

A Hydrographic Society in West Africa

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INTRODUCTION

The evolution of modern hydrography in West Africa could arguably be traced to the navigational safety requirements of colonial expeditions seeking trading seaports along the coastline. On the attainment of independence, an obvious maritime infrastructure inherited by most former colonies included some level of hydrographic capacity. This was in the form of land survey equipment, survey launches and mid level man power. In most West African Ports, relics and structures of the colonial Hydrographic Departments are a familiar sight.

The discovery of hydrocarbons in the early 1960s along portions of the West African coastline precipitated the need for technological advances in hydrographic positioning and depth measuring devices. Consequently, the emphasis in national hydrographic capacity shifted from nautical charting to oil and gas exploration. Whilst the demands of the world-wide offshore industry brought dramatic advances in hydrographic technology, its application for traditional charting surveys continues to demand a high degree of professional understanding and engagement. Today, the Multi-beam Echo Sounder (MBES) and Global Positioning System (GPS) have become the surveyor's tool of trade for depth and position, as opposed to the Lead Lines or Single Beam Echo Sounder (SBES) and the Sextant of the 1960s. However, employing the MBES and GPS in hydrography presents issues which are constantly under appraisal by various user groups through research, papers, seminars, workshops and conferences. What makes these issues more challenging and equally interesting is the disparity in results obtainable between geographical locations. This probably underscores the plight of the hydrographic surveyor globally, particularly in areas of extreme environmental conditions, like the tropical West African Region.

Little wonder that the former Hydrographic Society, now renamed International Federation of Hydrographic Societies (IFHS) has recorded phenomenal strides and success in providing a professional fortress, where knowledge, experiences, challenges, prospects, advances and best professional practices are mutually shared amongst stakeholders. However, despite internationally binding hydrographic obligations, environmental and coastal projects, the establishment of National Hydrographic Capacity as an essential tool for sustainable environmental development still remains an aspiration in most West African States. It is instructive to note that as well as international initiatives, some West African states have in the past embraced varying levels of hydrographic capacity programmes that have yielded dismal returns. It is against this backdrop that this

paper seeks to propose the establishment of a West African society of the IFHS. Bearing in mind the success of the IFHS in other counties around the world, perhaps the West African Society would serve as a tool to complement other endeavours and facilitate the growth of Hydrography in the Sub Region.

The geographical extremities of West Africa lie between 5° & 25° north, and 18° west to 24° east. The region represents about one fifth of the entire African continent, which translates to a total land area of 7,324,000km. The Sub Region comprises the states of Benin, Burkina Faso, Chad, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Cape Verde, Liberia, Mauritania, Mali, Niger, Nigeria, Senegal, Sao Tome and Principe, Sierra Leone and Togo¹, as shown in figure 1 below.



Figure.1 Map Showing West African Nations on the East Atlantic Coast

Source: UKHO²

Although there are no great water courses in the desert areas, the southern area is endowed with three rivers. These are, the Senegal River, which covers a length of 1,700km, the Niger spanning about 4,200km in length, and the Volta flowing into the world's longest man-made lake in Ghana. With an estimated population of 198 million inhabitants, 14 of the 18 countries that make up the Sub-Region have coastlines along the Atlantic Ocean. The highest population densities are in regions where the natural conditions have allowed the development of intensive agro-pastoral systems (Niger and Senegal River valleys, coastal plains and mountains around the Gulf of Guinea)³.

1. FAO (1995) Conservation and Sustainable Utilisation of Plant Genetic Resources in West Africa, Proceedings from FAO International Technical Conference on Plant Genetic Resources, Dakar, 27-30 November 1995, Rome, FAO.

2. United Kingdom National Hydrographer (2004) North Atlantic Ocean Eastern Part Scale: 1:10,000,000 Taunton, UKHO

3. Ibid 1

It is therefore not surprising that all littoral nations in West Africa are member states of the International Maritime Organisation (IMO), which serves as a global legislative and regulatory body for ensuring shipping and maritime safety. As such, they have obligations under the International Convention for the Safety of Life at Sea (SOLAS). A new revised Chapter V of SOLAS was adopted in December 2000, and entered into force on 1 July 2002. The revised provisions of the SOLAS Convention Chapter V, in particular Regulation 9, prescribe a host of hydrographic obligatory responsibilities on contracting nations⁴. Despite the huge indemnity from non compliance, most West African nations are in contravention of certain provisions of this convention. In a response to this worrying situation, the International Hydrographic Organization (IHO) through the East Atlantic Hydrographic Commission (EAthC) mustered a technical team of experts to assess the situation. The team, christened the West African Action Team (WAAT), was mandated to assess national hydrographic capacity with a view to offering advice to the relevant authorities on remedying actions in the region, and engender progress through regional co-operation. The team concluded its assignment last year with a report that catalogues a host of observations and recommendations⁵. During the visit, the WAAT was struck by how the maritime situation of each country visited differed from the other; a summary is as shown in Table 1, and IHO phase capacity outline shown in figure 2. While some nations had a government department with overall responsibility for the safety of navigation, others had no existing organization. In some other cases, there was a lack of clear cut responsibilities between various governmental stakeholder, which precipitated inter departmental rivalry.

Table 1 : Assessment of National Hydrographic Capability

Country	IHO Member	EAtHC ²	NHC ³ Proposed	Phase 1 Capacity	Phase 2 Capacity	Phase 3 Capacity
Cap Verde	No	Assoc M	Yes	Partial	No	No
Mauritania ⁴	Pending	Assoc M	No	No	No	No
Senegal	No	Assoc M	Yes	Partial	Yes	Partial
Gambia	No	No	Yes	Partial	No	No
Guinea-Bissau	No	No	No	No	No	No
Guinea	No	Assoc M	Yes	Partial	Partial	No
Sierra Leone	No	No	No	No	No	No
Ghana	No	Assoc M	Yes	Partial	Partial	No
Togo	No	No	Yes	Partial	No	No
Benin	No	Assoc M	Yes	In process	Yes	No
Nigeria	Yes	MS	Yes	Partial	Partial	Partial
Cameroon	No	Assoc M	Yes	Partial	Partial	No
Equatorial Guinea	No	No	Yes	No	No	No
Gabon	No	No	Yes	Partial	Partial	No
Republic of Congo	No	No	Yes	Partial	Partial	No
D.R.C	No	No	Yes	No	No	No

² Eastern Atlantic Hydrographic Commission

³ National Hydrographic Commission

Table 1. Assessment of National Hydrographic Capability

Source: EAtHC⁶

4. IMO (2002) SOLAS Amendments 2001 &2002, London, IMO Publishing.

5. IHB (2004) Report of East Atlantic Hydrographic Commission West African Action Team-October/November 2002 (Chairman: I. G. A. M Le Gouic), Monaco: IHO.

6 Ibid.

The most striking discovery of the WAAT was the misconception about what constitutes national hydrographic functions, and how national capacity building could be achieved. Most nations sought the acquisition of a survey vessel as a desired priority. To focus attention on a logical staged progression, starting with first essentials, the IHO's 3-Phase National Hydrographic Surveying and Nautical Charting Capabilities capacity building document was presented by the WAAT; Figure 2 illustrates a summarised flow chart. Bearing in mind the WAAT observations, and technical issues involved in implementing the capacity building programme, sensitisation and awareness of stakeholders is implied. It is uncertain if government machinery can solely transcend all the necessary strata of society to create awareness and sustainability of such a programme.

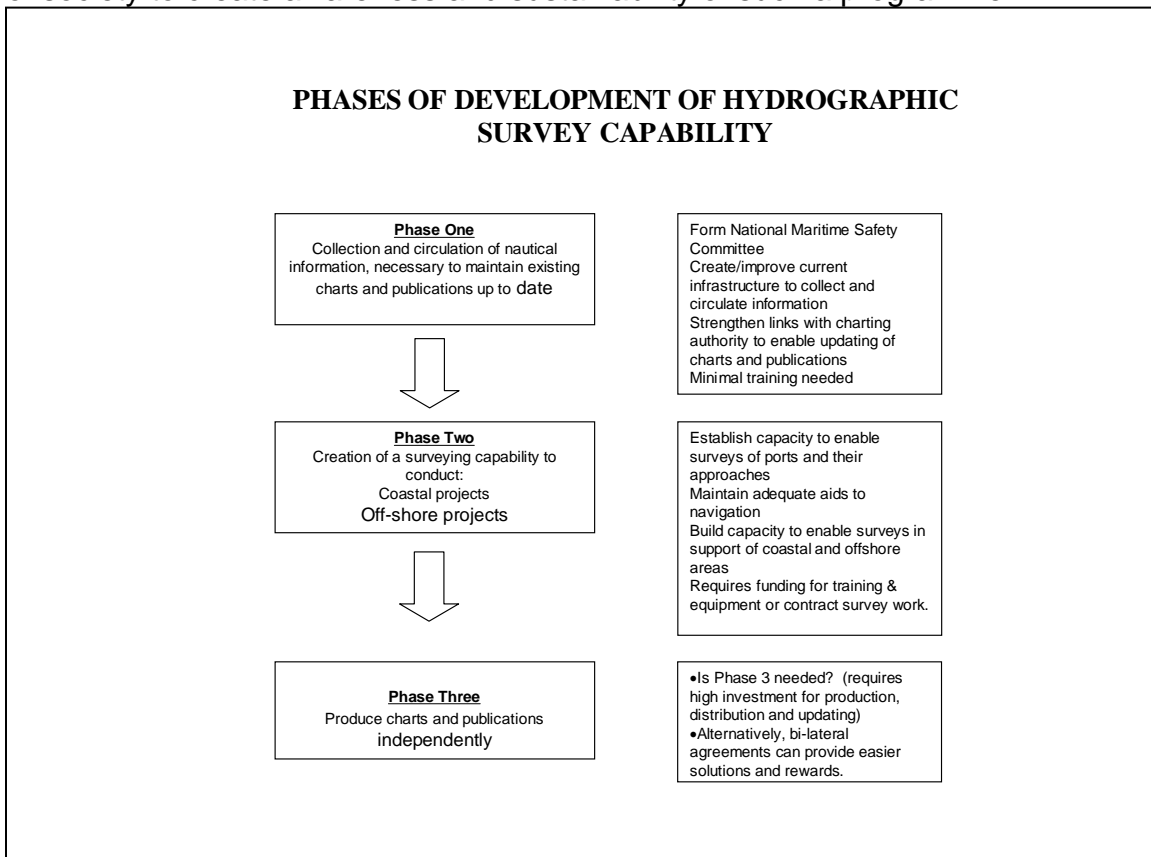


Figure.2 IHO Hydrographic Surveying & Nautical Charting Phase Capability
Source: EAtHC

Other findings that have proved inimical to the growth of hydrography in the sub region include inadequate funding, lack of training opportunities and inadequate trained manpower. The issue of training remains vital to sustainability in capacity building. Cuts in governmental funding for hydrography have become globally familiar. Hence, the consequent decline of FIG/IHO hydrographic training opportunities, which are mostly available in European and North American institutions, would require a strategy to address the sub region's training

requirements. The technical meetings which fit into personal continuing career development such as those offered by local Hydrographic Society branches, will go a long way in shoring up and complementing any knowledge and information deficit in the West African Sub Region. While acknowledging the immense achievements of the WAAT visit in creating awareness among stakeholders, the frequency of manpower turnover at ministerial, management and even practical levels will diminish the accomplishment over time. A professionally stimulating environment, such as a West African arm of the IFHS, would be useful in promoting continuous awareness at all times and levels. In December 2003, the South African Hydrographic Society, through a laudable awareness initiative staged a Technical Awareness Seminar (TAS) to address a similar concern. The success of this four day seminar is probably attested to by the response to the event, which has precipitated plans for a second TAS⁷. This initiative is one of the numerous strategies of the IFHS that a West African Society would have the capacity to emulate.

In September 2000, world leaders gathered at the United Nations Millennium Summit and placed development at the heart of the global agenda by adopting the Millennium Development Goals (MDGs). Among other issues, it set clear targets for reducing environmental degradation by 2015. In support of these goals, the UN has launched the Millennium Project to recommend the best strategies for achieving the MDGs. Constructively, a core component of the environmental goal is to “Integrate the principles of sustainable development into country policies and programmes and reverse loss of environmental resources”⁸. Surprisingly and contrary to this principle, environmental projects are still conceived without hydrographic considerations. An instance of such is a World Bank Coastal and Biodiversity Project under appraisal for Guinea Bissau which takes no account of the hydrographic perspective⁹. Bathymetry provides the infrastructure on which planning and future developments are founded. Maps and charts are intrinsic to the construction of new facilities, for example ports and their fairways leading to them, and the roads leading away. Considering that hydrography has a low profile in Western African governmental circles compared with other technical areas involved in environmental and geographical issues, an awareness strategy using an established West African Society could provide a remedy.

On the African front, in September 1999, some African Leaders with a shared vision made a pledge to eradicate poverty and place the African continent on the path of sustainable growth and development, and to participate actively in the world economy and body politic. This pledge was christened the New Economic Partnership for African Development (NEPAD). In addressing NEPAD’s

7. South African Hydrographic Society (2005) From The National Societies, Hydro International (9) 1

8. United Nations Headquarters (2001) Millennium Development Goals [online] Available: <http://www.un.org/millenniumgoals/> [Accessed: 26 December 2004].

9. World Bank (2004) Project Appraisal Document for Coastal and Biodiversity Management Project-Guinea Bissau, Report No: 28166-GUB, Washington, Office of the Vice President World Bank.

objective, the environment was also identified as one of the eight priority areas for socio-economic programmes within the continent. In spite of this laudable enterprise, NEPAD has remained flaccid on the role of nautical charting and the development of national hydrographic capacity for sustainability of environmental projects.

A working research on Sustainable Development in Sub-Saharan Africa by the Centre for International Development of the Harvard University that commenced in 2004 made some observations and recommendations in its report. The report stated that “The post-independence development efforts failed because the strategy was misconceived. Governments made a dash for “modernisation” copying but not adapting Western models. The result was poorly designed public investments in industry”¹⁰. It further opined that if science and technology was to be used to galvanize sustainable development in Sub Saharan Africa, it would have to recognise the existence and seek to mobilise indigenous knowledge and technology that would enable it start to appreciate local societal capabilities for sustainability. This assertion can be buttressed drawing from experiences that precipitated decay of most National Hydrographic Infrastructures in West Africa.

Elements of Geographic Information Systems (GIS), Global Positioning System (GPS), Cartography, Surveying and Remote Sensing technologies are already being applied to some of the major issues of sustainable development in Sub-Saharan Africa¹¹. While this shows that Sub Saharan Africa has embraced modern developmental techniques, the establishment of national hydrographic capacities and infrastructure that would ensure sustainability still remains absent. Furthermore, expertise in the fundamental elements of Hydrography, which include geodesy, cartography, salinity/velocity profiling, positioning techniques, tides and tidal prediction, and land surveying is essential for sustainability in environmental projects. Using the ethos of the IFHS as a focal point for ideas, and as a catalyst for their realization, the NEPAD community could be engaged in embracing hydrography as a tool for sustainable environmental development, while achieving charting and navigational safety in the sub region.

Despite the established benefits of hydrographic survey and nautical charting, it still seems to be a great hurdle in the West African Sub-Region. Although hydrographic charts are primarily used for navigation, their applications in Environmental Impact Assessment (EIA), underwater cables and pipeline routeing, nautical archaeology, Offshore Wind farms, mapping fishery habitats, shoreline protection and many other applications are well known¹². Another beneficial feature of establishing a national hydrographic capability is the

10. Mabogunje A.L (2004) Framing the Fundamentals Issues of Sustainable Development in Sub Saharan Africa-CID Working Paper No.104, Boston, Centre for International Development at Harvard University.

11. *ibid*

12. University of New Hampshire (2004) UNH Establishes First-Of-Its-Kind Ocean Mapping Center [online] Available: <http://www.ceps.unh.edu/news/releases/jhc699.html> [Accessed 26 December 2004].

availability of a hydrographic and oceanographic data base, useable for developmental projects. Tidal, geodetic, spatial, oceanographic and meteorological data all form part of a hydrographic database. Considering that a complete tidal cycle takes 19 years of observation to establish, a Coastal Zone Management (CZM) decision needing tidal data would be incomplete without this resource collected over time. Despite the wide use of the GPS technology in West Africa, most states have not established a determined mathematical mapping model (Spheroid) with transformation parameters to the World Geodetic System 1984 (WGS 84).

The provisions of the United Nations Convention for the Law of the Sea (UNCLOS) Article 76, provides for coastal Nations to submit their case for extension of their continental shelf beyond 200nm by 2009. Despite a number of maritime boundary delimitation disputes in the West African Sub Region, most nations have commendably commenced preparations that would satisfy a claim submission. However, due to the scarcity of technical expertise on issues involved, foreign expertise in the form of consultants and contractors had to be sought. While acknowledging the pragmatic effort of the national organisations involved, the possibility of evolving a strategy to develop Hydrographic survey capability at the same time, could have been explored. Still within the Provisions of the Convention, nations would be required to maintain sovereignty over their claim. Considering that seabed topography is dynamic, it remains to be seen how resources within the claim area would be sustainably managed without national surveying capability. External assistance may have to be sought; again the question of sustainability in development is being posed.

In some West African cities, shoreline reclamation projects are being undertaken for housing projects. The novelty of providing shelter for citizenry is commendable, but cognisance of hydrographic and oceanographic issues does not seem to have been considered. Using hydrographic and oceanographic data in a GIS and EIA, an informed decision could have been taken on the issue. Some of these areas lie below sea level, and do not have structural barriers in place to cope with sudden ocean surges. The heart-rending images of the tsunami seismic sea waves that hit the coastlands of the Indian Ocean and some South East Asian states last winter are still fresh in our minds. Without trying to relive the horrific details of the event, the potency of the ocean and the ocean conveyor belt which serves as a high speed link for the spread of maritime pollution and degradation cannot be overemphasized. There is no gain-saying the preference for providing services that would create awareness of the benefits of hydrography for averting environmental eventualities, as against the contributions to disaster relief and aid packages.

On environmental issues, the United Kingdom Hydrographic Office (UKHO) has received reports from mariners of uncapped and uncharted disused well heads within the Gulf of Guinea¹³; this assertion has neither been verified nor dispelled.

13. Gordon Taylor- Head Chart Branch 5 (2004) International Hydrographic Training Course, Taunton, UKHO.

Last year the UKHO also received enquires from a consultant in a West African country about the charting of a submarine cable that had been damaged while a vessel was weighing her anchor. Although there is an Admiralty chart of the area, the UKHO had not received any information about the existence of a submarine cable in that location. There is clearly a vacuum of information exchange between maritime operators and the relevant charting authority. Issues like this need to be addressed using awareness programmes like workshops and conferences, which the West African Society could achieve.

As the tonnage of vessels increases, so does the global acceptance and reliance on Electronic Navigation Charts (ENC). The hazard to shipping caused by inadequate charting of the West African coastline is increased as ECDIS becomes the standard fit on this major shipping route. Compared to the North American, European and Indian ENC coverage, there is a vacuum of ENC coverage along the West African coastline, as shown in figure 3 below.

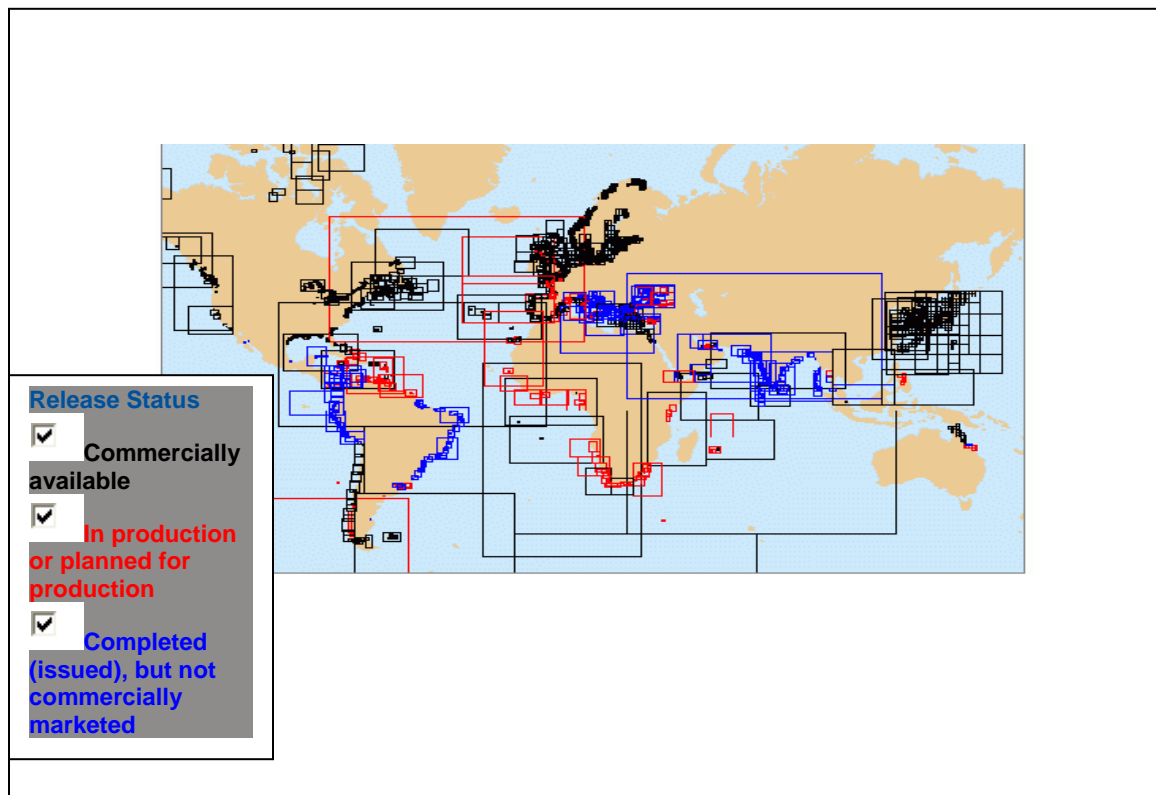


Figure.3 IHO Global Electronic Navigation Chart (ENC) Catalogue
Source: IHO Website¹⁴

It is worth stating that the Gulf of Guinea along the West African coastline is intensely dotted with offshore Oil and Gas installations. This situation combined with a local fishing fleet devoid of modern aids to navigation and nautical charts

14. International Hydrographic Organization (2004) ENC Global Coverage [online]Available: <http://www.iho.shom.fr/ECDIS/introduction.htm> [Accessed 26 December 2004].

with Source Data dating back to 1846, poses a hazard to all shipping transiting the region¹⁵. The replacement of paper nautical charts with ENC holds particular promise despite a few contentious issues, which are gradually being resolved, and a global seamless ENC coverage offers huge benefits both for commerce and safety at sea. While the issue of nautical charting is being addressed, it is essential to create awareness in the sub region of the global ENC outlook. From a shipping perspective, inadequate charting has penalising effects. It is opined within the shipping industry that insurance charges on cargoes and vessels trading with some African countries is 20% higher than the norm¹⁶. This in turn transcends into increased landing cost of whatever commodity is being transported. Thus making some West African ports unattractive, as well as fuelling fears for navigational safety. Again, the proposed West African Hydrographic Society with a wide reach amongst professionals and government will address this concern.

Conclusion

In a quest to give the global community the modern day benefits of hydrography, and to keep alive the legacy of the Hydrographic Society's founding fathers, we must cross borders and remove bureaucratic and professional restrictions that militate against the philosophy of the IFHS.

Unfortunately the human resource that would form the nucleus of hydrographic capacity in West Africa remains untapped. Whatever individual and collective positive action that would stimulate the establishment of a West African arm of the IFHS is hereby sought. The inclusion of locals (nationals and expatriates) in the West African Society at a status able to meet with significant political and economic players in the region would be extremely useful to the promotion of hydrography. This Society therefore would not only act for the educational benefits of its members but also as a beacon to highlight local opportunities and the value of the hydrography to nation building.

Rephrasing the time tested saying of Geoff Haskins, a former president of the Hydrographic Society, "...what is needed is a co-coordinating focal point through which international interests could be channeled towards a wider audience in West Africa. Perhaps an umbrella organization would be a more useful move. Make no mistake, whatever happens, hydrography remains a vitally important part of a coastal country's prosperity, and the Hydrographic Societies will have a part to play¹⁷".

15. United Kingdom National Hydrographer (2004) Chart 1385-Cotonou to Pennington River, 1:350,000, Taunton, UKHO.

16. Guy .N (2001) Hydrography for Countries in Transition Where Do You Start, Proceedings from the Hydro 2001, Norwich, 27th-29th March 2001, Plymouth, UK Hydrographic Society.

17. International Federation of Hydrographic Society (2004) The Organization-Past & Present [online] Available <http://www.hydrographicsociety.org/about/description.html> [Accessed 26 December 2004].

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