

Distance Learning and Certification for Hydrography – the Hydrographic Academy

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SUMMARY

This paper presents the plan, now implemented, for establishing an international distance learning programme for hydrography and the certification of hydrographic surveyors. The programme is based upon industry standards (FIG/IHO Cat A / B) and developed by recognised and certified organisations working in the field of hydrographic surveying and education.

Accredited hydrographic education and training has for many years been the successful attainment of only a small percentage of those actively involved in the hydrographic survey industry as a whole. In general, most companies rely on either employing staff that have already received an academic Geomatics education (with or without hydrography) or ex-service personnel who have completed military training. In either case, there is limited scope for continuing their education thereafter.

In order for a continuing professional development (CPD) model to work successfully, the training and education paradigm must be converted from overhead to investment. Worldwide, lead centres of learning have for a long time relied on students to come to them for training; paradoxically the industry can ill afford to release valuable personnel for several weeks or months at a time with the associated overhead costs and loss of productivity.

The aim of this paper is to describe the outline programme plan devised by Fugro and their partners to create a professional teaming between academia and other agencies with a vested interest and whose goal is to deliver internationally accredited, affordable hydrographic training and education to an industry-wide audience.

Key words: education, hydrographic, distance-learning

1. PROVISION OF EDUCATION AND TRAINING

The Hydrographic Academy intends to meet the needs of industry through the development and delivery of accredited postgraduate and undergraduate education and training, delivered primarily through distance and online learning. Specifically, this will employ the proprietary Mohive® Learning Production System (LPS) and a separate Learning Management System (LMS) to design and deliver asynchronous training and education to a global student market primarily using the Internet (but with back-up media to ensure product availability for the students when connectivity or bandwidth is an issue).

The Plymouth University and Fugro, together with assistance from the Royal Navy's hydrographic and meteorology training facility at FOST HM, agreed upon an initiative to work cooperatively on the development of the 'Hydrographic Academy' (HA) for the wider survey and marine industries. This partnership works to share and spread costs associated with the development and delivery of an IHO-based curricula, attract external funding opportunities as and when appropriate and, critically, share commercial and academic experience and expertise.

2. PRIMARY OBJECTIVES

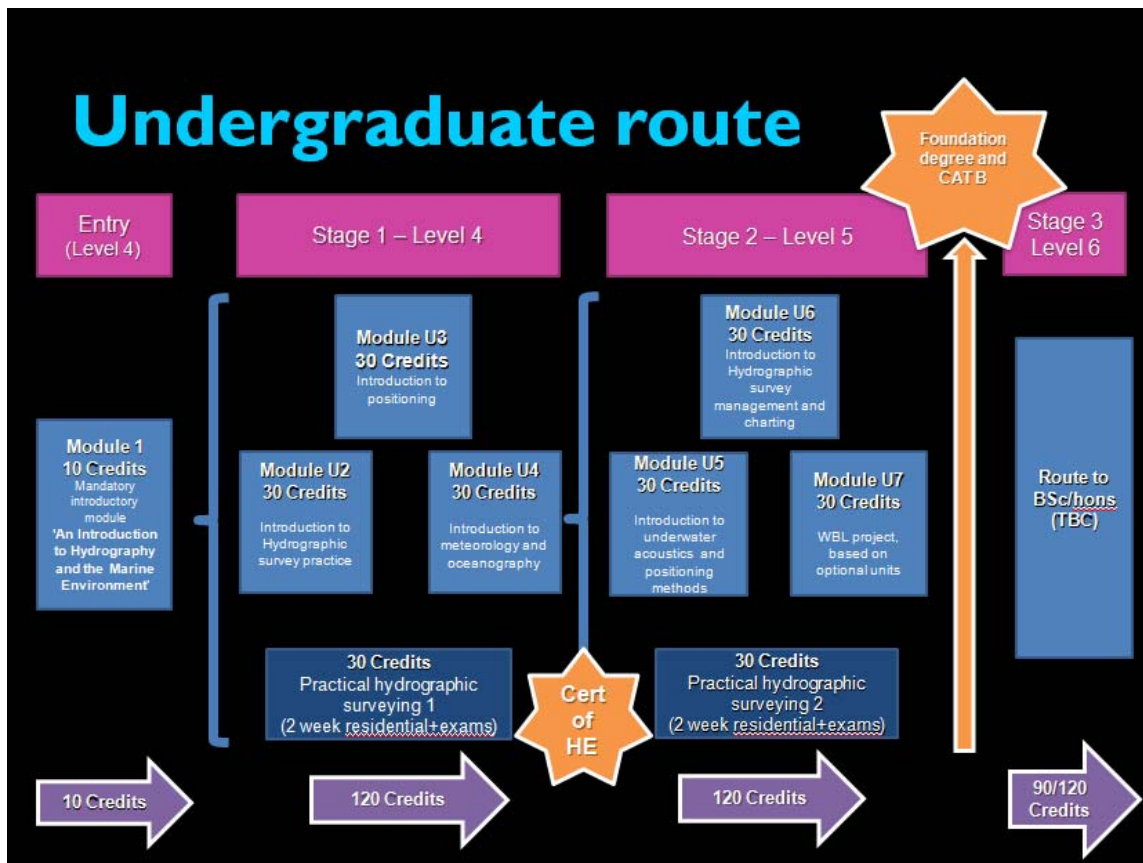
The primary objectives of the plan are as follows:

1. To establish an appropriate team of internationally-recognised organisations that, by combining their respective resources and skills, can provide a fully developed programme of e-learning modules, practical training and supervised final exam preparation, conduct and accreditation.
2. To develop and deliver, based upon material sources from current internationally accredited IHO classroom-based education and training courses, a new web-based e-learning programme delivered through the already-established Fugro Academy model.
3. To capture a 'student' market within the hydrographic industry (or aspiring to enter the profession) that is not currently being provided for with regard to structured education, qualification and CPD. This will create a route into the industry for school leavers which has not been available to them before.
4. To market the educational package and certification industry-wide.

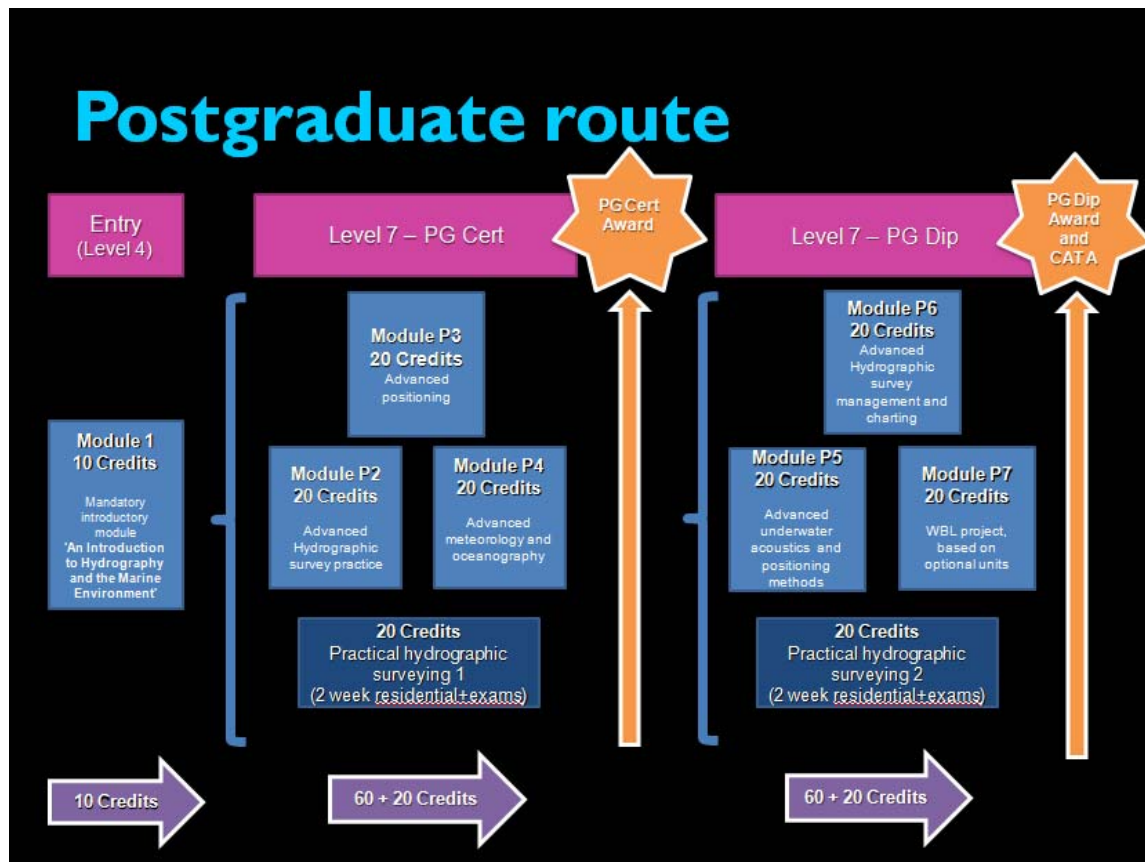
In order to ensure that all parties maintain their current core business levels of activity (i.e. this initiative does not undermine the success of any party involved), an appropriate partnership agreement and allocation of roles and responsibilities was established between the three main entities. Plymouth University was elected to act as overall project manager, in order to provide the appropriate academic legitimacy to the project as a whole.

2.1 Education and Qualifications Model

The proposal to develop and deliver hydrographic education, qualification and certification is based upon a progressive model that allows students to participate as and when time and funding permits. Two routes have been created to capture the majority of students to whom the HA is directed: undergraduate and postgraduate students. Post-graduate student acceptance will be based on possession of an appropriate recognised degree in a related ‘earth science’ or GIS subject; thus geography, physical oceanography, geology or marine science students would be considered appropriate whereas an arts-based degree would not necessarily guarantee qualification. Each and every situation however must be graded through an enrolment process which takes into account previous and current employment and experience in the field of marine surveying, as well as the student’s academic qualifications, to best determine the appropriate route for that particular student.



Basic structure for undergraduate route to Foundation Degree (with the goal to attain IHO Cat B Level)



Basic structure for postgraduate route to Post-Graduate Diploma (with the goal to attain IHO Cat A Level)

At specific milestones through the model, appropriate qualification or certification can be awarded based upon the student's satisfactory completion of the requirements. Carefully-structured modules will be designed to encourage the student to the next phase of education/qualification; to that end a strong feature of the programme will be that all modules will carry some accredited merit, from the fundamental/introductory packages through key stage elements.

A feature of the project is the recognition of the need to provide concentrated packages of practical training to comply with current IHO-approved curricula. These modules will take place under the auspices of trained staff already undertaking such duties for current residential courses. The practical modules will require the student to display a degree of familiarity with the processes involved in field survey, from geodetic control establishment to the check calibration and operation of industry-standard survey systems and software suites. Progress from each stage relies on the successful completion of the practical modules which are conducted after that stage's online content is fully attained. At project initiation it is intended to conduct these

practical modules at Plymouth University's facilities in Plymouth, UK; as the program develops it is planned to secure the support of other international training centres of excellence in hydrographic training to ensure this element of the project is kept within tolerable fiscal levels.

As the project team also includes a major academic teaching establishment, these modules can be incorporated into formal education as self-study options for students attending the relevant courses in the facilities of relevant team members.

2.2 Enterprise e-Learning and Technology Issues

The intent of the HA is therefore to create an academically-run portal for web-based hydrographic training to the international hydrographic survey industry. To do so in a non-proprietary manner requires a focus on the source of the academic input and less-so on the actual web service provider. Success of the programme depends on participation of potential and current competitive businesses to its own core functions. To that end the current PU Centre of Excellence in Naval Oceanographic Research and Education (CENORE), which has FOST HM as the primary partner, has been optimised as the 'gateway' to the Fugro enterprise software and web services on which the training modules will be hosted. A new page, managed through a PU server, will provide the link to the student base. Accreditation issues are also more easily managed through an already-established framework such as CENORE and individual team participation is recognised by appropriate 'badging' on the website. A focus on the academic providers to the project prevails and is emphasised through 'badge' prominence; this does not infer any greater or lesser team partnership, importance or priority within the elements of the teaming arrangement.

After gaining admittance to the website through an appropriate user ID, password and module/course reference, the PU server connects the learner to the modules. Material support and student auditing/performance monitoring is the role of the academic team members and therefore permissions for these staff would also be created.

From a technical perspective, much of the basis of this project, and to an extent its success, is based upon the use of appropriate technology for development and delivery of the course modules. The two main areas of technology that make the project viable are the e-learning course authoring software and learning management systems software.

The e-learning course authoring software package is a web-based collaborative package that would allow specialists from the project team to design and develop e-learning modules within a structured and consistent framework. The software uses a template-style model for creation of course pages and supports a wide range of multimedia and interactivity to ensure an engaging educational experience. The software has a strong in-built quality control mechanism that provides audit trails for content modification and facilitates the independent review of content by

authorised reviewers within or without the project team. The delivery format is Flash-based which affords a degree of security for the content embedded within the courses. Courses developed in this system comply with e-learning standards for tracking progress and performance on assessments and quizzes.

2.3 Accreditation by Professional Bodies and Academia

2.3.1 Professional Accreditation

Accreditation of the programme by the IHO will be a major objective and will lead to significant market capture, as there are currently only 11 academic institutions globally who are able to offer IHO accredited courses in English, with three of those being UK based¹ (including FOST HM). Discussions on accreditation and tacit support for the project have already been sought from IMarEST (The Institute of Marine Engineering, Science & Technology), RICS (Royal Institute of Chartered Surveyors) and ICES (Chartered Institution of Civil Engineering Surveyors). Whilst all are UK-based professional bodies, all have international membership and recognition and therefore carry a great deal of influence in the international surveying marketplace. It is planned to provide respective memberships with a link or portal through their parent websites to the HA information and enrolment pages, thus making access to this approved education problem easy for all. As the project gains traction it is envisaged that it will be delivered using a variety of languages, with the most obvious global markets being Spanish, French and Portuguese derivatives.

2.3.2 Academic Accreditation

Each module will be approved separately, and carry stand-alone credits, such that any student who wants to complete 1 or 2 modules for CPD purposes will still be awarded transferrable university credits. Any module offered in the HA (e.g. Module 1) will have these credits already attached to it, irrespective of whether the full HA curricula is undertaken or not.

Preparations for submission of the full programme (undergraduate and postgraduate) for university approval is underway at the time of writing (Apr 2012). This is likely to be in place well before the initial students graduate. Students will therefore work their way through the programme gathering credits as they go, and on successful completion of the course will be awarded a Foundation Degree (undergraduate) or PG Diploma (postgraduate).

¹ http://www.iho-ohi.net/iho_pubs/CB/C47E-SEPT09-UPDATED-MAY10.pdf

2.4 Advantages and Disadvantages of the Hydrographic Academy

2.4.1 Advantages

Other national maritime-related organizations, even sizeable ones such as OPITO in Europe, have attempted to create national Vocational Qualification (NVQ)-type level courses but have been hampered by lack of resources and limitations to their plan due to their geographically regional nature. By accessing a potentially more international student base, this plan succeeds through a combination of the volume of material being accessed and delivered, the recognised standing of the organisations involved, and the modern, cost-effective approach of delivery for the vast majority of the course material (notwithstanding the practical elements).

The practical elements can be provided either at a location suitable to the student, if enough students from a parent organisation or company are all geographically close, or by utilizing current assets of the team members, in particular the excellent facilities available to PU and possibly FOST HM. As well as the e-learning material and systems, the use of Webex/Webinar/Go-To-Meeting type online interactive tools might also be used to present live, or recorded, lectures and seminars, if considered necessary.

For the academic and training material providers, there is clear benefit to them in 3 ways;

- The provision of CPD (short) courses for industry;
- e-learning material for their own student base (where there is already pressure to reduce direct contact hours in most universities) and;
- access to a wider range of material through mutual collaboration

Accreditation separates the gold standard training environment, which it is intended to create with this initiative, from the partial and proprietary multitude of bespoke training mentioned earlier. Furthermore, it allows the participant to gain meaningful, transferable and sought-after professional credentials which are of value to both the individual and the company for whom they work. The expanded student base is also highly desirable in the growth and development of the survey industry's own intellectual value and that of its workforce; in other words a true investment in personnel.

Fugro Academy has a well developed and industry-approved LMS already forming the backbone of the training and education environment for the company. It is mature, looks professional and is attractive to the modern student more used to web-based learning. If utilised, the in-built Language Translation Tool may also allow expansion of the programme (once mature) to a truly international market.

A commercial partner in such a team allows a very effective handling of issues such as licensing of seats/module or course access, and financing/funding/accounting aspects of the programme

which are naturally more difficult for non-commercial entities and for a truer representation within the team of the actual needs of the industry. The latter aspect is a facet highly valued by the academic partners and is seen to provide legitimacy to the structure and aims of the project.

Accredited training on a resume or CV will be a massive boost in confidence for those engaged in trying to recruit staff where, currently, only a college based associated degree (e.g. geography) and a summary of previous experience is all a recruiter has to go on regarding the professional competency of an individual.

2.4.2 Disadvantages

Notwithstanding the clear advantages to the industry as a whole, there remains a notion that such a proposal essentially trains the staff of direct competitors. This however is a somewhat myopic view; the survey industry has always had a very dynamically changing workforce and very few individuals ever remain with one company or organisation.

Assessment and auditing of physically remote, e-learning students has to be very carefully planned, managed and recorded so that external authorities gain confidence that the program is attentive to progress, quality of response and development of the students undergoing the course. External accreditation is only likely to be awarded if this facet of the structure is seen to be very robust.

Additional effort is likely needed to develop within the student base a recognition that they are indeed 'students', with affiliation to the lead university, a sense of belonging to an actual (rather than a virtual) centre of learning and student-tutor communications all very important factors. Previous studies have shown that this aids greatly in the performance of the student base and is an important psychological factor which determines the success of such e-learning programs.

Even with broad agreement and a tight team structure, certain primary goals and objectives will be desired from each entity. It must be ensured therefore that they are incorporated into the goals and objectives of the overall program so that the end result achieves the needs of all participants whilst still creating the greater set of deliverables (namely, the CPD set of accredited modular courses).

3. CONCLUSION

Continuous Professional Development is the key rationale underpinning the need for an elemental-to-advanced level training and education investment in the global survey industry's primary resource: its people. A structured course approach (including internationally recognised certification or equivalent education awards) is attractive in order to develop participants throughout their careers i.e. to grow, retain and maintain the workforce of the hydrographic

survey industry (the de-facto student base).

The delivery of such CPD and education through a modular web-based delivery mode offers many advantages over traditional classroom instruction and opens up a potentially large market consisting of private individuals, full-time students, company employees and corporate organisations. The on-demand and modular nature also meets today's lifestyle.

The team approach discussed here is designed to bring together the three main components necessary to develop the scheme: the academic course material, the accreditation system and the communications and management system. The academic partners(s) providing content and review might need to be expanded slightly to share workload in creating the e-learning modules (albeit from a common, already accredited training programme) but this is open to further discussion, perhaps with various international Boards once the business case and philosophy gains more widespread acceptance.

Taking the education and training to the client ensures that their human resource remains available to them; training and education is therefore transformed from being an overhead into an investment.

Affordable, accredited and internationally approved hydrographic education and training would be available to the industry globally for the first time ever.

REFERENCES

¹ http://www.iho-ohi.net/iho_pubs/CB/C47E-SEPT09-UPDATED-MAY10.pdf

BIOGRAPHICAL NOTES

Don Ventura is a charge hydrographic surveyor with Fugro Pelagos Incorporated of San Diego, California. Don is a retired Royal Naval officer and has 28 years of experience in the field of hydrography, oceanography and marine geophysics. He is currently supporting Fugro Pelagos' business marketing department but also provides operational and QA support to the Company's global Airborne Lidar Bathymetry business, which also includes frequent interaction with Fugro LADS Corporation in Adelaide. Past work experience during a 22 year Naval career included various appointments at sea and secondments to the United Kingdom Hydrographic Office and the US Naval Oceanographic Office, during which Don became increasingly interested in the training of hydrographic surveyors. He has also worked in support of NOAA's National Data Buoy Center at Stennis Space Center, Mississippi, specifically with the DART tsunami and TAO pan-Pacific oceanographic monitoring arrays. He lives in Louisiana with wife Jane and 2 grown-up daughters.

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