A day is Never Long Enough
One Hydrographic Surveyors Quest

John MCCARTHY, Australia

Mr Chairman, Ladies and Gentlemen

This is the story of an Australian boy who grew up to be a Hydrographic Surveyor.

This is not a technical paper but I guess it has something to do with "Hydrographic Surveying in Practice" which is the subject of Commission 4 Working Group 4.1 on which we are embarking for the coming three years.

As a boy I watched my Father in awe as he meticulously and effortlessly penned his way through large state maps as a Survey Cartographer. My Dad's hand was distinctive and beautiful and should I be searching through a thousand plans or maps today his draftsmanship will jump out and demand the respect it deserves – sadly a lost art in today's world of computers.

After completing High School I commenced my early training in 1959 as a Cadet Land Surveyor being articled to a Queensland State Government Surveyor and then continuing my training with several private consulting survey firms working in the field during the day and studying at night. This was the norm at this time but the University Degree course was starting and was soon to take precedence.

In 1964 I joined the then Queensland Government Department of Harbours and Marine as a junior Hydrographic Surveyor – and my career was set in motion.

After receiving my Licensed Land Surveyors certificate in 1968 I commenced private practice in Land Surveying and gradually worked towards opening a door to a Hydrographic Surveying Practice, an industry that was fledgling at best and dominated in Queensland by the government department from which I had been employed for some four years.

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MHS first Survey boat:----------

At this time a very few Hydrographic Surveys were being carried out by private organizations (small organizations or individuals) all of which had no qualifications (not even land surveying qualifications) and no experience, the results were a mess and the reputation of Hydrographic Surveyors was black.

A good example is a case in which I was involved for a short period. I had been engaged by a group who was involved in the early development of lasers and who had also somehow become involved in carrying out some nearshore Marine High Resolution Seismic (Sparker) work for the location of mineral sand deposits.

This was early 1970's and well before GPS and well before Miniranger and Trisponder microwave positioning systems.

The normal position fixing system at that time was two horizontal sextants operated by two survey assistants, the surveyor using a three armed 'Station Pointer' to plot each fix and give helm orders to the coxswain to keep the line, a survey assistant to book the angles and a survey assistant to annotate the echo sounder. Line keeping was by one minute position fixing.

The laser was a very good idea as it was visible from the boat and the coxswain could more easily keep on line. The other saving was that only one sextant was used (although this left room for large errors if in fact the boat was not exactly on line) and the plotting was easier and quicker and could also be done by the same surveyor.

So it was clever, a saving of three persons, as at least one person was required on shore to set up and move the laser for each line, but wide open to error.

As the surveyor I then had to produce the plans, sign and take the survey responsibility. This was all well and good however 'the client' then thought he could save another person on the boat, being myself. I was however still to produce the plans, sign and take the survey responsibility. This is where we parted company.

That company must have done pretty well because they are now retired and I am still working although I did hear that one of their associates spent some time at Her Majesties pleasure for printing counterfeit money.

MHS Second Survey boat:

I had widened my interest to include High Resolution Marine Seismic Survey and met up with a fine older gentleman who was at that time Professor of Geology at Queensland University and who had a passion for Marine Geophysics and a hobby in Electronics. Gerald Sergeant had developed a very good *BOOMER* system (both electronics and acoustics) which I purchased and today still operate with extremely good results.

Gerald and I worked on many survey projects together over the years and although he is now long retired he still maintains my *BOOMER* system and we have become good friends.

One day in the late 1970's Gerald and I were having dinner together after a day's surveying – nearshore – and we were discussing the state and reputation of the Hydrographic Surveying Profession and he said to me that If I wanted to improve the Reputation and Image of the Hydrographic Surveying Profession I would have to form a Hydrographic Surveying Institution, bring all the participants together as members and formalize appropriate and recognizable qualifications.

In the early 1980's the offshore oil industry was gathering momentum however on the Queensland Coast we have one of the eight wonders of the world – The Great Barrier Reef –

which you all should take time to see when you come to Australia for FIG SYDNEY 2010

So exploration for oil on the Queensland Coast was - and still is forbidden.

During this period my Firm **MAPPING and HYDROGRAPHIC SURVEYS** was engaged on several major government contracts on behalf of the Great Barrier Reef Marine Park Authority to map several major reef areas.

This involved bathymetry over the top of the reef including the weather face, so small shallow draft boats were the requirement and Miniranger Microwave Position Fixing Systems and Raytheon Echo Sounders were the instruments. Hand reductions, processing, plotting and drafting was still the method to produce plans which we overlaid with rectified aerial photography.

MHS Third Generation Survey launches:-------

During the 1980's there was a strong tide of discussion within the Hydrographic Society and also within the Australian Association of Ports and Marine Authorities (AAPMA) on the ways and means and requirements for recognition of Hydrographic Surveyors.

In 1988 during an extraordinary meeting of Hydrographic Surveyors at the second Hydrographic Society, Australasian Hydrographic Symposium in Sydney, I was given the task of investigating the possibility of establishing a method by which Hydrographic Surveyors in Australia could be accredited, in an endeavour to lift standards in Hydrographic Surveying, insure the delivery of quality survey services to Government and Private Clients and to provide a career path for aspiring Hydrographic Surveyors. It was even considered at that time that it may have been necessary to form an independent Institution of Hydrographic Surveyors as Gerald had suggested.

Under the enthusiastic chairmanship of Commodore John Leach Hydrographer RAN, and with the help of others we were able to convince the Institution of Surveyors Australia (ISA) to accept

Accredited Hydrographic Surveyors as members of the ISA as they themselves were restructuring the Institution in line with the FIG Commission structure.

Over the next few years the framework of the Accreditation Panel and the 'Guidelines for Accreditation' were formulated to meet IHO standards and specialties in that qualification Standards were set strictly in accordance with IHO Category A (which we termed Level 1 to avoid confusion) and IHO Category B (which we termed Level 2).

The Accreditation Panel itself was constituted to represent all specialities nominated by the IHO at that time and comprised a panel member representing each of those specialities namely – Nautical Charting; Coastal Zone Management; Industrial Offshore; Education and Private Practice with all members elected and with the Panel chaired by the incumbent Hydrographer RAN.

In 1989 I incorporated my firm as the size and variety of projects demanded a more substantial structure and projects were coming from further and further a field.

MAPPING and HYDROGRAPHIC SURVEYS Pty Ltd although still a small company was working interstate in Australia and overseas in Papua New Guinea, South East Asia, The South Pacific and Oman in the Middle East. For a few years in the mid 1990's MHS opened an office in Kuala Lumpur, Malaysia, jointly with an Australian Maritime Engineering Consulting Group.

Almost overnight Microwave Positioning Systems became obsolete and DGPS very rapidly became the universal positioning tool. Hand reductions, processing, plotting and drafting were replaced by computer methods and plans produced by automation on Plotters. Sadly my Father witnessed this transition and took it to heart that his life's work had been replaced by a machine and he withered away.

MHS Fourth Generation Survey Launch:---------

In 1994 with the framework of the Panel and draft 'Guidelines for the Accreditation of Hydrographic Surveyors' completed and all legal aspects addressed the Australian Hydrographic Surveyors Accreditation Panel (AHSAP) held it's inaugural formal meeting under the chairmanship of Commodore John Leech (Hydrographer RAN)

By 2001 the Australian Hydrographic Surveyors Panel (AHSAP) had become the Australasian Hydrographic Surveyors Accreditation Panel (AHSAP) following the ratification of the Trans Tasman Agreement between the Institution of Surveyors Australia (ISA) and the New Zealand Institute of Surveyors (NZIS). The AHSCP had also by this time accredited a number of International applicants from New Zealand and beyond.

The AHSAP and it's work had become recognized Nationally and within the Region

In 2004 the Institution of Surveyors Australia amalgamated with other interrelated bodies to become the Spatial Sciences Institute of Australia (SSI) and the Australasian Hydrographic Surveyors Accreditation Panel became the Australasian Hydrographic Surveyors Certification Panel (AHSCP) in line with the new convention for SSI and with some 130 Certified Hydrographic Surveyors registered.

In 2004 I was nominated as the Australian delegate to FIG Commission 4.

During this period **MAPPING and HYDROGRAPHIC SURVEYS Pty Ltd** was carrying out major projects including Submarine Pipeline and Cable Route Surveys and Port Development Investigation Surveys including Bathymetry, Marine Reflection Seismic, Marine Refraction Seismic, Side Scan Sonar Sweeping, Magnetometer and Current Monitoring (ADCP) Surveys.

In 2006 MAPPING and HYDROGRAPHIC SURVEYS Pty Ltd purchased a Kongsberg EM 3000 Multibeam Echosounding System and peripherals and fitted out it's Fifth Generation Survey Launch to enhance this work.

MHS Fifth Generation Survey Launch:---------

In April 2006 I presented a submission on behalf of the AHSCP to the FIG/IHO/ICA Advisory Board at it's meeting in Goa, India for Intrnational recognition of the AHSCP as a Certifying Body for Hydrographic Surveyors to IHO standards and this and other similar submissions were discussed at FIG Munich 2006.

I look forward to a report here in Hong Kong on this matter following it's tabling at the IHO Conference in Monaco last week.

As I see it there are two major areas that impact today's **"Hydrographic Surveying in Practice"** which is the subject that Commission 4 Working Group 4.1 is now addressing and on which WG 4.1 is to report at FIG SYDNEY 2010.

1. **A CRITICAL Skills shortage within the Hydrographic Surveying Profession.**
2. **International Accreditation/Certification for Hydrographic Surveying Individuals**

For some reason young school leavers do not have the spirit for adventure and exploration that my generation inherited. Perhaps we as parents have been too soft on our offspring or perhaps they are transfixed by a computer screen.

My generation has opened many new horizons from Space Travel to "Inner Space Exploration" in the depths of the oceans.

The advances in technology that I have witnessed from the early days of my career using sextants for positioning with leadline and very rudimentary echo sounders for measuring depth have been exciting and invigorating.

As Hydrographic Surveyors in the 1960's who in their wildest dreams could have imagined today's real time Differential Dual Frequency GPS positioning systems using 'ITRF' International Terrestrial Reference Frame Differential corrections transmitted from the world wide reference station network and received via an on board Inmarsat satellite data link with real time accuracy in horizontal positioning of $\pm$ 0.1 metres.

And who would have believed that in thirty years from then Hydrographic Surveyors would be using Multibeam Echosounding Systems covering the seabed in swaths to achieve 100 percent ensonification.

This is only the beginning of an exciting future for the next generation of Hydrographic Surveyors and we as today's practitioners must transmit our enthusiasm for our profession to the young school leavers as it is our responsibility to insure that the Hydrographic Surveying Profession continues it's very important roll in the Security, Trade and Resources of our countries.

The use of new sophisticated and ever expanding technologies throughout the profession requires the Hydrographic Surveyor to have the necessary knowledge and competencies to perform both field and office operations efficiently and accurately.

For multi million dollar offshore resource projects (Oil, Gas and Minerals) tighter tolerances, greater skills and expertise are now demanded. Our sadly abused Environment requires accurate mapping and data gathering - the emerging Marine Cadastre will require the Surveyors skills and in traditional harbour and shipping route surveys, as ships get larger, exporters demand maximum loading and Under Keel Clearances become ever diminished the weight of responsibility resting on the shoulders of the Hydrographic Surveyor grows heavier.

Today with the use of modern Multibeam Echosounders and Side Scan Sonar the Hydrographic Surveyor is finding artefacts that have lain on the sea/harbour floor for hundreds of years. With the emergence of terrorism – tomorrow he/she may well be required to find ordinances that have been placed on the harbour floor or on the hulls of ships *Tomorrow*.

We as the custodians of today's Hydrographic Surveying Profession must set the wheels in motion for the security of tenure of tomorrow's Hydrographic Surveying Professionals.

We must insure that we create a Career Path with attractive remuneration for aspiring Hydrographic Surveyors.

We must insure that there are recognizable and attainable Qualifications in place and that those qualifications demand respect in not only their local community but also in the International community as the next generation of Hydrogeraphic Surveyors will most certainly be International Technocrat Professionals.

In Australasia the AHSCP certification process is designed to ensure that those purporting to be hydrographic specialists have the appropriate skills, education and exposure to meet contemporary demands.

This provides surety and protection to prospective employers as is evidenced by the fact that Government and private tenders for Hydrographic Survey Contracts in Australasia now insist upon Level 1 Hydrographic Surveyors taking the responsible rolls.

For the surveyor it provides a simple, recognizable confirmation of competence and has unquestionably swelled his/her salary package.

For the legislator it provides a system whereby it can be legislated that critical hydrographic survey tasks are carried out by competent professionals.

Tomorrow's Hydrographic Survey professionals working on international projects of strategic and commercial significance – must possess International Accreditation and Certification.

To attract the best young people to select Hydrographic Surveying as a career there must be an outstanding and exciting career path with internationally recognizable and highly respected qualifications and an attractive remuneration available to them.

We very few who attend FIG Commission 4 are tasked with the responsibility of setting the standards for generations of Hydrographic Surveyors to come.

Thank you Mr Chairman and Members of FIG Commission 4

CONTACTS

John Edward McCarthy
Director/Sole Shareholder
Mapping & Hydrographic Surveys Pty Ltd
31 Byron Street
Bulimba
Brisbane 4171
Queensland
AUSTRALIA
Tel. + 617 3399 8566
Fax: + 617 3899 1515
Email: john@mhshydro.com