MEETING

10. Inahina submitted a written report to the 9th SAIHC meeting taking place in September 2012. The report gives an overview of ongoing and planned activities. Under some topics more information was needed to distinguish between what has actually been done and the near future plans. Most of the subjects in the national report are reflected in other parts of this TV report and only a few comments are given below:

a. New publication (part 4). The development of new *Master Plan* and new *Strategy for Development of Hydrography* are in progress.
From the existing planning documents (period 2007-2012) and information given during the visit it is recognized that the planning should be more realistic. The goal achievements have been low compared to the ambitions presented in the available documents. Inahina has a lot of duties and tasks to deal with in the years to come. The list of proposals of equipment needed for implementing and improving the required functions is quite long and the related investments will be very high. An extensive increase in yearly budget and investment capital is required to carry out all the indicated functions. A key word in the ongoing planning process will be **prioritizing**. Prioritizing is a demanding task and normally implies to say **NO** to some activities even if everyone would like to have them implemented. The process of realistic planning in short, intermediate and long terms should be improved. It is strongly recommended that a priority list for tasks to be realized, equipment to be acquired and the period of implementation is included in the planning documents in preparation. A yearly survey plan should also be prepared based on the chart production plan and the recommendation on resurveying scheme stated in Appendix 1 of the former Technical Visit Report.

b. Capacity Building (7 and 7.2). The report address a generic problem related to capacity building; the training is given on modern technology that is not available for the staff when returning to the office, resulting in lost competences after some time due to the lack of practice. On the one hand it is relevant to learn about the new technologies for any near future acquisition, on the other hand any training should be synchronized in a way that achieved competence is applied shortly after training has taken place. Each organization should make a realistic evaluation on how to apply any new knowledge and desist from support when no adequate utilization is planned.

Inahina has over years benefitted from cooperation with some other hydrographic offices. The national report states that much remains to be done. On the other hand Inahina recently felt forced to cancel some cooperation with Portugal due to financial constraints. It is advisable to explore any possibility to maintain cooperation with relevant HOs.

DESCRIPTION OF MARITIME AFFAIRS

11. National Maritime Affairs. Mozambique has a very long coastline. As the terrestrial transport infrastructure is inadequate, transport by sea is an obvious option. The representation at the Stakeholder meeting demonstrated that the national responsibilities related to the IMO

membership in general, included the SOLAS convention chapter V, is well understood. Mozambique has for a couple of decades educated navigators, engineers and people for the fishery sector. The TVT was informed that the Navigational School (Escola Superior de Ciências Náuticas) struggled with maintaining adequate activity. The number of students is decreasing at the same time as the demand for navigators and engineers are increasing. Inahina is experiencing problems in recruiting adequately trained crew for the buoy tender vessel.

12. Trade and Maritime Traffic. The TVT gave low priority to the collection of statistical and other supplementary information for this part of the report due to the limited time available.

a. Through Routes. Bordering the Mozambican Channel the through traffic is considerable. The oil transport from the Gulf region constitutes a significant part. In the Pemba and Inhambane regions the sea line is not far from the coast. At these two locations AIS stations is about to be established with the purpose of monitoring the traffic. This establishment is an outcome of the Western Indian Ocean (GEF) Marine Highway Development and Coastal and Marine Contamination Prevention Project. According to this project over 5,000 tanker voyages per year, carrying 30% of all crude oil, take place in the sensitive coastal waters of the Western Indian Ocean. Many of the vessels carry approximately 300,000 metric tons of crude oil each. Any accident could have devastating impact on the environment.

b. Transshipment. The two most important ports are Maputo and Beira. In addition to be the main destinations for national supplies, these ports are of great significance for some neighboring countries. Beira is an important hub for distribution of oil. The offshore gas industry is starting to utilize the most northerlies ports like Nacala and Pemba. A new port in Palma (close to the border of Tanzania) is under planning.

c. Bulk Trades. A couple of coal mines are in the process to start export (Nacala and Beira). In Nacala a new port of shipment is under construction. A significant increase in the bulk transport is expected related to the coal mines.

d. Feeder, Coasting and Local Trade. Two brand new coastal steamers, visiting all relevant ports along the coast regularly, became operational recently.

e. Offshore Supply and Support. Some recent discovery of commercial exploitable gas resources offshore northern Mozambique has already had some influence on maritime activity. This activity is expected to grow in the years to come and is likely to have great impact on the most northern region. An increased pressure on operational services related to MSI/GMDSS, navigational security (reliable charts, sea marks etc), harbour facilities (anchoring sites, quays, supplies..) is to be expected.

f. Tourism - Cruise Liners and Small Crafts

Tourism is so far not a big issue in Mozambican waters, but visits of cruise liners happens occasionally in Maputo. Small crafts are mainly from South Africa, either visiting the Inhaca Island, Inhambane region and the Bazaruto archipelago. Often the boats are brought in on trailers.

g. Fisheries. The fishery sector constitutes several foreign trawlers operating on the Sofala bank (catch of shrimps), in addition to numerous artisanal small fishing boats, operating close to the coast for the whole country. Also some purse seining for tuna take place off the coast.

13. Responsibility for Safety of Navigation. Inahina is the responsible institute for the maintenance of channels, provision and maintenance of navaids, and the promulgation of Notices to Mariners. Since the early 1990s Inahina has operated the buoy tender vessel "Bazaruto". This vessel is capable of handling all kinds of anchored buoys in national waters. Given the long coast and high number of buoys in some regions, it is challenging to substitute/repair sea marks within reasonable time. Inahina is also facing a problem related to ageing of the buoys. A renewal program has been prepared but the financial resources are not available.

Inahina would like to increase the capacity on buoy handling, combined with increased survey capacity, by acquiring an additional vessel to cover a part of the coast. Some draft drawings of a vessel were presented to the TVT, but the investments needed were not yet clarified.

14. Defense Force Responsibilities. The Mozambican Navy does not have any vessels at disposal for the time being. A regular Search and Rescue service is not operational. Inahina is sometime asked to assist the Navy, Inamar and other agencies for urgent matters by using "Bazaruto". Quite recently Mozambique commissioned two fishery surveillance vessels patrolling the most relevant areas.

The piracy problem in the Western Indian Ocean has so far not reached Mozambican waters to any extent (one attack reported). The necessity and possibility of setting up a Coast Guard is under consideration.

15. Coastal Zone Management and Environmental Protection. This subject was not addressed during the visit as the most relevant stakeholders were not available to the TVT. On the other hand it is well known from other countries that access to high resolution bathymetric data and tidal information (tide surges, currents, sea level changes etc) are fundamental information for any research and decision making. Activities in the coastal zone normally require close cooperation between agencies responsible for sea and land. There is in general an increasing demand for hydrographic information in combination with terrestrial information in the coastal zone.

Inahina is in charge of the tidal observation along the coast and therefore also implicitly the long term monitoring of sea level. The institute cooperates with global programs on observing any sea level changes related to climate change. Unfortunately the operation of the tide gauges is not satisfactory for the time being. The access to, and the quality control of, the observations need to be improved. Three out of the six tide gauges have operational problems that could quite easily be solved (silt accumulation in the stilling well, power supply cable damaged). The data acquisition interruptions hamper the analysis and interpretations of the time series.

Recommendation 11:
Inahina should give higher priority to solve the problems related to proper operation of the tide gauges.

OUTLINE C-55 ANALYSIS
The last update of the C-55 was done in 2009. *Inahina was requested to deliver an update to IHO as soon as possible.*

16. Status of surveys within the National Maritime Zone.
Apart from some harbours and approaches to harbours little systematic surveying has taken place in Mozambican waters after the independence in 1975. The only exceptions are the limited surveying related to international cooperation, some surveying done by the former Soviet Union and the more recent surveying of a part of Lake Niassa. In general no high resolution bathymetric information is available for chart production, for generation of gridded topographic models, environmental needs etc. outside the harbour areas.

As mentioned earlier the needs for more detailed and reliable bathymetric information are evident. This is clearly demonstrated by the surveying done by external agencies and projects.

17. Collection and Circulation of Nautical Information. Reference is made to item 9 "The further development of the Marine Safety Information (MSI) system", page 5. The meeting with Stakeholders confirmed that the liaison with other relevant authorities (ports, pilots, Inamar..) was established and operational.

18. Survey Capability. Inahina has 3 operational survey launches (9-12 meters) equipped with SBES system. The survey launches are donations from Norway during the 1990s (one new, two built in the 1970s).

Inahina has four hydrographic SBES acquired in 2007 and all are operational.

The positioning of the survey launches is obtained with three pairs of Differential GPS systems, which were achieved more than 10 years ago.

Inahina also have one Geodetic GPS receiver. Geodetic GPS methods are efficient in the topographic data acquisition and in the determination of the control points coordinates, but normally it is necessary to have observations data from another GGPS receiver at a reference station. Cenacarta has the national responsibility for the geodetic network and maintain some permanent GPS stations with GGPS receivers. Cooperation with Cenacarta will enable Inahina to do topographic work with GGPS methods in some places without the need of mounting reference stations and excluding the problems related to the equipment vandalism. Also in this area they can share equipments and exchange of training and experiences.

Recommendation 12:
Inahina should enter into an agreement with Cenacarta to share the GGPS data obtained and develop a common project related to training in GGPS methods.

One survey launch is based in Beira permanently as resurveying takes place several times per year. The others are transported along the coast onboard "Bazaruto" in accordance with the survey missions. In an unpublished modernization proposal Inahina would like to achieve two somewhat smaller launches equipped with shallow water MBES system (mobile system to be transferred between launches). This would represent a significant increase in capability of delivering high resolution bathymetric data from near shore areas. As mention in item 7.b. introduction of MBES will also require some additional equipment. With the necessary precautions taken care of, Inahina is regarded to be in position for utilizing MBES technology.

For the capability related to human resources, see item 7.h., page 4.

A detailed future survey plan is not available, apart from the one attached to the former TV report. This overview has identified all the harbours, last survey (not all are surveyed) and a relevant re-survey frequency.

Recommendation 13:
Inahina should prepare an adequate survey plan based on the primary needs and on the available resources.

19. Independent Chart Production Capability. Inahina has an adequate paper chart production system. The staff has received some training abroad, but the number of qualified persons is still low. Inahina has recently requested support from Portugal for further training and they are working together to overcome some remaining issues. In spite of having modern tools the production rate of charts is low. Only the two nautical charts of Maputo are published and a nautical chart of Beira harbour is almost finished. Charts for the Quelimane area and Pemba Bay are in preparation. The low chart production rate makes it difficult to maintain a high professional standard among the cartographers.

There are nautical charts series published by the Portuguese Hydrographic Office and by UK Hydrographic Office (mainly based on the former Portuguese charts) but the cartographic data is not regularly updated.

Recommendation 14:
Inahina should continue the collaboration with a recognized HO with the objective of increasing the competence, the capacity and the production rate with respect to paper chart.

Staff at Inahina has also been trained on software for ENC (Electronic Navigational Chart) production. The training has partly taken place at the South African HO. A license of dKart software was achieved some years ago, but has expired. Inahina has an ambition to produce ENC for the most important ports. Especially for the ports of Maputo and Beira, included the approaches, ENCs should be available to the users in rather near future. The intension of Inahina to be the producer of both paper charts and ENCs is supported as the production processes are somewhat interrelated. On the other hand Inahina is facing some problems with maintaining an

adequate paper chart production. Given this situation it may not be advisable to put much effort into ENC production at present.

Recommendation 15:
It is recommended that Inahina evaluates the option of leaving the ENC production to an external partner for the next few years.

20. Aids to Navigation Capability. Almost 30 lighthouses exist along the coast. None of them is equipped for automatic remote operation. Every lighthouse has at least 2 local persons for supervising the operation. Some minor lights and close to 100 buoyant beacons are placed along the coast. The buoys are serviced by the buoy tender vessel "Bazaruto". The vessel services the entire coast with respect to aids to navigation and in addition participates in surveying operation (done from the launches).

A greater portion of the buoys are quite old and a renewal programme has been suggested. It is considered necessary to acquire 60-70 buoys in the short term to keep the sea marks at a reasonable good standard, including some additional marking for some ports in the north.

Vessels calling at Mozambican ports are charged with light house/navigational mark fee, which constitutes a part of the income for Inahina. This fee is far from sufficient to cover the cost of the buoy tendering. Substantial increase in the investments will be necessary to catch up with the lack of maintenance and renewal over the last decade.

CAPABILITY BUILDING and PROPOSALS FOR ASSISTANCE

21. The actual situation in the field of hydrography in Mozambique has not improved noticeably during the last decade. After a long term cooperation with some Nordic countries up to 1998 Inahina experienced flourishing development. The institute has later on not been in the position to renew technology and equipment to any extent. Without an extensive investment programme the deterioration process is likely to continue.

In spite of having skills in all the 3 phases related to the development of hydrography, Inahina underachieve in the different areas. This is partly related to lack of skill and capacity, but also to the efficient utilization of the assets available.

Inahina has decided to re-structure the organization responsible for MSI and GMDSS, but the new department is yet not operational. Training course in MSI is still requested even though several persons have attended courses in recent years (five in 2007 and one in 2010). It is appropriate to remind that the selection of candidates to courses must be from the relevant institution and the relevant level within the institution.

As mentioned in item 7.h. several employees have participated in a Cat A programme. However, the scarcity of field operations is a threat to the maintenance of their competence over time. If Inahina will be able to acquire a MBES system, some surveyors needs to undergo practical training in surveying and data processing. As mentioned earlier this kind of training can be done in co-operation with an experienced HO or by contracting a private company.

The capacity building related to chart production is covered by item 21 above.

The Oceanography Service within Inahina has quite good formal competence. The main constraint for an adequate service seems to be access to relevant technology. A "near real time" transmission of water level observations to the office will enable the staff to supervise the performance of the equipment, carry out continuous quality controls and subsequently make information available to users (through Internet or other means). An exchange programme with an experienced HO could be beneficial to Inahina.

22. Summary of proposed capacity building and assistance.

- Internal, optionally external, training of surveyors to maintain acquired skills
- Training in topographic surveying with Geodetic GPS methods
- Increased capacity and training of chart production staff (paper and optionally ENC)
- Course in MSI for the staff responsible for the daily operations of the services
- Assistance for making the Bathy database fully operational and instrumental for the data management
- Cooperation with a relevant HO or private company for the introduction of any MBES operation
- Cooperation with a relevant HO on improving data collection, quality control and distribution of tidal/water level information

CONCLUSIONS

23. The responsibility and activity of Inahina seems to be well understood and supported by the Ministry of Transport and Communications. In spite of this favorable situation Inahina has experienced a lack of renewal related to equipment in all sectors of its activity during the last 15 years, resulting in outworn and partly outdated assets. The only exception seems to be the investment in the chart production system in 2002 and some other minor acquisitions later on. The donation of the Bathy database recently has brought Inahina in a position to take up the role as The national manager of bathymetric data.

24. The level of formal competence and the capacity within the different Services of Inahina are reasonable good, especially in areas like hydrography and oceanography. In the field of chart production (paper and ENC) a lack of capacity was identified. In general the productivity is too low compared to the number of staff available. The reason for this may partly be explained with the lack of modern equipment.

25. Inahina would obvious benefit from an increased cooperation with well developed HOs, especially in relation to utilizing more modern equipment. In chart production and bathymetric data management improvements might be achieved at relatively low cost. For other areas like surveying, oceanography and aids to navigation further improvements will heavy depend on adequate investments. The budget constraints are considered to be a main obstacle for an increased productivity at Inahina.

Appendix 1

MINISTRY OF TRANSPORT AND COMMUNICATIONS

Instituto National de Hidrografia e Navegção (INAHINA)

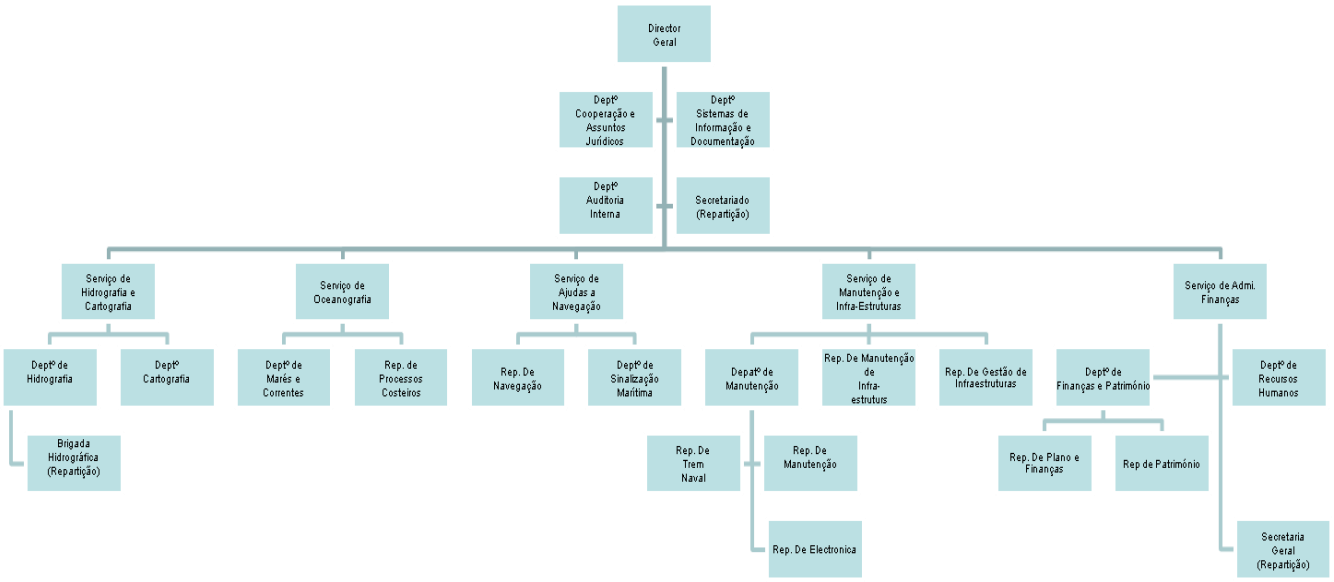
EFFECTUATED PROGRAMME FOR THE IHO/SAIHC VISIT TEAM

DATE	VENUE	TIME (HRS, CAT)	ACTIVITY	ACTORS
Sunday, 21 October 2012	Maputo airport	21:45	Welcome SAIHC Technical team	International relations, Inahina
	Arrival hotel	23:15	Check in	SAIHC Team
Monday 22 October 2012	Inahina meeting room	08:30 - 09:30	Meeting with the management team of Inahina	Inahina Management team SAIHC Team
	Ministry of Transport and Communication (MTC)	10:30 - 11:30	Meeting with the Permanent Secretary of the MTC	SAIHC Team Director Inahina + two more from Inahina
	Meeting room, Capitania, Maputo	13:30 - 15:30	Overview of activities at Inahina Review of the preceding Tech Visit Report	SAIHC Team Director Inahina All heads of Services All heads Departments
Tuesday 23October 2012	Meeting room, Capitania, Maputo	08:30 - 11:00	Review of the activities at the Hydrographic Services	SAIHC Team, Head of Hydrographic Services, the heads of the two Departments
		11:00 - 12:30	Review of the activities at the Oceanographic Services	SAIHC Team Head of Oceanographic Services, head of one Department
		13:30 - 16:00	Review of the activities at Maintenance Services	SAIHC Team Head of Maintenance Services, The heads of the two Departments

Wednesday 24 October 2012	Meeting room, Capitania, Maputo	08:30 - 13:00	Meeting with invited stakeholders	SAIHC Team, Director Inahina, Heads of Services, Inahina Heads of Departments, Inahina Stakeholders representing 7 institutions
	Institute of Fishery Research (IIP)	15:15 - 15:45	Separate meeting with a Stakeholder	SAIHC Team Head of Hydrographic Services, Deputy Director at IIP
Thursday 25 October 2012	Meeting room, Capitania, Maputo	10:30 - 13:00	Review of preliminary Recommendations	SAIHC Team Director Inahina All heads of Services All heads Departments
	Capitania	13:30 - 13:50	Presentation of the Bathy Data Base	SAIHC Team Technicians, Inahina
	Waterfront Restaurant	14:00 - !6:00	Lunch by invitation of Inahina	SAIHC Team Director Inahina All heads of Services All heads Departments
		20:30	Departure for the airport	

Appendix 2

INAHINA - ORGANIZATION



Appendix 3

STAKEHOLDER REQUIREMENTS AND EXPECTATIONS TO THE SERVICES UNDER THE RESPONSIBILITY OF INAHINA

Invited and participating agencies

STAKEHOLDER	Main activities	REQUIREMENTS /EXPECTATIONS
1. Ministry of Transport and Communications	- Safety of transport	- Is necessary to create a department to supervise the compliance with the international standards (INAHINA – commented that already exists through the MCT – Direção Nacional de Segurança e dos Transportes and through INAMAR) - Is necessary to improve the relationship between the entities with maritime activities. - Is necessary to create a plan to divulgate the products and services available.
2. Ministry of Science and Technology		
3. Ministry of Environment		
4. CENACARTA	- Production of georeferenced information – Terrestrial thematic maps. - Geodetic network.	Have complementary activities with a good relationship that should be maintained and improved.
5. IIP (fishery research)		A separate meeting with the Deputy Director took place after the ordinary stakeholder's meeting - IIP confirm that the competence and tools for processing and management of bathymetric data is not available - Support Inahina as the national manager of bathymetric data
6. EMODRAGA (dredging company)		
7. INAMAR (Maritime Authority)	Maritime authority Maritime management, security and surveillance Mozambique IMO's representative	- There are established relationships between both institutions. - INAHINA must be strong in their area of intervention.

8. INAM (Meteorological institute)		
9. IMAF (Institute of Sea and Boundaries)	Technical coordination of the state action in the maritime limits and borders	INAHINA has been involved in the definition of maritime limits.
10. The Nautical School		
11. The Navy	Defense of the national sovereignty in the maritime areas	- There are established relationships between the institutions
12. CFM (Port Authority)		
13. MPDC (Maputo Port Operator)	Harbours management (control and support)	There are a strong relationship and collaboration in the areas related to the safety of navigation.
14. TRANSMARITIMA (Shipping company)		
15. SOMONAV (Naval industry)		

Appendix 4

List of Participants

Please apologize for any misspelling of names (based on handwritten list)

Name	**Institution**
Internal meetings	
Augusto Bata, Director	Inahina
Humberto Mutevuie	Inahina
Célia Magaia	Inahina
Felix Pelembe	Inahina
Candida Sete	Inahina
Laura Chirindzja	Inahina
Susana Tembe	Inahina
Herminio Chavango	Inahina
Joao J. Munguambe	Inahina
Domingos Nataniel	Inahina
Cid Cambule	Inahina
Sinibaldo Canhanga	Inahina
Stakeholder meeting	
Ernesto Nhambe	Ministry of Transport and Communications
Eugenio Muianga	Inamar/IMAF
Rustick Paulo	Navy
Samuel Daniel Muzime	CFM
Alfredo Guambe	MPDC
Paulo Anade	MPDC
Alberto Nota Comboio	CENACARTA
Atanasio Brito	IIP (separate meeting)
Visiting Team	
Leonel Pereira Manteigas	Portuguese Hydrographic Office
Noralf Slotsvik	Norwegian Hydrographic Service