INTERVIEW WITH DR PHIL CHAPPLE, SCIENTIST, CONFERENCE CONVENOR, AUSTRALIA

Shallow Survey 2003

After completing a Bachelor of Science with Honours in Physics in 1983, Dr Phil Chapple worked in a laboratory of the Australian Defence Science & Technology Organisation (DSTO) where lasers were being developed for Australiaâ€™s Laser Airborne Depth Sounder (LADS). He returned to university to study for a PhD in Physics (laser spectroscopy), returned again to DSTO to investigate laser-material interactions and later worked some years on statistical image processing techniques. He completed the degree of Master of Mathematical Sciences (Signal & Information Processing), meanwhile learning details of sonar signal processing.

In 1999 he moved to the DSTO Maritime Operations Division to study and develop techniques for mapping and characterising the seabed, when he attended the first international conference on surveys in shallow waters, Shallow Survey 99, followed by Shallow Survey 2001. Who could be better qualified to organise such a conference?

What is Shallow Survey and how did you get involved in the conferences?

When I arrived in Sydney I joined a group that was actively investigating shallow water survey techniques. This happened in the lead-up to the First International Conference on High Resolution Surveys in Shallow Water (Shallow Survey 99). Those that I joined were busy surveying Sydney Harbour to collect data for the conference.
The conference was born from a discussion between Dr Roger Neill of DSTO and Dr Lloyd Huff of NOAA. The concept was to focus on a common dataset of shallow water survey data, obtained from a local area. This dataset was made available to conference attendees prior to the conference, for them to analyse. In this way, different techniques of surveying, data processing and data visualisation could be compared and contrasted. This conference brought together people actively gathering and presenting seabed data and information and was a great success. Equally successful was the second conference, Shallow Survey 2001, which took place at Portsmouth, New Hampshire, USA. This conference was led by Professor Larry Mayer and hosted by the University of New Hampshire Center for Coastal and Ocean Mapping and the NOAA/UNH Joint Hydrographic Center.
A dream of the organisers of the first and second conferences was to revisit the same survey areas over the years in order to map changes in the seabed and changes in technology. It was therefore natural for the conference to return to Sydney in 2003 and it became my role to convene Shallow Survey 2003, which is to take place from 17th-20th November.

What will be the main theme for this yearâ€™s conference? Is the emphasis in the conference papers on scientific developments or is there also attention to practical experiences and/or developments in industry?

The conference is devoted to the study of technologies and processing methods for mapping and characterising the seabed in shallow water areas. This will include novel, state-of-the-art swath mapping systems that are used on boats and aircraft; it will include hydrographic measurement and error budgeting; it will also include gee-whiz techniques for visualising the seabed. The conference will focus on both the practical developments in these technologies and the scientific understanding of the seabed gained as a result.

Who should attend, is a Web page available and is there an exhibition connected to the conference? How can you subscribe?
Shallow Survey 2003 will attract those who are interested in technologies and processing methods for mapping and characterising the seabed in shallow water areas. The conference web page is http://www.dsto.defence.gov.au/corporate/conferences/swsurvey. I would encourage readers to have a look at the images there, even if unable to attend the conference. Yes, there will be at least sixteen exhibition stands. The call for papers and registration information is available on the conference web-site. We cannot accept more than two hundred registrations, so those who are interested should act soon.

The conference is organised back-to-back with HYDRO 2003 in New Zealand. Is this deliberate and do you co-operate? Will people attending both events get special facilities or benefits?

The 4th Australasian Hydrographic Symposium (Hydro 2003), to be held in Christchurch, New Zealand from 24th-26th

November, has been planned for a long time. In view of the overlap of interests of those attending these two events, we decided to hold them back-to-back, giving those from other countries the opportunity to attend both and save on travel costs. We are also hoping that the Royal Australian Navyâ€™s Hydrographic Ship HMAS MELVILLE may be able to visit both conferences.
The dates of our conference have presented difficulties because the Rugby World Cup will be being held in Sydney at the same time. Those who need to book accommodation for Shallow Survey 2003 should do so as soon as possible. Those interested in both shallow water surveying and rugby will have some very good opportunities!

Do you see shallow water survey as a continuation of land surveying or as the limit/border of sea surveying?

Clearly there is some commonality between both land surveying and deep-sea surveying but I think the linkages with sea surveying are stronger. Usually land surveyors do not have any trouble seeing the land, but the seabed is more elusive. â€˜Shallowâ€™ indicates an emphasis on ports, harbours and coastal areas, but many of the techniques discussed can be applied equally well in deeper waters.

You studied physics and have been involved in land surveillance imagery. Do you consider yourself to be a land surveyor or a hydrographer in the context of the coming conference?

I consider myself to be a physicist who knows a little bit about hydrography. I have been very fortunate in being exposed to a wide variety of hydrographic survey systems and techniques in the short time that I have been working in this field. I have the background to appreciate the acoustical, optical and signal processing principles involved.

Will the definition of the coastline, in view of the various water levels in use, be a topic during the coming conference?

The conference will focus on technologies and processing methods for mapping and characterising the seabed. The definition of the coastline is not a focal topic, but it could be discussed if there are conference submissions in this area.

What is the role of lasers in harbour surveying?

Airborne laser bathymetry plays a major role in hydrographic surveying in clear shallow waters. As I have mentioned, our Navy's Laser Airborne Depth Sounder (LADS) achieves as much survey coverage as all the other sensors put together, because of the much higher rate of effort. Unfortunately, the waters in many harbours are too turbid for this technique to work well and in these locations sonar systems do a better job. Many acoustic swath-mapping systems also have a higher spatial resolution and feature detection capability, which can be important in harbour surveying. I am pleased to say, however, that laser bathymetry data from the eastern part of Sydney Harbour will be available in the common dataset for Shallow Survey 2003. We have been pleased with the quality of the data from this less turbid part of the harbour.
Other laser techniques, such as laser line-scan and laser range-gated imaging, also have a role in more specialised feature detection and classification. Airborne electromagnetic bathymetry is another technology that DSTO is investigating, for rapid low-resolution surveys of shallow waters in areas where turbidity precludes optical techniques.

Extrapolating your experiences with the series of Shallow Survey conferences, where will we stand in, say, five to ten years with new technologies and its commercial use? Do you believe that technology will ever make the water transparent?

To some extent the water is already transparent to a good swath bathymetry system, but there is still a way to go. Sonars and peripheral equipment need to become more reliable. Acoustic imaging and navigation may reduce the need for dynamic motion sensing; autonomous underwater vehicles will probably take on an increasing role in surveys of both deep and shallow water areas. There is also a need for improved automation of data processing, so that the analysis of data ceases to be a major bottleneck in the survey process. Improved visualisation techniques, data fusion and Geographical Information Systems (GIS) interfaces are also important for conveying information efficiently and transparently to customers. There are significant developments taking place in all of these areas.

Will these new technologies require a change in education or will it be possible for personnel with todayâ€™s training and education to work with these new technologies?

I hope that new developments will make the equipment easier to use. In this way, hydrographers and habitat mappers will be able to concentrate on what they are measuring, rather than on how they are measuring it. These sorts of changes often take place as technologies mature, enabling the technology to be a servant rather than a master. An important driver is the desire to save costs by reducing the numbers of people involved - achieving more with fewer resources. Training in GIS applications will equip personnel to convert gathered data into useful and meaningful information.

Are there government programmes on Australian export of hydrographic knowledge/technology, for instance to developing countries? Are Australian universities, the Defence Department or DSTO providing facilities for foreign students or scientists to study hydrographic subjects?

Australia has Defence co-operative arrangements with various developing countries and so there are opportunities for the exchange of knowledge and technology. The Laser Airborne Depth Sounder (LADS) has been commercialised by Tenix LADS Corporation in South Australia and has operated in a number of countries around the world.
The Royal Australian Navy runs an IHO Category B course and has several times hosted the University of New Brunswick Asia-Pacific Coastal Multibeam Sonar Training Course. Both courses have been attended from various countries in the region, including developing countries.

Is there much support in Australia for marine and shallow water environment subjects? How large is the community of scientists and surveyors involved? Is there a difference in mentality or attitude between land surveying scientists and marine scientists,

either from Defence or industry?

Australia is a maritime nation with direct influence on, and interest in, vast tracts of the earthâ€™s maritime environment. Considering our small population, there is a large community of those interested in the biology and ecology of the seabed, for monitoring fish habitats and the preservation of endangered marine environments. The numbers interested in hydrography are smaller, but still significant. There are 133 members of the Australian Branch of the Australasian Hydrographic Society, which indicates that there is a healthy community of interest in this area.
While land-surveyors and maritime surveyors have some issues in common, there are many issues that are unique to the marine environment. These include the demands of working on a relatively unstable platform while surveying something that we cannot directly see. Nevertheless, both communities have much to learn from one another in matters of geodesy, data analysis, data fusion, visualisation and GIS techniques for presenting information derived from measurements.

Do you have any message for our readers or is there anything else you want to mention?

See you in Sydney!