Updating the FIG/IHO/ICA Standards of Competence for Hydrographic Surveyors (S-5A/B) and Nautical Cartographers (S-8A/B)

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AHS WHD Seminar – Auckland 11th July 2024
International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC)

- Maintain IHO Publications – Standards of Competence
  - S-5A and S-5B (Hydrography)
  - S-8A and S-8B (Cartography)
  - IBSC Templates

- Review syllabi and delivery of programs and individual subject courses from education and training institutions (Recognition)
  - IBSC Recognized Programmes

- Review and recognize individual recognition schemes (since 2012)
IBSC Membership

• 12 Board members: 4x FIG, 4x IHO, 4x ICA

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Andrew ARMSTRONG; Felipe BARRIOS; Rod NAIRN; Nickolás ROSCHER
Lysandros TSOULOS; J GURUMANI; Pablo SÁNCHEZ Gámez; Manuela MILLI
Evolution of the Standards

• 1978 – 1st edition of the Hydrographic Surveyor competency M-5 published at A and B levels and endorsed by FIG and IHO
  - These were content-based standards: Cat A was Cat B plus more content
  - Required practical experience before award of qualification

• 1994 – 7th Edition removed the specific requirement for practical experience—now purely education-based.
  - This left a void in individual recognition and led to the formation of AHSCP, ACLS IHCS, NSPS-THSOA, and other individual hydrographic surveyor competency schemes

• 2000 – ICA joined the IBSC and the 1st edition of Nautical Cartographer Standards M-8 were issued in 2003
Recent History of the Standards

• 2017 – Full revision of the standards resulted in separate Edition 1 standards for S-5A and S-5B, S-8A and S-8B
  • Level of knowledge for each element of the standard substantially different between Cat A and Cat B.
  • Cat B no longer a subset of Cat A
  • Standards are based on Learning Outcomes (not just content)

• 2024 – Recognition for stand-alone Subject-Level courses

A complete history is included in the Guidelines that accompany the Standards
Basic Subjects—Often considered pre-requisites for a program

B2. Information and Communication Technology
B3. *Physics
B4. Nautical Science
B5. Meteorology

Foundation Science Subjects—May be exempted with prior learning

F1. Earth Models (geodesy, coordinate systems, surveying, projections
F2. Oceanography
F3. Geology and Geophysics

Hydrographic Science Subjects—Must be included in Cat A training

H1. Positioning
H2. Underwater Sensors and Data Processing
H3. Lidar
H4. Survey Operations and Applications
H5. Water Levels and Flow
H6. Hydrographic Data Acquisition and Processing
H7. Management of Hydrographic Data
H8. Legal Aspects

*These requirements reflect the expected academic level of the F. and H. Subjects
The Need

Since 2017 – Extensive changes in hydrography and nautical cartography

• Survey/Sensor Technology
• Survey methods evolution
  • more reliance on GNSS, ellipsoidal surveying, post processed position, autonomous and remote controlled sensors
• Increased Data Volumes - management, > reliance on statistical analysis
• Information Technology, Machine Learning, AI, Cloud computing
• New Products and Applications
  • Wind Farms, Coastal inundation models, S-102, Seafloor habitat maps
• Post-Covid working and learning environments
  • Remote operation, online training
The Plan

- IHO has endorsed the plan to review/revise the Standards
- FIG and ICA endorsement expected
- Consultation workshops underway - London, Nov 2023; Hamburg, April 2024; St. John’s, May 2024; Wollongong, June 2024; Auckland 2024; HYDRO 2024, more to come... FIG Working Week, Brisbane April 2025.
- Optimistic timeline - aim to have drafts for comment in 2025 and a revision by mid 2026
- Goal to submit to IHO Member States / FIG / ICA in 2026
The Challenge

• S-5 and S-8 syllabi are already challenging – most educational institutions can’t make the program any longer and fit into academic or working schedules

• Lots of things to add – we all agree ... but what MUST we add?

• What can we REMOVE? - no agreement here
  • some want more maths, physics and computer science..... some want less
  • Can we remove traditional survey techniques – sextant, theodolite, sun azimuths – Almost surely! Total stations – maybe not...
  • What about seamanship & meteorology?
  • Paper chart techniques?
A fundamental question

• Should a Cat A qualification mean you know about all aspects of hydrography or cartography? To what level of knowledge?
• Or should there be Electives, i.e. Cat A + syllabi for specialty topic such as:
  • Hydrographic data management, Statistical processing methods, Cloud computing methods
  • Autonomous survey methods, Space based hydrography
  • MSDI
In Summary

Some things to consider

• How much foundation/prerequisite theory is needed?
  • Maths, physics, computer science
  • Geodesy/geomatics, oceanography, geology/geophysics
• Do hydrographers need to go to sea? Are nautical skills needed?
• Balance of theoretical education and practical training
• What new technologies need expanded coverage?
• Does the curriculum get bigger and the time to complete get longer?
  • Or does something come out for everything new that goes in?
• Should we reintroduce Electives - Remote Sensing, Inland waterways, others?
Contribute to the Process:

- Email (Subject Line: New Standards of Competence)
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- Or via Questionnaire