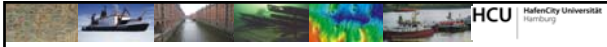


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Economic Benefits of/in terms of Hydrographic Education?

Volker Böder
HafenCity University Hamburg, HCU

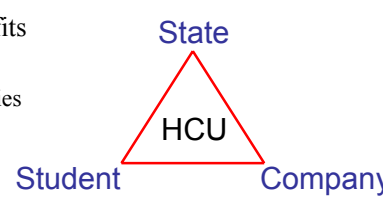
6th FIG Regional Conference
12-15 November 2007, San José, Costa Rica
TS21 –Economic Benefits of Hydrography-



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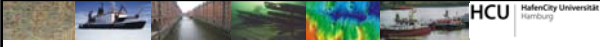
Contents

- Hydrographic Education at HCU
- Economic Benefits
 - For the State
 - For the companies
 - For the students
- Conclusions



3-Win-Situation?
Does it help?

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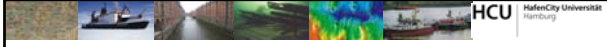


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Hydrographic Education in Hamburg

- Hydrographic Courses since 1985 at the Hamburg University of Applied Sciences
- **1990: Certification Category-A (Academic)**
 - International Advisory Board (IAB) of the FIG/IHO
 - Recertification in 2001
- 2006: First M.Sc. Hydrography graduates
 - First B.Sc. Geomatics courses
- January 2006: Department of Geomatics moved to the HafenCity University (HCU) Hamburg




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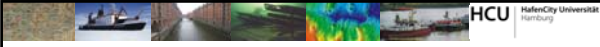
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Equipment and Software (Examples)

- **Echo Sounder**
 - RESON: Multibeam Echosounder SeaBat 8101
 - Innomar SES-2000 FAN
 - Fahrentholz: LituGraph (Single Beam) (15 - 700 kHz), ...
- **Positioning and Attitude Determination**
 - Leica: System 500 (RTK)
 - Javad: JAVAD 4 Gyro (GNSS Positioning and Attitude)
 - IXSEA: OCTANS III (fiberoptic IMU), ...
- **Additional Sensors**
 - Marine Magnetics: Mini Explorer
 - SVP Reson 15, ...
- **Software**
 - CARIS HIPS/SIPS/GIS
 - QPS Qinsy and Qloud
 - SURFER, ...

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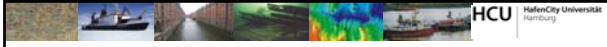


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IMPORTANT

- The following values are calculated without any research, only approximated
 - Hopefully realistic
 - Regarding situation in Germany
- Please feel free to discuss the values in „real-time“

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Economic Benefit for the State?

- Germany
 - Cheap student fees (approx. 900 \$ per semester, included free public transports)
 - Nearly 100% sponsored by the State
 - Approx. Costs: 50.000 \$ / Student / 2 years for the State ?
 - Reason: number of students small
 - Returning income tax approx. 200.000\$ for successful students
 - Further: Protection of the Health System ...
 - Not take into account
 - Taxation of companies
 - Students working in foreign countries

WIN / WIN

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Economic Benefit for the Companies?

- Companies earning money with well educated staff
 - Category A staff prerequisite for projects with higher profit potential
 - Profit per year/and CAT-A absolvent >20.000\$
- Companies don't spend much money in first education
 - Except practica, sometimes donations
 - Companies normally profits from good students in practica
- Students Research Projects
 - In terms of the Master Thesis
 - Testing of new methods, hard- and software
 - Software development

WIN / WIN

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Current Diploma/Bachelor Thesis

- Optimization of Hydrographic Software for the Use at Hamburg Port Authority (HPA) (Thomas Thies with HPA)
 - Use of CARIS and QPS software
 - Investigation of cube algorithm
 - CARIS and Qloud
 - Optimized integration in the working process at HPA

finished

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Diploma Thesis / Maybe!!

- Use of CARIS 3D Software in the BSH (Karsten Nehls with BSH) **Not started until now**
- Softwaredevelopment for Dredging Company (Mark Mohrmann) **Under progress**


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Current Diploma/Bachelor Thesis

- Investigation of Tube Measuring Unit for SBP (Arne Sauer, development of Prof. Andree)
 - Use of parametric subbottom profiler in extremely shallow water
 - heighten the column of water into the boat
 - Applications:
 - Archaeology in shallow water
 - Sediments in shallow water
 - ...

finished





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Current Diploma/Bachelor Thesis

- Investigation of Motion Sensors in Various Environments (Mario Röttger with HydroSupport)
 - IXSEA OCTANS III
 - Showing bad results and resulting in the change of the sensor
 - XSENS MTi (Michael Barth)
 - Low cost motion sensor
 - GPS-Attitude

Under progress

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Current Diploma/Bachelor Thesis

- Use of Different Sensors in Hydrographic Applications, f.e.
 - Radiodetection for Sea Cables **Under progress** (Peter Mott with Nicola Engineering)
 - Telephone cable between Heligoland and main land
 - Measuring of Quay Walls with Seabat 8101 and QPS-Software (Qinsy and Qloud) (Ronny Schinke)

finished

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Current Diploma/Bachelor Thesis

- High Precision GPS for Height Control of Tide Gauges **Under progress**
 - (Frank Borsutzki with **WSA Hamburg**)
 - Some mm accuracy with 2 sessions / 6 hours
 - Distance between stations: 5-10 km
 - Nivellement has to be replaced in the near future
- Results of the 1st International Hydrography Summer Camp (IHSC) **finished**
 - (Lars Engelhardt)

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Economic Benefit for the Student?

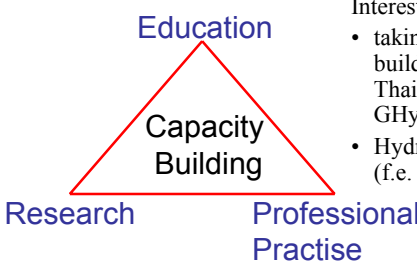
- Paying money instead of earning money in studies
 - Spending 1,500 \$ / month for 2 years without earning money (2,000 \$/month) : 84,000 Euros
 - Earning 1,000 \$ /month more => 12,000 \$/year
 - Profit after 7 years
- Getting a dream job with hopefully enough money

WIN / WIN

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Capacity Building?



Interests of HCU

- taking part in capacity building projects (f.e. Thailand with GHyCOP?)
- Hydrography courses (f.e. UPM in Spain)

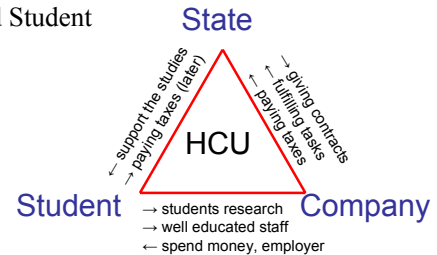
After: Dr. Diane Dumashi (UK): Land, Sea, People ..., FIG Costa Rica 2007

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Summary

M.Sc. Hydrography (Category A) seems to be a WIN/WIN/WIN situation for Society, Company and Student



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WIN / WIN / WIN : **NO PROBLEM?**

- Many courses under pressure
 - Few students
 - Not cheap
 - Nearly unknown outside the hydrographic/surveying community (politics)

**Economic benefits of Hydrography:
don't forget education
as one basis**

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Some of the Beginners 2007

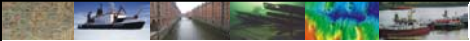
-Capacity Building?-

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



Muchas Gracias

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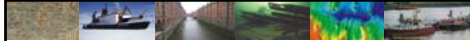


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CV Volker Böder

- 1994: graduated in Geodesy from the University Hannover
- 1994-2003: Research Associate at Institut für Erdmessung, University of Hannover (Prof. G. Seeber)
- 2002: doctoral thesis
 - Precise Positioning and Attitude Determination in Marine Applications
- 2005: Assessor Degree
 - Government of the Federal State of Lower Saxonia
- Sept. 2005: Professor for Practical Geodesy and Hydrography at the HafenCity University, Hamburg



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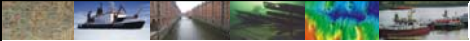
Equipment

- 2 survey craft
 - LEVEL-A
 - length 7.5 m
 - Width 2.5 m
 - Draught 0.35 m
 - best conditions for practical exercises
 - Optimized to operate in shallow water
 - LEVEL-L
 - length 3.5 m
 - Width 1.5 m
 - Draught 0.2 m

Located on the Ship and Buoy Yard in Wedel, belonging to the Water and Shipping Authority (WSA) Hamburg.

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Software

- CARIS HIPS / SIPS / GIS
- QPS: Qinsy / Qloud
- PDS 2000
- ISE for SES-2000
- WinProfile
- SURFER
- Geo++ ® GNNET-RTK / GNATTI / GEONAP

Main problem: Integration of the complementary sensors with the sonar systems with reference to timing and their relative locations to get reliable Digital Terrain Models (DTM)

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