Towards more attractiveness
For Hydrographic Surveying Courses through Double Diplomas

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ENSTA-Bretagne, Brest
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Countries with University courses on Hydrographic surveying Recognized by the FIG/IHO/ICA at Cat A level
Hydrographic data

Collecting
Processing
Analyzing

Physics
Applied mathematics
Information technologies

Survey planning with quality requirement

Difficult to deliver a complete education in a complex field

Survey systems
INS/GNSS/DVL/USBL/LBL
Sounders, LiDARs
Acquisition system and software
Data processing and visualization tools
Applied geodesy

Hydrographic education
Cat. A level
Aiming at taking the responsibility of a complete survey work
Being reactive
Autonomous

HOs
Developers of hydrographic systems and tools
Industry

Many different technologies

Wide variety of skills

Interactions
Non uniform Diplomas

- BSc, 1 year
- MSc, 2 years
- MSc

10 university courses in 6 countries

Naval academies

8 courses

Need to increase catA courses capacity

- Rapid changes in technologies and new challenges
- Companies need qualified hydrographers
- Fast growing market

Problems in running cat.A courses

- Staff shortcuts, budget cuts, high running costs
- Lack of applicants, or limited group size (30 at the ENSTA Bretagne)
- Institutes have difficulties to cover the wide range of expertise required in Hydrography
Profiles of young hydrographers

- Autonomy
- Ability to work in an international context
- Ability to think independently
- Ability to manage a survey project from A to Z
- Ability to manage a survey team
- Communication and reporting skills

Detailed knowledge of:
- Essential subjects (FIG/IHO/ICA standards)
- Hydrographic systems at various scales
- Data proc. and management
- Error and quality analysis
Wishes of young hydrographers

Fieldwork, intl context (offshore, nearshore), 60%,
To become party chief, chief surveyor

Technology providers, software companies, 15%,
Acoustics, Positioning systems, data processing

Applied research, 25%, prototyping advanced,
experimenting new survey systems and design new methodologies
Master programs

EU: Course modules: 3 semesters,
Master thesis: 1 semester

North America: Course modules: 1.5 semester
Master thesis: 2.5 semester

Observations:
- 1 semester master thesis is too short
- PhD programs: very low employability
- Level of knowledge transfer from Univ to Industry is very low
- Hydrographic opportunities are at global level
- The industry don’t need “press button” surveyors

Challenges:
- International courses
- Enhance the level of technology transfer
Erasmus IP program

50 students
12 staff
14 days intensive

Official Sponsor

Partners
Erasmus IP Hydrography and Geomatics experience

- Lake of Vassivièrè (France, Limousin)
- 40 to 50 students: HCU Hamburg, Ghent Univ, ENSTA Bretagne
- 14 days intensive
- 7 nationalities
- 6 different project topics
- Clear Hydrographic Instructions, Large scale: 10km² dam lake

- Geodesy (3D compensation)
- Mobile Terrestrial LiDAR
- MBES Bathymetry
- Infrastructure mapping (dam, outfall, ports)
- Sediment mapping (SBP)
- Current profiling

ADDED VALUE:
- Learn new topics
- Practice in intl. group
- Discover new equipments and soft. Tools
- Complementary knowledge
Benefits of Intl Cooperation

- **Erasmus IP Hydrography And Geomatics**
  - Fieldwork project management
  - International student groups
  - Remote data processing after the camp

- **Erasmus Student Mobility**
  - to discover other point of views or methodologies
  - Students take benefits of a wider range of expertise.

- **Erasmus staff mobility**
  - To share high level experts
  - To develop research partnerships

- **Joint Diplomas**
  - Full integration of courses, with Student and staff mobility
EU Double diploma scheme

Semester 1
Hydrography

Semester 2
Summer training

Semester 3
Specialty
Short term research

Semester 4
Master thesis

Academic scheduling

+ Mid term research?

Industry sponsoring?

Elective Semester

Intl Hydrography camp (Vassivière)

Physical oceanography

Advanced hydrography
EU Double diploma possible scheme

- Semester 1: Hydrography
- Semester 2: Summer break
- Semester 3: Specialty
- Semester 4: Elective Oceanography courses
- Summer training
- Semester 5: Master thesis
- Semester 6: Master thesis

Mid-Term applied research project sponsored by a Company
How to conciliate detailed knowledge and autonomy development?

- Necessity of wide and heavy scientific knowledge for young cat. A hydrographic surveyors
  - quality assessment competences,
  - more and more complex survey systems
  - new challenges (from very small scale hydrography to satellite bathymetry)

How to conciliate detailed knowledge and autonomy development?

- Both Universities and the Industry have interest in joint diplomas

- Sponsoring required for 3 semester Master thesis will produce fast and high quality technology transfert