

INTERVIEW WITH ASSOCIATE PROF. DR MOHD RAZALI MAHMUD

Hydrography in the Far East

There is much current activity on the hydrographic scene in the Far East region; the area was hit by the Tsunami, 26th December 2004. The region is also on the doorstep of China, a country undergoing enormous economic growth and a consequent growing market for hydrographic surveying. Have developments in China any other consequences for the hydrographic community in the Far East? Associate Professor Dr Mohd Razali Mahmud, Head of Hydrography, Institute for Geospatial Science and Technology of the Universiti Teknologi Malaysia (UTM) agreed to be interviewed by Hydro international (HI) on the matter.

Please give our readers a summary of your hydrographic career and your involvement in hydrography.

In 1982 I completed my Diploma in Land Surveying at Universiti Teknologi Malaysia (UTM) and in 1983 went on to study for a BSc (Hons.) in Surveying and Mapping Sciences at the North-East London Polytechnic (now the University of East London). During this period I became interested in hydrography, mainly due to Dr Bob Britton, who supervised me for my final year project focusing on multi-beam systems. In 1989 I continued my studies, aiming for a Master of Philosophy (Mphil) degree in Surveying Science at the University of Newcastle upon Tyne, United Kingdom. My research topic there involved the study of offshore positioning and Kalman Filtering. I was very fortunate to have Professor Dr Paul Cross, a very well known professor in geomatic engineering, as my supervisor. He also supervised me during work for my PhD in Surveying at University College London, four years after completing my MPhil in 1991. My PhD research topic focused on multi-receiver GPS attitude determination. As for my hydrographic training, I was very fortunate to be able to work with Professor Dr David Wells and Mr Tom McCulloch, both of whom have had a personal influence on my hydrographic career.

The recent Tsunami has caused enormous changes in sea bottom and coastal areas. What will be the impact on hydrographic survey work?

The impacts resulting from the Tsunami, particularly in sea-bottom and coastal areas, demand the contribution of hydrographic communities in monitoring seabed changes. For short-term monitoring work the physical changes in the seafloor may be carried out through bathymetric surveys, sonar imaging and seismic surveys. These three hydrographic surveying techniques can detect anomalies through imaging seafloor features and subsurface profiles. The Malaysian Marine Department has received 24 reports of changes in depth in Indonesian waters following the Tsunami. The sweep survey carried out by the Royal Malaysian Navy indicates slight changes at the One Fathom Bank. The biggest concern now is changes in bathymetry where depths could be shallower than the charted depth, especially in approaches to ports. This may jeopardise the safety of navigation, especially for deep-draught vessels. Perhaps these areas need more frequent hydrographic survey work.

What sort of developments in hydrography and/or hydrographic equipment do you expect to emerge in attempts to limit the damage caused by natural disasters like tsunamis?

We cannot limit damage when it has already occurred. It depends on the magnitude of the sources. But possibly we can predict and save lives of people living in coastal regions through studies of seismic occurrences, seabed anomalies and oceanographic parameters such as tides and waves. Since the development of hydrographic equipment is vital in current marine applications, such technology could bring benefits, particularly in monitoring seabed anomalies, and might perhaps help in short-term prediction of underwater earthquakes. Technological developments in hydrographic equipment such as sonar and acoustic systems, and tidal instruments, look like producing more effective means of monitoring underwater earthquakes in the future. These combined technologies may provide more timely detection of seabed changes in support of tidal and waves data. However, such systems need to be installed permanently on the seabed and involve high costs, especially during maintenance. NOAA and USGS have installed such systems in the Pacific Ocean. Implementation requires linkage with satellites systems for dissemination of information, particularly to coastal residential areas.

Which aspect(s) of space technology might be applied for maximum prevention of natural disaster damage?

The DART mooring system developed by NOAA and USGS currently looks effective in monitoring the Tsunami. This system was installed in the Pacific Ocean and covered mostly the Hawaiian zone; it was embedded with GPS, radio communications, geophysical, oceanographic and hydrographic instruments that were attached and installed on the buoy. After the Tsunami there were crucial demands for integrated instruments to monitor the complexity of this phenomenon. High-precision space geodetic technology through GPS can detect movements in tectonic plates with sub-millimetre accuracy. This might be installed with the integration of tidal instruments on the sea surface and some embedded communications links. UTM is planning to set up a National Geodynamics Processing and Analysis Centre to carry out tectonic plate movement and monitoring studies using GPS data.

What are the requirements for an efficient warning system against tsunamis in your area?

In Malaysia this responsibility lies with the Malaysian Meteorological Services Department, which monitors changes in atmospheric and meteorology conditions and correlates this information through the study of tectonic movement and ocean currents. But this meteorological satellite-based monitoring system is not effective as a warning system, especially when underwater earthquakes and tsunami occur. We need more efficient systems, probably integrated satellite-based, acoustic and sonar systems, with combined geophysical and geological measurements. However, the utmost effectiveness in term of warning systems is through educating the public about earthquakes or dissemination of "tsunami safety tips". The Malaysian Government plans to use Short Message Service (SMS) to warn people of impending disasters like earthquakes and tsunamis after the latest earthquakes at Nias Island, west of Sumatera on 29th March also shook the Malaysia region, particularly in the west peninsular area.

What are the tasks and objectives for the Hydrographic Centre of the Institute for Geospatial Science and Technology? How many students follow hydrographic courses?

Recently, UTM has established the Institute for Geospatial Science and Technology. This institute is a merging of the six centres that were once directly under the Faculty of Geoinformation Science and Engineering UTM. The new institute consists of expertise in Hydrography, Remote Sensing, GIS, Industrial Surveying, Cadastral Surveying and Geodetic & Geodynamic Studies and was established as a gateway towards sharing and co-operation in geoinformation and geospatial technology for this country. The main hydrographic objective is to provide education, training, research and consultation services to the community. For this the latest techniques and technology in hydrography will be used to:

- (a) establish the necessary infrastructures for hydrographic training at national and international levels,
- (b) facilitate training and development in hydrography,
- (c) provide training for related users,
- (d) conduct hydrographic projects in co-operation with the local users,
- (e) serve as a communicating agency between the local and international users groups in the field of hydrography, and
- (f) serve as a local and international reference centre in the field of hydrography.

We conduct HYDRO I and HYDRO II courses. The former is the FIG/IHO/ICA Category B course and the latter the FIG/IHO/ICA Category A course. Approximately ten students graduate every year from these courses.

Does the Malaysian Navy have a separate Education and Training Centre for hydrographic surveyors, or is the UTM involved?

Yes, the Royal Malaysian Navy has its own Hydrographic School located at its naval base in the north of Peninsular Malaysia. However, this School trains support staff as assistant surveyors only. Naval officers are sent to UTM or overseas to gain their Category B or Category A qualification.

What co-operation is there in Malaysia between government Hydrographic Surveying and the private sector?

In Malaysia the National Hydrographic Committee was established as a platform for the hydrographic communities to meet, present and discuss matters related to hydrography. This committee meets annually and has been very valuable in terms of sharing hydrographic information.

To what extent is the UTM involved in education and training of Chinese hydrographic surveyors?

I think China is well equipped to train and educate its own hydrographic surveyors. At present most of our students are from Middle Eastern countries such as Oman, the United Arab Emirates, Kuwait and Qatar. We also have students from Sri Lanka, Maldives, Philippines, Brunei and Singapore.

The International Hydrographic Conference in Kuala Lumpur (KL) will take place this year from 5th to 7th July. A similar conference was organised in KL two years ago but some sources described the number of attendees and exhibitors as somewhat disconcerting. What do you expect for the coming conference?

UTM in co-operation with the Royal Malaysian Navy held an East Asia Hydrographic Symposium and Exhibition in 2001. The main objective of this event was to provide a stage for hydrographic communities in this region to meet, discuss and present papers related to hydrography. Our intention then was to hold this symposium biennially. However, when the organisers of the International Hydrographic Conference came up with the idea of combining hydrography and oceanography under one event, UTM fully supported their idea. The conference organised in Kuala Lumpur in 2003 was the first such conference. This year it will be a second organisation of this conference and I am sure the experience of the 2003 event has encouraged the organisers to prepare for a better and more attractive event this year.

In HI March 2005 we published an interview with Professor Commodore LIU Yanchun of the Dalian Naval Academy in China. He and his colleagues are making efforts to publish Chinese hydrographic research results for use by hydrographic surveyors in the wider world. Does UTM have any exchange programme with China or does language remain a problem?

Language is still a problem but we are very keen to look at an exchange programme. At present we have ties with Indonesia's Universiti Gadjah Mada, Institut Teknologi Bandung and Institut Teknologi Nasional. A lecturer from Universiti Gadjah Mada spent three months at our institute working on marine data management. We have a professor from Institut Teknologi Bandung as external examiner to our postgraduate student, working on multi-beam echo sounding systems. Currently a lecturer at Institut Teknologi Nasional is preparing for his master's degree with us. Most recently, we have had visitors from the Vietnamese Center for Sea Survey and Mapping who would like to explore the possibility of co-operation in hydrographic training and research with us.

Do you have a personal message for the hydrographic world in general and young hydrographic surveyors/students in particular?

Marine GIS will increase in importance in the future. Therefore the scope of hydrography must be widened to include marine data management. This offers a good opportunity for young hydrographic surveyors/students to become involved in this technology. I would like to see more aspects of data sharing between hydrographic communities, especially on the part of hydrographic agencies. I hope to see

more institutions submitting courses to meet FIG/IHO/ICA ~Standards of Competence for Nautical Cartographers.™ The United Kingdom Hydrographic Office and The International Maritime Academy of Trieste, Italy have already submitted their programme for accreditation to the International Advisory Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers.

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