

# Development of Hydrographic Education in Israel

Barry GRINKER, Israel

## ABSTRACT

Israel does not have a National Hydrographic Office though it is a member of IMO represented by the Ministry of Transportation Shipping and Ports Authority. National charts are being produced by the Survey of Israel (SoI) and hydrographic surveys are conducted mainly by the Institute of Oceanographic and Limnological Research (IOLR) within the Ministry of Infrastructure.

Surveying is taught in Israel only at the Haifa Technion and the Haifa University has recently opened a school for Marine Studies. In recent years the University has incorporated programs whereby both Navy Officer Cadets and Merchant Marine Officer Cadets receive undergraduate education and a BA as part of their training course.

As of 2008 six different hydrographic and marine surveying courses are being taught annually in Israel. Two courses are being given at the Technion, the first of which has been running since 2001. Four are given at the Haifa University. In the spring semester of 2008 over one hundred students participated in the various courses given at both academic institutes. However, still lacking a formal procedure for licensing qualified hydrographic surveyors, few if any of these students will ever be active in hydrographic surveying projects.

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## 1. BACKGROUND

Israel is a small country with a relatively short coastline, 100 NM long in the eastern Mediterranean and 6 NM long at the north-western end of the Gulf of Eilat/Aqaba. Both coasts are relatively straight, without major navigational hazards and with direct access to the major ports, Haifa, Hadera and Ashdod in the Mediterranean and Eilat on the Red Sea. Whilst there is no official national hydrographic office in Israel today, Israel is represented in IMO by the Shipping & Ports Authority which is responsible for all matters concerning "safety of navigation". This means therefore that the Authority should be responsible for implementing regulation 9 of SOLAS Chapter V, requiring contracting governments (including Israel) to maintain hydrographic services.

Over the past decade much development along Israel's coasts has begun, namely:

1. Port expansion projects at Ashdod and Haifa (phase I near completion)
2. Offshore gas production platform west of Ashqelon with submarine pipelines to power stations along the coast
3. Submarine telecommunication lines along the coast and to Europe
4. Mariculture – fish farms for both production and research
5. Plans for artificial island construction off the central Israel coast

These projects and plans raised a need for enhanced hydrographic activity, particularly the need for producing modern, up - to - date national nautical charts. Charts used today in Israeli waters are mostly British Admiralty charts with data from hydrographic surveys during the British mandate in the early 1930's or from scientific surveys conducted by the Israel Oceanographic Institute (IOLR) in the mid 1960's.

It was thus decided in 1998 to engage in a national project to produce a modern, updated set of national charts. Not having hydrographic assets of their own, the directorate of the Shipping & Ports Authority (Ministry of Transport) approached the Survey of Israel (SoI - national mapping authority within the Ministry of Housing & Development) to produce the charts by contract. A steering committee was set up under the director of the Survey of Israel for this purpose, with the participation of the Shipping & Ports Authority, IOLR and the Israel Navy. In the absence of a centralized National Hydrographic Office, under a single governmental ministry, this steering committee could be regarded as a step forward towards the implantation of SOLAS regulation 9.

## 2. PROFESSIONAL HYDROGRAPHY

The question "what is hydrography – a science? An art? Engineering?" could probably be answered in various ways. "Who is a qualified hydrographer?" should have a simpler answer. But, is this really the case? Today's hydrographer has to be competent in many disciplines;

surveying and geodesy, cartography, physics, mathematics, computer science, oceanography and acoustics. So, is a geodesist or a physicist with some knowledge in maritime navigation, considered a qualified hydrographer?

FIG, IHO and ICA, in publication M 5 have set the standards for category A and category B courses in hydrography and outlined requirements and proposals for hydrographic survey qualifications. It is evident from this publication that certain core subjects are essential, together with some practical experience. Other subjects, considered of lesser importance are suggested in order to broaden the horizons of the hydrographic surveyor.

Having international guidelines, based on the vast experience of experts from a number of countries, is of course a good start for determining qualification demands. Naturally, each country may adopt national qualification programs and demands for marine or hydrographic surveyors, since the coastal state is responsible for safety of navigation in its waters. Thus most countries, having a national hydrographic office, have published national legislature for licensing qualified hydrographic surveyors.

### 3. THE ISRAELI SITUATION

Since Israel is a country without a national hydrographic office, it is not surprising that to date no procedures for qualifying hydrographic surveyors have yet been determined. Usually this would cause some concern in the international hydrographic community and even more for the shipping and maritime companies frequenting Israeli waters. However, in Israel's case there are many mitigating circumstances:

1. Israel's coast is very straightforward with few natural navigation hazards
2. Israel is a very advanced technological country with highly skilled manpower
3. capable of understanding and utilizing to the full all surveying and mapping equipment
4. (Land)surveying in Israel is of the highest level by international standards
5. There are some qualified hydrographers in Israel working in the field - either locals having training from recognized institutions overseas (such as the author) or immigrants, particularly from the former Soviet Union, who have both formal education and vast experience in hydrography

At the same time that The Survey of Israel embarked upon the national charting project, IHO and the International Maritime Academy (IMA) \* initiated the MEDA 7 project for enhancing hydrographic capacity building in the developing countries around the southern and eastern Mediterranean coasts. This project couldn't have been better timed for Israel.

All in all 6 Israelis participated in the various courses offered within MEDA 7. Unfortunately, 10 years on, only 2 are currently active in the national charting project: a cartographer at the SoI who is producing a new set of national charts and a graduate of the hydrographic surveying course who, other than participating in the surveys with the IOLR crew also deals with data processing.

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\*IMA which was based in Trieste Italy is now closed and apparently is going to reopen under a different name in Genova Italy.

#### 4. COURSES AT THE HAIFA TECHNION

In 2000 the head of the Geodesy department, in the faculty of Civil & Environmental Engineering at the Haifa Technion, approached the author, then head of the Hydrographic Branch of the Israel Navy, with a request to propose a course in marine surveying. The geodesy and surveying programs were under review and with the recent coastal development, as detailed above, the necessity for introducing a course in marine surveying was clear. The author was approached since he was the only professional, qualified hydrographer holding an official capacity in Israel. The proposed course "**Marine Surveying**" was approved by the Technion board and the first lectures were given in the spring semester of 2001. It was insisted that the 28 hour course include an additional 28 hours of tutorials as well as a one day field survey aboard the IOLR vessel Etziona, equipped with a MBES and other modern hydrographic equipment. Prerequisites for the course include: Basics of mapping and measurement; Cartography and (Land) Surveying Field experience I.

Within two years the course became so popular that the number of students registering for Marine Surveying rapidly increased. Due to limitations on IOLR's survey vessel, the course was limited to a maximum of 24 students. As the demand grew, an "**Advanced Marine Surveying**" course was introduced in 2005. This course, given bi-annually in the winter semester, includes less frontal lectures and more guided research based upon articles from Hydro International and the International Hydrographic Review, along with internet and other sources. The emphasis of this course is on modern surveying techniques, electronic navigation systems and state of the art sea technology. Also included in the course are lectures on acoustics, physical oceanography, marine meteorology, coastal geomorphology and the Law of the Sea with an emphasis on maritime boundaries.

#### 5. COURSES AT THE HAIFA UNIVERSITY

In the spring of 2005, nearing retirement from the Israel Navy, the author was approached by the head of the Maritime Civilizations department at the Haifa University. This department teaches subjects related to the marine environment: underwater archeology, oceanography and marine biology and it was decided to introduce a new course - "**Introduction to Marine Surveying**". Whilst based on the course given at the Technion, since the students in this department are well familiar with the marine environment, the emphasis is given to surveying and mapping techniques and practice and familiarization with the nautical chart.

In 2005 the Israel Navy added a module of academic studies to the Naval Officers Course, transforming it into a full "Naval Academy". Cadets in the officer's course get some credit for parts of the course and at one stage spend a period of time doing intensive studies at the Haifa University. Upon retirement the author proposed introducing a course in "**Hydrography and Marine Surveying**", being both pertinent to the Naval Officer's service and academic by nature. Thus, in January 2006 the first 48 hour lecture course was given. This 6 week intensive course is given twice a year.

Since the cadets have vast seafaring experience and basic maritime skills, the emphasis of this course is on surveying techniques, modern navigation and equipment calibration. The course also includes introductory lectures in oceanography, acoustics, marine meteorology, coastal geomorphology and cartographic and hydrographic aspects of the Law Of the Sea and boundary delimitation. Visits to IOLR and CAMERI – the Coastal and Marine Engineering Research Institute at the Technion are encouraged.

In the 2007 – 2008 academic year a new "School of Marine Sciences" was established at the Haifa University, through a generous donation by Mr. Leon Charney. The school envisages corporation of all marine affiliated studies under one roof with enhanced cooperation with governmental organizations and institutes (such as IOLR) involved in marine and maritime affairs.

The school offers a postgraduate degree in one of four fields: marine biology, maritime affairs, marine civilizations and "geo-marine sciences".

The latter degree is open to students with a BSc in Geophysics, Geology or any scientific degree related to the marine environment. A course in "**Hydrography**" was included in the mandatory syllabus and was given for the first time in the spring semester of 2008.

This year the Haifa University, together with the Institute for Maritime Training in Accre, have opened a BA degree course for trainees in the merchant navy. During their training the cadets spend 2 years intermittently at the Haifa University and after 4 intensive semesters meet the requirements for a BA degree. The first semester at the university, after 3 months of studying coastal navigation at the institute, includes "**Marine Surveying and Hydrography**", similar to the course given to the navy cadets, but with a purely civilian emphasis. The first "Marine Surveying and Hydrography" course in the program is being given in the winter semester of the 2008-2009 academic year.

## 6. OTHER COURSES

The only other known hydrographic course given in Israel is a week long workshop, given once a year at the Inter-University Laboratories in Eilat. This course is given to students from all universities in Israel dealing with marine studies. The course gives basic lectures on maps and navigation, GPS and echosounders and includes some practical fieldwork and data processing.

## 7. SUMMARY

As of the winter semester of 2008 - 2009 six academic courses in hydrographic related subjects are being given annually in Israel:

Two courses at the Technion (the advanced course is being given annually at present, due to high demand)

Four courses at the Haifa University – Maritime civilizations, Geo-marine Sciences, Merchant Marine cadets and Navy cadets.

The following table summarizes the various courses, related to hydrography, given today (2008) in Israel.

#	Institute	Course	Course Details	Practical Fieldwork	Prerequisites	Duration
1	Haifa Technion	Marine Surveying	Navigation Echosounders Depth sounding Calibration	1 day at sea aboard a survey boat	Basic mapping & surveying Cartography I Field Survey I	1 semester 28hrs lecture 28hrs tut
2	Haifa Technion	Advanced Marine Surveying	Modern survey techniques ECDIS, Data Processing	None	Marine Surveying	1 semester 28hrs lecture 28hrs tut
3	Haifa University Maritime Civilizations Dept.	Introduction to marine mapping	Navigation Echosounders Depth sounding Calibration	None	None	1 semester 28hrs lecture
4	Haifa University	Hydrography & Marine Surveying	Hydrography Oceanography Acoustics Meteorology	None	For naval officer cadets	2 trimesters 48 lecture hours each
5	School of Marine Sciences	Hydrography	Hydrography Acoustics	None	Postgraduate degree	1 semester 28hrs lecture
6	Haifa University	Hydrography & Marine Surveying	Hydrography Oceanography Acoustics Meteorology	None	For Merchant Fleet cadets	1 semester 48 lecture hours
7	Inter – University Laboratories	Hydrography workshop	Maps & Charts GPS Echosounders	Data collection & processing	None	1 week

Table 1 - Hydrography related courses in Israel (2008)

More than 100 students participated in 5 courses given during the spring semester of 2008 ! This could be considered phenomenal, taking into account the size of the country and the demand for qualified hydrographers. However, almost all of the students in the variety of courses take the courses for two main reasons. The first is interest and curiosity - hydrography and marine surveying are not well known and the idea of learning more about the marine environment is challenging. The second, unfortunately, breaks down to two components: either the course is mandatory (such as for naval and merchant marine cadets) or it is taken for academic accreditation where the choice of courses is limited (particularly at the Technion).

On the optimistic side, the least that could be said is that many more academics in Israel today are aware of the hydrographic profession and users of hydrographic products, namely naval and merchant marine officers, have a much deeper understanding of and appreciation for

them, knowing today how they are produced and what their limitations are. Perhaps some students from the postgraduate courses at the Technion and University might even find employment in the field in Israel or abroad. Formalizing hydrographic survey qualifications and licensing is a matter to be addressed by the Survey of Israel and the Technion. In 2008 there was some discussion, but no advance has yet been made regarding this matter to date.

## BIOGRAPHICAL NOTES



### **Barry Grinker**

#### Education

1991 - 1989 MSc in Hydrography, Category A Hydrographic Course, Naval Postgraduate School, Monterey, USA

1979 – 1976 BSc in Geology and Earth Studies, Hebrew University, Israel

#### Masters Thesis

“Kinematical GPS Navigation for Marine Surveys ”

#### Professional Experience

2005on - Associate lecturer at Haifa University

2005 - 1997 Head of the Hydrographic Branch, IDF Navy (Rank: Commander)

2001on Associate lecturer in the Faculty for Civil & Environmental Engineering, Geodesy Department, Technion Institute, Haifa

2000on Israel’s Hydrographic Representative in “FIG” – the International Surveyor’s Association - Commission 4 – Hydrography .

2001 – 1998 Israel’s Representative in “Meda 7”, an International Hydrographic Project conducted by the IHO & IMA

1997– 2005 Israel’s Representative to the MBSHC – (Mediterranean & Black Sea Hydrographic Commission)

1994 – 2005 IDF Navy’s Representative to the team of experts assembled to determine Israel’s maritime boundaries.

#### Honors and Awards :

2006 & 2004 Honorary Lecturer – Technion Institute in Haifa

1998 - 2 honorary awards for projects prepared for the IDF: “Navy Commander in Chief Award for Creative Thinking”

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FIG Working Week 2009  
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