



T2F – Young Surveyors (2967)

## **The 1st International Hydrographic Summer Camp 2007 in Germany**

**Volker Böder**

Integrating the Generations

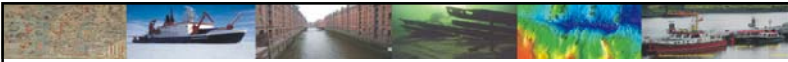
FIG Working Week 2008

Stockholm, Sweden 14-19 June 2008



### Motivation

- Missing students in the fields of Hydrography
  - A few hundred of Hydrographers are needed worldwide
  - Special field of Geomatics/Geodesy
  - Only a few Universities offer an complete course
  - Often Hydrography study program/courses are adressed to the Navy
    - Few exceptions, f.e. Germany: HafenCity University Hamburg (HCU); UK: Plymouth
- Question: how to inform and interest students?




HCU HafenCity Universität Hamburg

## Hydrography versus Geomatics/Geodesy

- Hydrography: Speciality of Geomatics/Geodesy
- Determination of topography and objects which are normally invisible for the surveyor
- Use of Multi-Sensor-Systems
  - GNSS, IMU, echo sounder, magnetometer, subbottom-profiler
- Processing of large amount of data
  - i.e. multibeam echosounder : 40 Hz with 101 points
    - 4040 points/s => 14,5 millions points/h
- Global fields of applications
- Contact to other disciplines (navigation, logistics, oceanography)

2008/06/16 1st International Hydrography Summer Camp 3  
 V. Böder



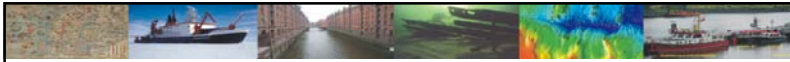
HCU HafenCity Universität Hamburg

## HafenCity University Hamburg (HCU)

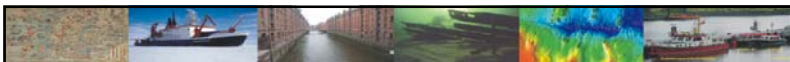


- B.Sc. Geomatics (ASIIN accredited)
  - Lecture Hydrography, 4th semester, 2 hours/week
  - Module Marine Topography, 6th sem., 4 h/week
- M.Sc. Hydrography (ASIIN accredited, FIG/IHO/ICA certified)
  - 2 years, 120 credit points

only academic institution in Germany  
 offering a two-years postgraduate program  
 which is **certified** according to the  
 “Standards of Competence of Hydrographic Surveyors”  
 by the IAB of **FIG/IHO/ICA at Category A**

2008/06/16 1st International Hydrography Summer Camp 4  
 V. Böder

 <b>HCU</b> HafenCity Universität Hamburg									
Curriculum M.Sc. Hydrography									
Common in Geomatics									
Sem.	A	CP	B	CP	C	CP	D	CP	Σ CP
M 4	<b>Project</b> Field of Marine Engineering Geomatics Project Management	9	<b>Elaboration of Master Thesis</b> 3 Months		<b>Final Examination</b>		21	30	
M 3	<b>Marine Geology/Geophysics</b> Geology/Geomorphology Basics Subbottom Profiling Seismics Magnetics	8	<b>Fundamental Oceanography</b> Physical Oceanography Tides	7	<b>Marine Environment</b> Oceanography Marine Weather Legal Aspects	7	<b>Software Technology</b> Object-Oriented Programming Project: Digital Cartography	8	30
M 2	<b>GIS Hydrography</b> Desktop Mapping GIS-Projects: e.g. Coastal Zone Management	7	<b>Hydrography III</b> Sonar Systems with Area Coverage Hybrid Hydrographic Measurements Digital Terrain Model (DTM)	9	<b>Navigation</b> Nautical Science Traffic Control Systems Electronic Chart Display Integrated Navigation	7	<b>Practice</b> Supplementary Field Training (3 Weeks) Quality Management	7	30
M 1	<b>Data Processing</b> Interface Technology Data Acquisition Basics on CARIS	6	<b>Higher Geodesy</b> Mathematical Geodesy Physical Geodesy Gravimetry	7	<b>Basics Hydrography</b> Remote Sensing Applied Mathematics II Hydrography I	8	<b>Hydrography II</b> Basics Underwater Acoustics Acoustic/Parametric Systems Determination of Position and Water Depths	9	30
Sem.	A	CP	B	CP	C	CP	D	CP	120

2008/06/16 1st International Hydrography Summer Camp 5  
 V. Böder

 <b>HCU</b> HafenCity Universität Hamburg									
Practical Training on Ship									
<ul style="list-style-type: none"> <li>• Hydrography I               <ul style="list-style-type: none"> <li>– Demo with MBES</li> </ul> </li> <li>• Hydrography II               <ul style="list-style-type: none"> <li>– Single beam with different frequencies</li> <li>– Multi Beam</li> <li>– Comparison</li> </ul> </li> <li>• Hydrography III               <ul style="list-style-type: none"> <li>– Wreck Search with                   <ul style="list-style-type: none"> <li>• MBES</li> <li>• SSS</li> <li>• SBP</li> <li>• Magnetometer</li> </ul> </li> </ul> </li> <li>• Navigation               <ul style="list-style-type: none"> <li>– Excursion to BSH ships</li> <li>– Excursion: Lights at Night</li> </ul> </li> <li>• IHSC Summer Camp</li> </ul>									
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">  </div> <div style="width: 45%;">  </div> </div>									
2008/06/16 <span style="margin-left: 200px;">1st International Hydrography Summer Camp</span> <span style="float: right;">6</span> V. Böder									

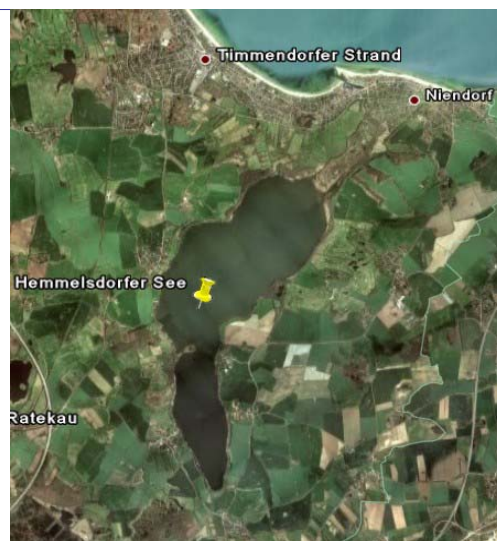
## M.Sc. Hydrography


- Additionally: practical trainings in nearby institutions possible
  - Federal Maritime and Hydrographic Agency of Germany (BSH)
  - Alfred Wegener Institute (AWI, Bremerhaven)
  - Hamburg Port Authority (HPA)
  - Geomar
  - various companies



## Location and Challenge

- Hemmelsdorfer See
  - 60 km north from Hamburg
  - 5 sq.km. (north+south)
  - Until 800 AD fjord of Baltic Sea
- Search for
  - The Deepest Natural Point Germany
    - -40 m below MSL
  - Archaeological sites
    - Viking settlement?
  - sedimentation
  - DTM for the south part of the sea






## Location and Logistics





- Carried out by HCU and NIAH (Northern Institute of Advanced Hydrographics)
- Operation Center: hut of scouts on sea „Dwarzlöper“ in Offendorf
  - Computation center
  - Bedroom, kitchen
- Participants: 15 students, from Madrid (E), Vienna (A), Oldenburg and Hamburg (D)
- Supported by the
  - German Hydrographic Society (DHyG, financial)
  - Northern Institute of Hydrographics (NIAH, HCU PPP-organisation: Ships-logistics, Measurement and Processing)
  - Innomar, Rostock (Measurement and Processing of Subbottom-Profiling)
- visitors:
  - Mrs. Dr. Fahrentholz-Wilkening (Dr. Fahrentholz Echosounder)
  - Archaeologists Dr. Bleile, Dr. Segschneider (Schloss Gottorf)
  - Barbecue with lawyer Jürgen Happ

2008/06/16
1st International Hydrography Summer Camp  
V. Böder
9



## Equipment

- **Echo Sounder**
  - RESON: Multibeam Echosounder SeaBat 8101
  - Innomar SES-2000 FAN
    - parametric sediment echo sounder with
    - SSS capability
  - Fahrentholz: LituGraph (Single Beam)
    - 15 / 100 / 200 / 700 kHz
- **Positioning and Attitude Determination**
  - Leica: System 500 (RTK)
  - Javad: JAVAD 4 Gyro (GNSS Positioning and Attitude)
  - IXSEA: OCTANS III (fiber optic IMU)
- **Additional Sensors**
  - Marine Magnetics: Mini Explorer
  - SVP Reson 15

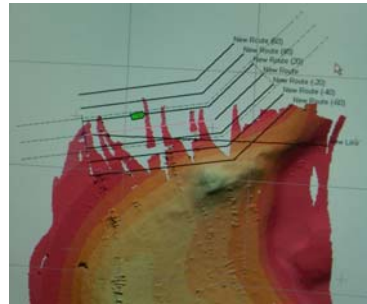





2008/06/16
1st International Hydrography Summer Camp  
V. Böder
10

## Measurements and Processing

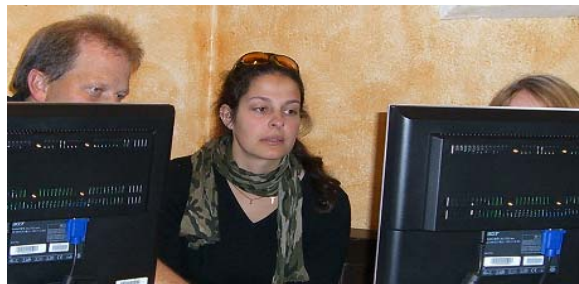
### Measurement on board Level-A

- Profile Planning (Qinsy, WinProfile)
- Multibeam echosounding (Qinsy)
- Sidescan Sonar (Innomar ISE/SES)
- Singlebeam echosounding (Fahrenheit)
- Subbottom profiling (Innomar ISE/SES) and
- Magnetometer (Sealink)



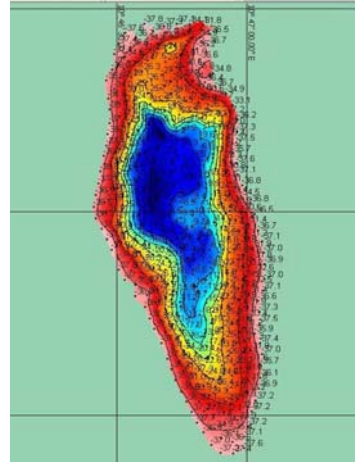
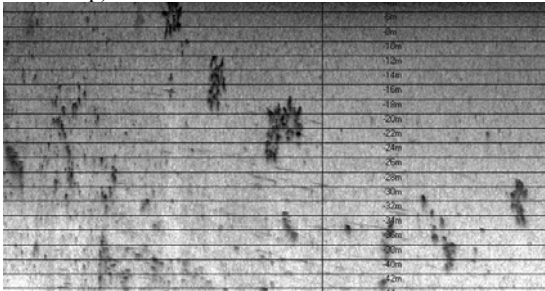
## Processing

- All data are processed by the students



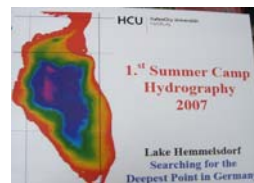
## Results

- Shaded relief of the „South Sea“
- SideScan images of interesting structures
- Problem: no penetration for subbottom profiling because of gas inside the sea bottom („Summer“ Camp)



## Deepest Point in Germany

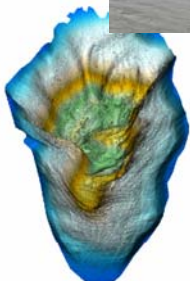


- Natural point, on mainland
  - Some deeper points in North Sea and Baltic Sea
- under water surface
- Determined by multibeam data (-39,60 m, 240 kHz)
- Marked out together with the local press



HCU HafenCity Universität Hamburg

## 1st IHSC 2007

- Found and marked out the deepest point in Germany (mainland)
- Founding interesting structures
- Get in contact with Hydrography

2008/06/16 1st International Hydrography Summer Camp 15  
V. Böder

HCU HafenCity Universität Hamburg

## 2nd IHSC 2008

- **18.08.-30.08.2008 at the Schlei**
- **Near ancient Viking Metropolis Hedeby (Haithabu)**
- **No participation fees**
  - accomodation must be paid
    - bed for 6 Euros in a Danish Rowing Club with kitchen
- **Contact to Producers, Companies and Archaeologists**
- **Searching for**
  - **Wrecks (ships and planes), underwater archaeological sites, morphological structures**

2008/06/16 1st International Hydrography Summer Camp 16  
V. Böder





## Conclusions

Possibility to practise theoretical knowledges

- Lectures in Hydrography
- Measurements onboard the Level-A in groups of 4 students
- Supported by engineers
- Languages: English and German
- Processing with different hydrographic software
- Visualization of the results

11.06.2008

Best Student Presentation

at the Hydrographentag in Karlsruhe, Germany

from

Hansjörg Reiner (Vienna) and Christin Wolmeyer (HCU Hamburg)

(some slides look similar to their presentation: Thanks)



### Information via

**Prof. Dr.-Ing. V. Böder**  
HafenCity University Hamburg  
Department of Geomatics  
volker.boeder@hcu-hamburg.de



Welcome to the

- IHSC at the Schlei (18.08.-30.08.2008)

- in the course M.Sc. Hydrography (application until July, 15th, 2008)?

HCU | HafenCity Universität  
Hamburg

## FIG / IHO / ICA - Standards of Competences

<p><b>INTERNATIONAL FEDERATION OF SURVEYORS</b></p> 	<p><b>INTERNATIONAL HYDROGRAPHIC ORGANIZATION</b></p> 	<p><b>INTERNATIONAL CARTOGRAPHIC ASSOCIATION</b></p> 
---	---	--

STANDARDS OF COMPETENCE  
FOR  
HYDROGRAPHIC SURVEYORS

2008/06/16
1st International Hydrography Summer Camp  
V. Böder
19

HCU | HafenCity Universität  
Hamburg

## FIG / IHO / ICA - Standards of Competences

- **The Mission**
  - **To provide guidance to the international hydrographic community about hydrographic education.**
  - **CAT A and CAT B suitable for international recognition**
- **Category A Programme (CAT A –Academic-)**
  - provides a comprehensive and broad-based knowledge in all aspects of the theory and practice of hydrography and allied disciplines for individuals and who will practise analytical reasoning, decision making and development of solutions to non-routine problems.
- **Category B Programme**
  - provides a practical comprehension of hydrographic surveying for individuals with the skill to carry out the various hydrographic surveying tasks.

2008/06/16
1st International Hydrography Summer Camp  
V. Böder
20