



## Capacity Building

# Helping Chart your World

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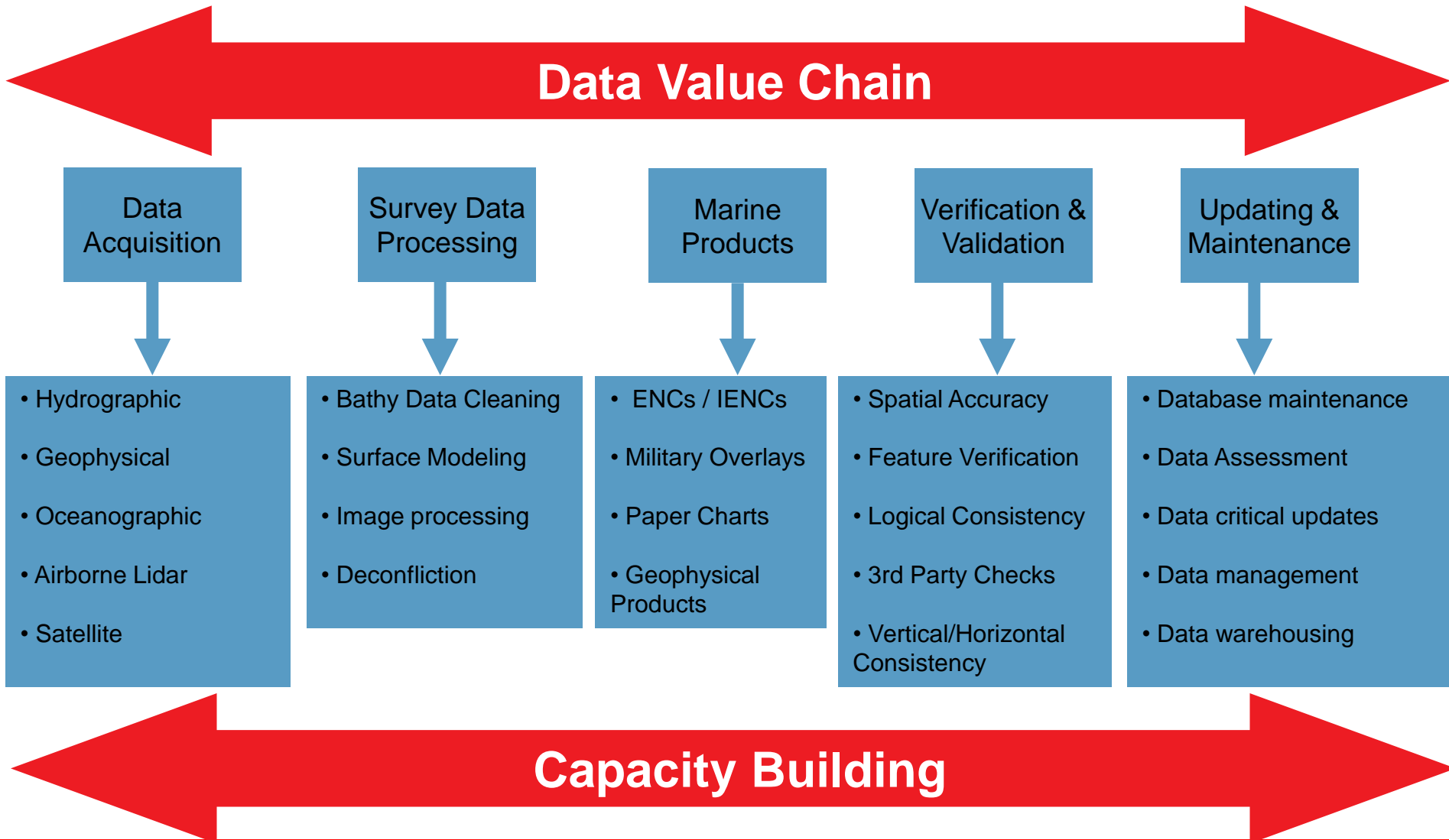
BSc, MSc, MBA, IHO Cat A, CLS, P.Eng

12<sup>th</sup> NIOHC Conference

March 20-23, 2012

- Hydrographic Data Value Chain
- Capacity Building – Concepts
- Starting Off
- Catching Up
- Keeping Pace

# Hydrographic Data Value Chain



## Capacity Building - Concept

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With respect to the IHO, Capacity Building is defined as the process by which the Organization assesses and assists **in sustainable development and improvement** of the States, to meet the objectives of the IHO and the Hydrography, Cartography and Maritime Safety obligations and recommendations described in UNCLOS, SOLAS V and other international instruments.

**“Starting off” ..... Phase 1**

**“Catching Up” ..... Phase 2**

**“Keeping Pace” ..... Phase 3**

## Starting Off

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### Phase One

Collection and circulation of nautical information, necessary to maintain existing charts and publications up to date

- Form National Maritime Safety Committee or Hydrographic Committee
- Create/improve current infrastructure to collect and circulate information
- Strengthen links with charting authority to enable updating of charts and pub
- Minimal training needed

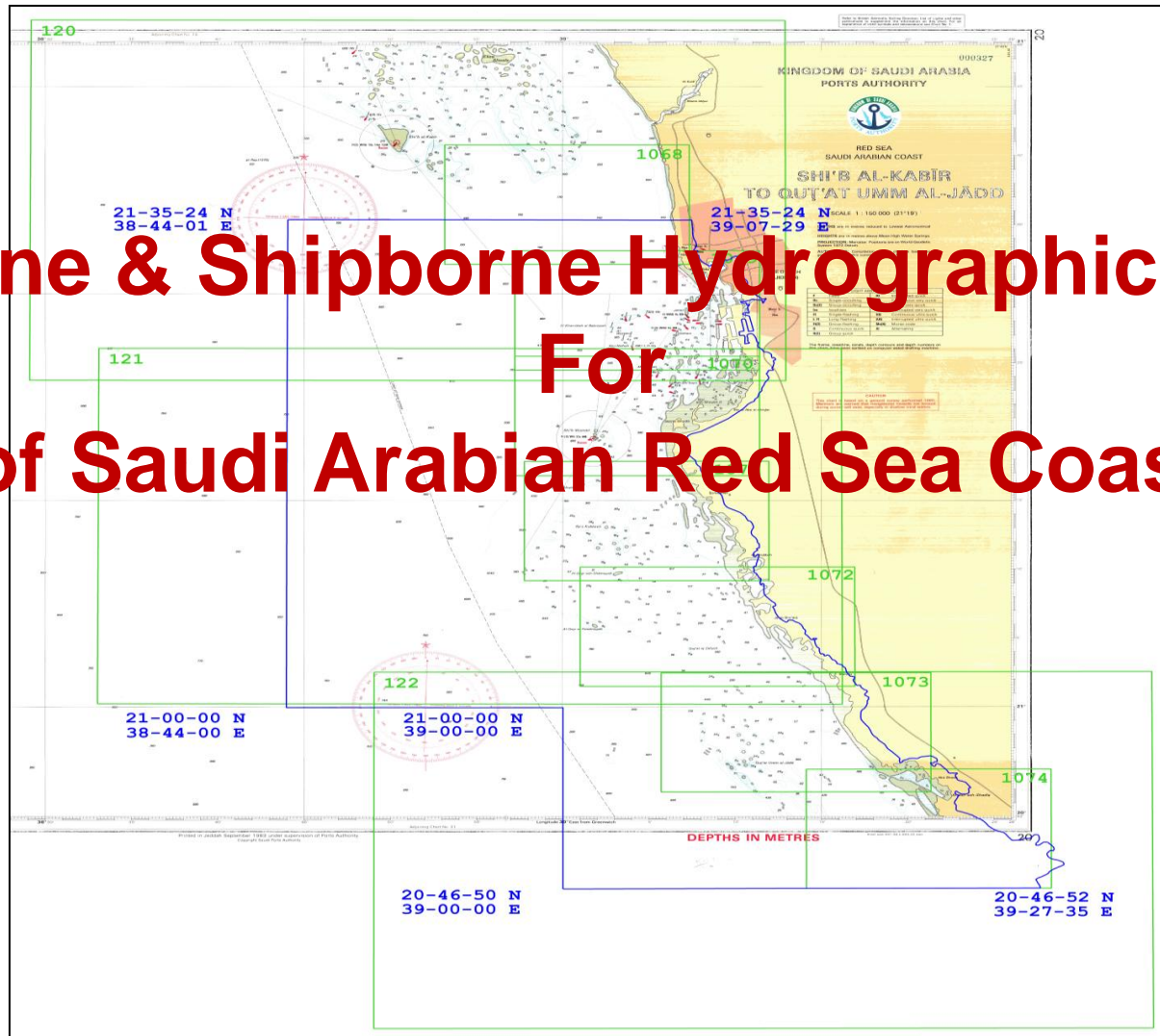
“and to develop a national **plan** to put in place appropriate elements of phases 2 and 3 or alternative co-operative regional or bilateral arrangements.”

## Phase Two

Creation of a surveying capability to conduct Coastal and Offshore projects

- Establish capacity to enable surveys of ports and their approaches
- Maintain adequate aids to navigation
- Build capacity to enable surveys in support of coastal and offshore areas
- Build capacity to set up hydrographic databases
- Requires funding for training & equipment or contract survey

**Airborne & Shipborne Hydrographic Survey  
For  
Part of Saudi Arabian Red Sea Coast Area**



**MV Mariner (54m length)**

- MBES / SBES
- Survey on ellipsoid
- Survey on chart datum
- Bottom sampling
- MBES Imagery
- DF SBES sub-bottom
- QC QC data processing
- Observe conspicuous objects
- Measure water currents
- Measure Sound Velocity
- L&R 9m survey launch
- Report of Survey



**Bathy Lidar Survey**

- Airplane
- Hawkeye lidar
- Initial post processing
- Initial QA/QC processing
- Sub-Report of Survey



**Survey Launch (9m length)**

- MBES hydrographic
- Survey on ellipsoid
- Survey on chart datum
- Shoal & wreck exam
- Bathy Lidar gaps
- MBES Imagery



**Processing Centre**

- MBES / SBES / Lidar
- Cleaning
- Field sheet generation
- Data management
- Sub-Report of Survey



**Support Vessel**

- Secchi disc
- People transfer
- Grab sampling
- Data transfer
- Medical transfer
- Establish 2m x 2m cube
- MBES hydrographic
- Survey on ellipsoid
- Survey on chart datum
- Shoal & wreck exam
- Bathy Lidar gaps
- MBES Imagery



**Project Support**

- Ship supplies, water , fuel
- Licensing, visas, clearances
- Land transport, hotel
- Aircraft logistical support
- GCS client liason



**Establish Tide Gauges**

- survey, install benchmarks
- Survey geodetic coordinates



**Establish Base stations**

- Survey geodetic coordinates
- Establish GPS RTK stations





**MV Mariner (54m length)**

- RESON 8160 MBES
- CNAV Positioning
- QINSy Navigation
- CODA Octopus F180
- ODOM MKIII SBES
- SVP & CTD
- Grab Sampler
- 1500m Winch
- Marine Camera
- CARIS HIPS/SIPS
- RDI ADCP
- Secchi Disc



**Bathy Lidar Survey**

- AHAB Hawkeye lidar
- Applanix POS AV
- CARIS HIPS
- Trimble DGPS

**Survey Launch (9m length)**

- Kongsberg EM3002
- CNAV Positioning
- QINSy Navigation
- CODA Octopus F180
- ODOM MKIII SBES
- VALEPORT CTD
- AML SVP
- CARIS HIPS/SIPS



**Processing Centre**

- CARIS HIPS/SIPS
- IVS Fledermaus
- CARIS S57 Composer



**Support Vessel**

- Grab sampling
- R2Sonic MBES
- CNAV Positioning
- QINSy Navigation
- CODA Octopus F180
- ODOM MKIII SBES
- AML SVP
- CARIS HIPS/SIPS



**Project Support**

- Ship supplies, water , fuel
- Licensing, visas, clearances
- Land transport, hotel
- Aircraft logistical support
- GCS client liaison



**Establish Tide Gauges**

- Valeport Seabed Tide gauge
- Valeport Dock Tide gauge



**Establish Base stations**

- Trimble GPS Receivers
- Geodetic Leveling



# GCS, Saudi Arabia



At Sea



# GCS, Saudi Arabia



On Land  
&  
In the Air

# GCS, Saudi Arabia



In the Classroom

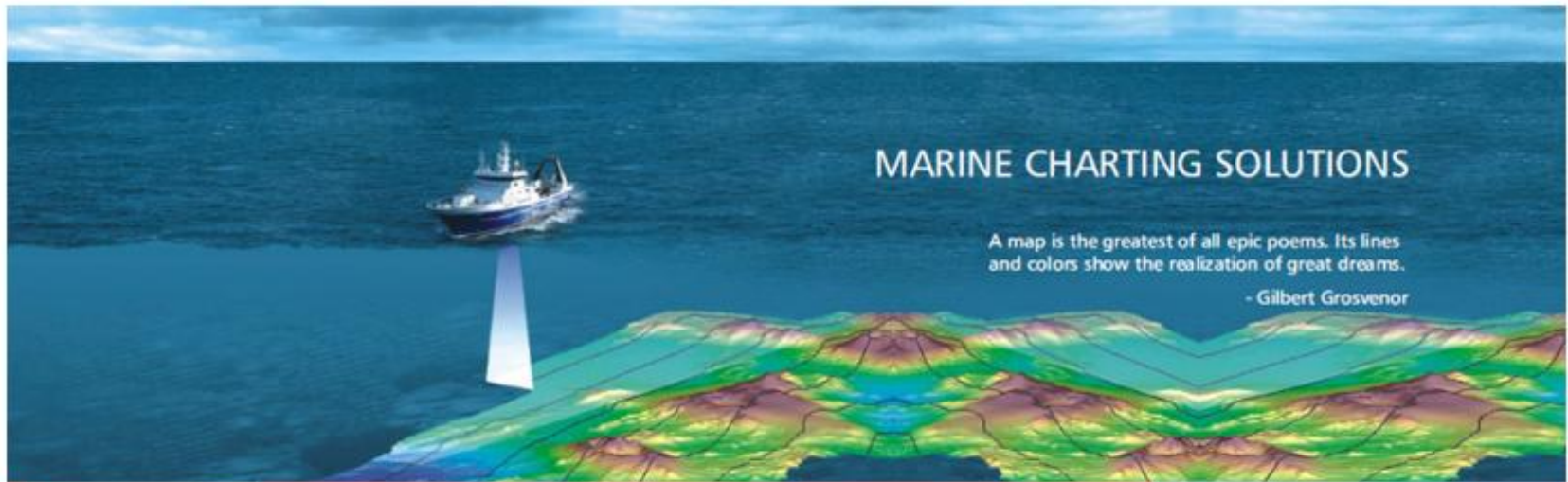
# Oman, on site data production training



# Multibeam Training, Visag, India



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## PROGRAMS

GEOSPATIAL

MARINE

GEO SURVEYS

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IIC Academy seeks to be an "international centre of excellence" in geospatial sciences and is the training arm of IIC Technologies, which brings over two decades of global expertise in geospatial projects and services. The Academy's industry-focused programs are flexible, customizable and range from short term fundamental to long term advanced levels.

Using best practices, the academy empowers its learners to be industry-ready and succeed at the workplace. The academy also supports interdisciplinary applied research that has a



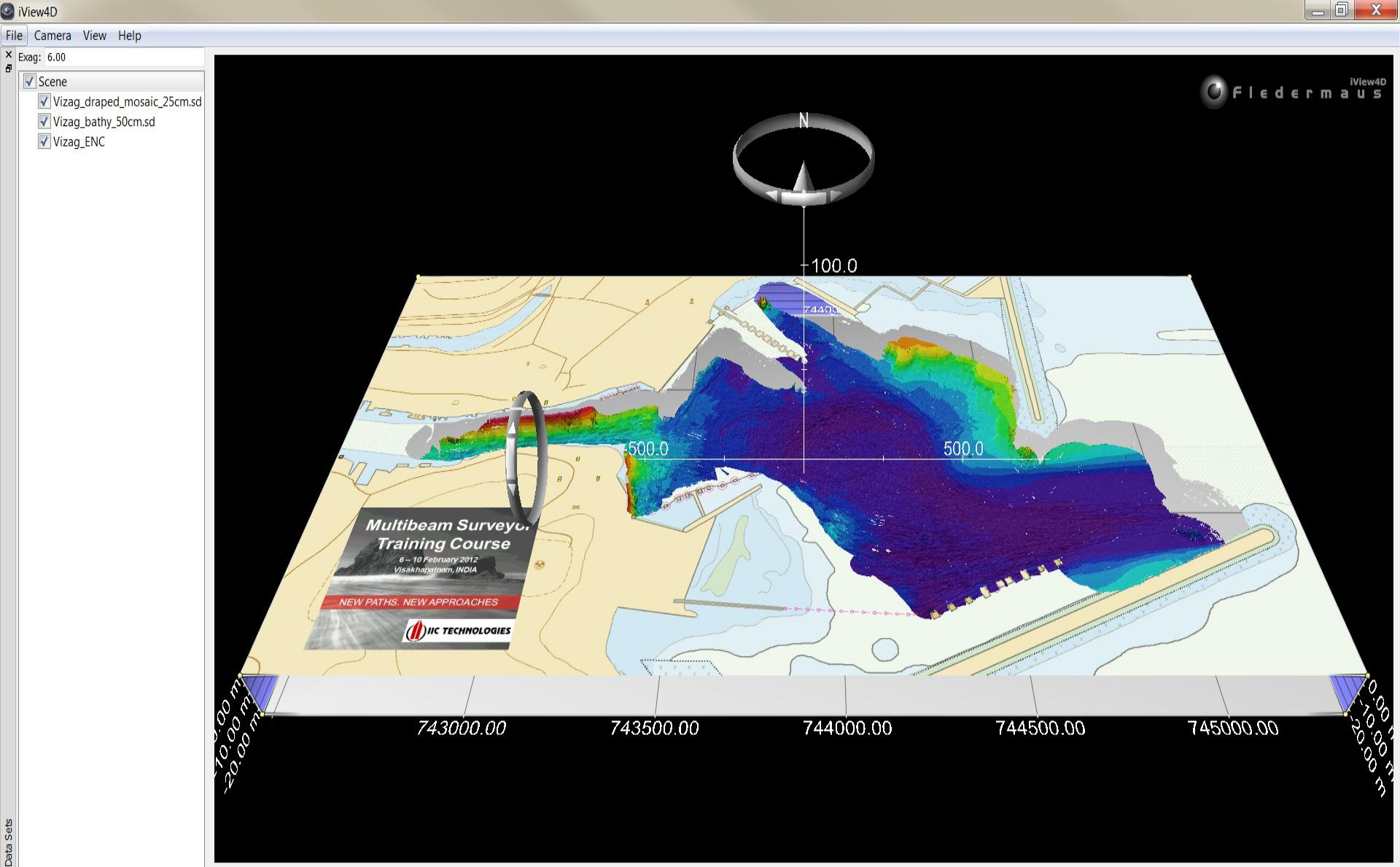
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NEW PATHS, NEW APPROACHES

# Multibeam Training, Visag, India



# Multibeam Training, Visag, India



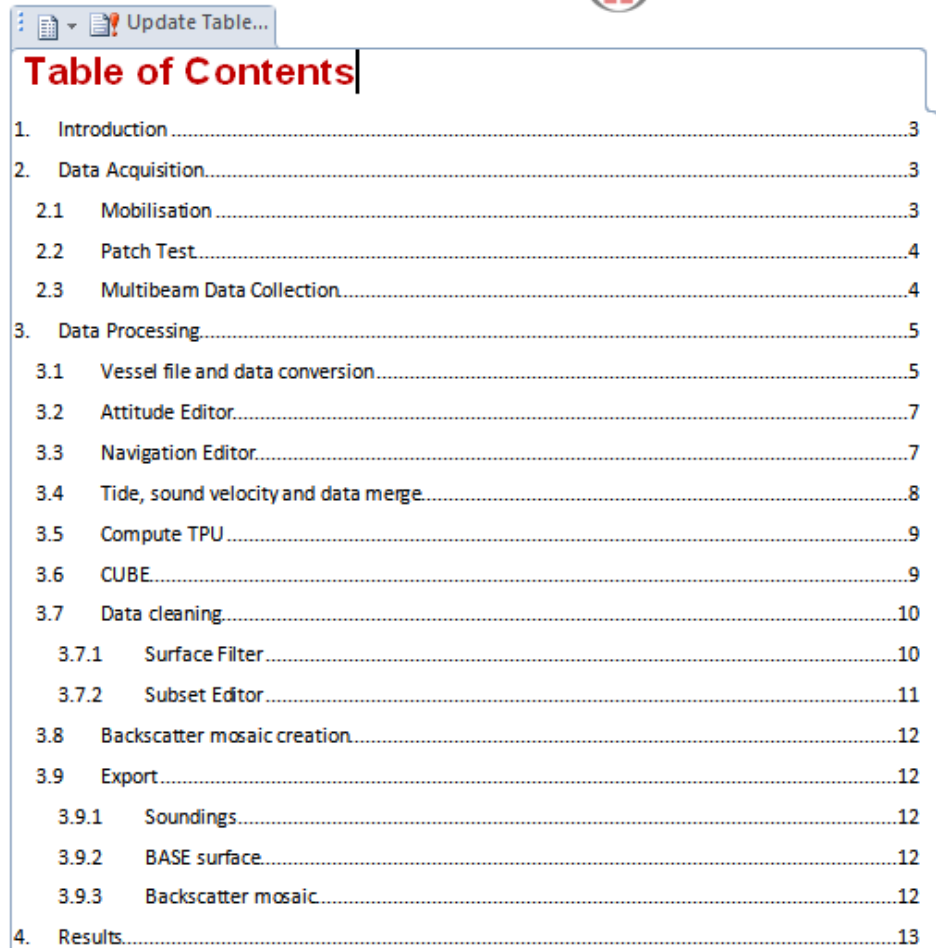




## Visakhapatnam Port Bathymetry

Multibeam Course for Hydrographic Surveyors  
6-10 February, 2012

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# S8 (Nautical Cartography) Category B



## Marine Geospatial Information Course

**Submission to FIG/IHO/ICA International Board for  
Standards of Competence for Course Seeking S8  
(Nautical Cartography) Category B Recognition**



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Athens, 19 December 2011

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35th Meeting of the FIG/IHO/ICA International Board on Standards of Competence  
for Hydrographic Surveyors and Nautical Cartographers (IBSC) - Programme Submission

## **Phase Three**

Produce paper charts, ENC and publications independently

- Requires high investment for production, distribution and updating
- Alternatively, bi-lateral agreements for charting can provide easier solutions in production and distribution (of ENC through RENCs) and rewards.

***“....we have enough capacity to do our job.....”***

**NOAA....** *“until we have a Katrina hurricane, a Horizon oil spill, a super tanker named EXON Valdez hit a reef, the QEII hits a rock.... ”*

**Chile** *“but we were hit with a tsunami and all our hydrographers are focused on one area...”*

**Canada** *“but the ice cap is melting and there is not sufficient chart coverage in the north.... and we are about to have the budget of a thousand cuts”*

**Others...** *“but everyone is retiring”.... “but no one wants to go to sea”*

# Keeping Pace

- Norwegian Mapping Agency paper chart and ENC production
- Canadian Defense Department production of DNCs
- Australian Hydrographic Service 80+ charts from source
- Indian Navy paper chart and ENC production
- Brazilian Hydrographic Office 150 charts
- NOAA, USA ENC & chart production
- Canadian Hydrographic Service multibeam & lidar processing
- US Army Corps of Engineers river ENCs
- Land Information New Zealand CARIS HPD data maintenance
- GCS, Kingdom of Saudi Arabia hydrographic training
- UKHO ENC production, HPD maintenance



# IIC Research & Development Laboratory



## Citrix Business Partners



ORACLE



## Citrix Users

*“97% of Fortune Global 100 Now Use Citrix Software”*

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All 20 of the largest U.S. federal agencies

All 10 of the top U.S. banks

All 10 of the top U.S. automotive manufacturers

All 10 of the top U.S. healthcare organizations

All 10 of the top U.S. Oil and Gas companies

### Europe

All 10 of the top banks

All 10 of the top chemical companies

All 10 of the top telecommunications service companies

9 of the top 10 high-tech companies

# Survey Description



Vancouver  
Survey Site

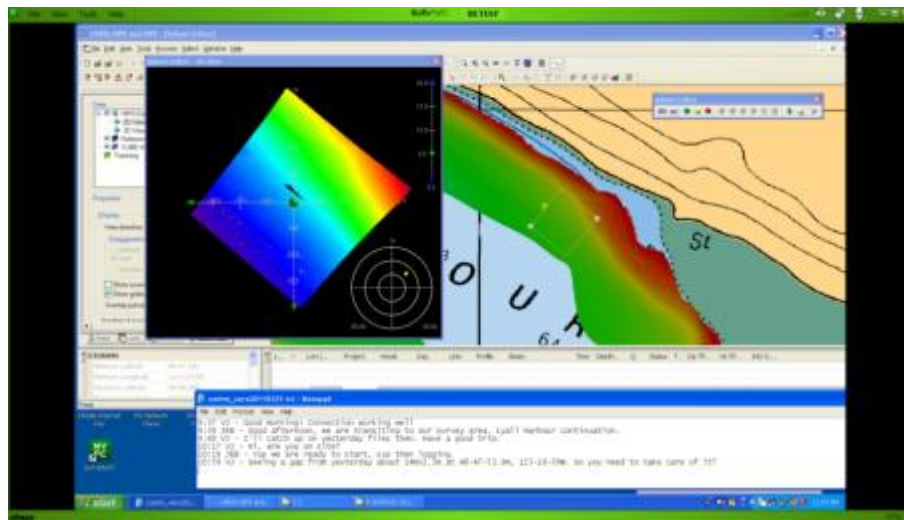
Toronto





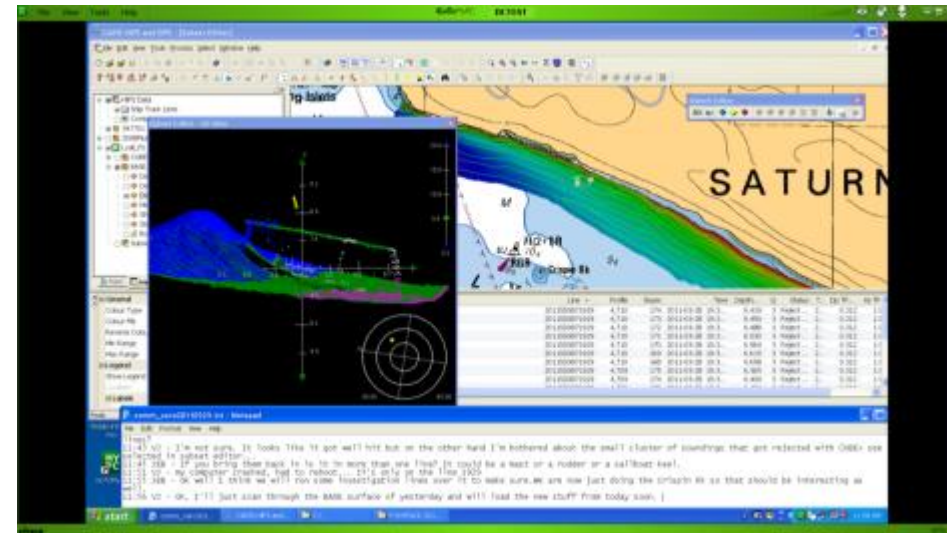
## Real-time communications....

Real-time QA/QC of the data was being performed so the survey could be adapted to correct defects (data gaps, uncertainties outside of specifications, more data needed over certain features to resolve multiple hypotheses, etc.) before the survey crew left the project area



### Identifying an acquisition data gap

*"I'm seeing a gap from yesterday about 14m x 2.3m at 48-47-53.9N, 123-10-58W"*



### problem soundings above a wreck

*"it looks like it got well hit but the on the other hand I'm bothered about the small cluster of soundings that got rejected with CUBE> see selected in the subset editor"*

# Costs....



The remote processing side used the existing Internet and existing hardware. No special purpose set-up costs were necessary.

PC box: .....~\$1000

Standard IT software: .....~ \$100

- (OS, antivirus, text editor, ftp client site licensing and/or open source)

Wireless mobile Internet stick: .....~ \$150

- month to month plan (or free on a 3-year contract);

Specialized software: pricing dependent on individual vendor agreements;

- CARIS HIPS, BASE Editor, Fledermaus, etc.

Two to three days if IT support to set it all up and test it.

## Ongoing costs

Citrix **GoToMyPC** remote access flexible plan..... \$35/month first 500MB

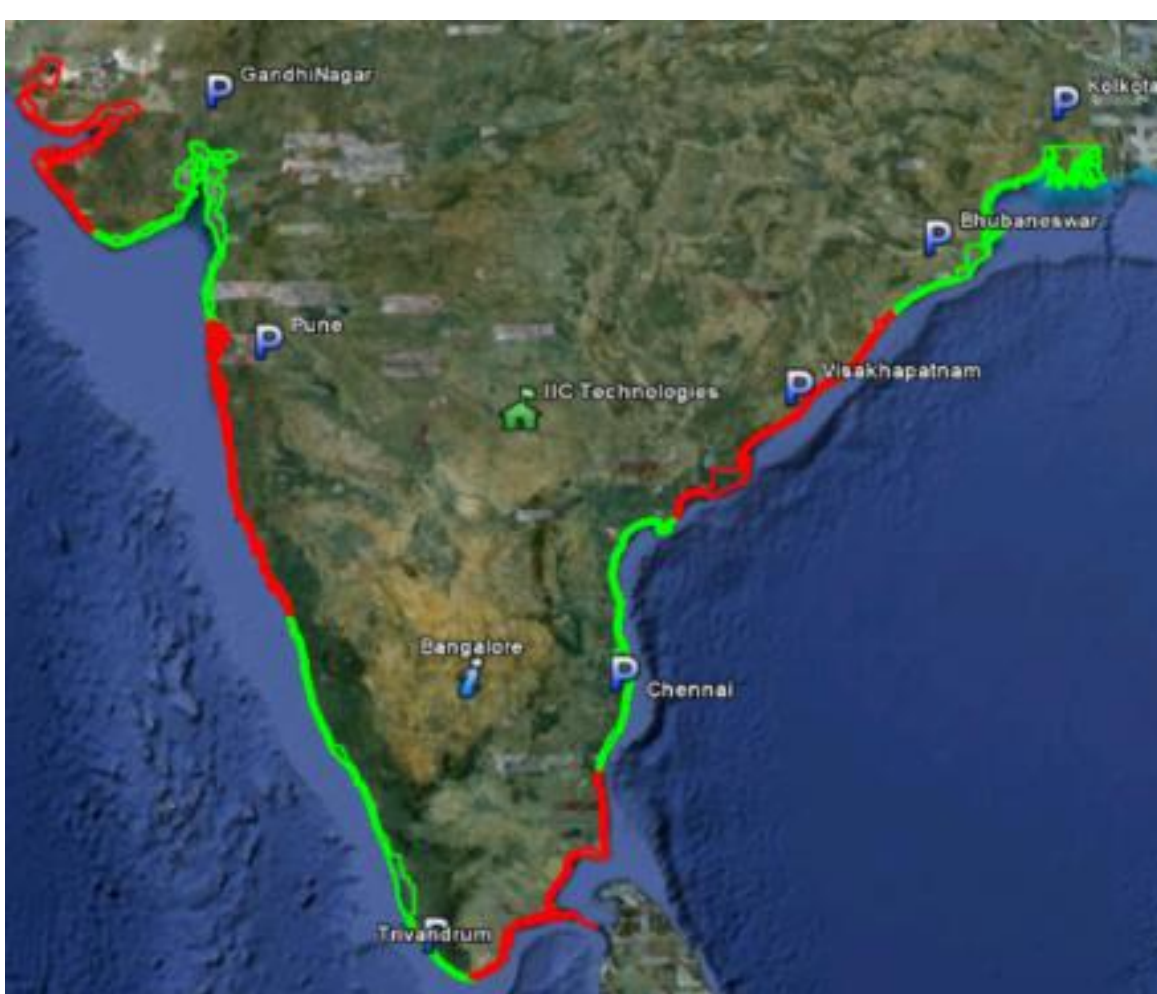
for each additional 500MB..... \$5/month

(daily usage is about 100MB/day)

Ongoing IT support and system maintenance

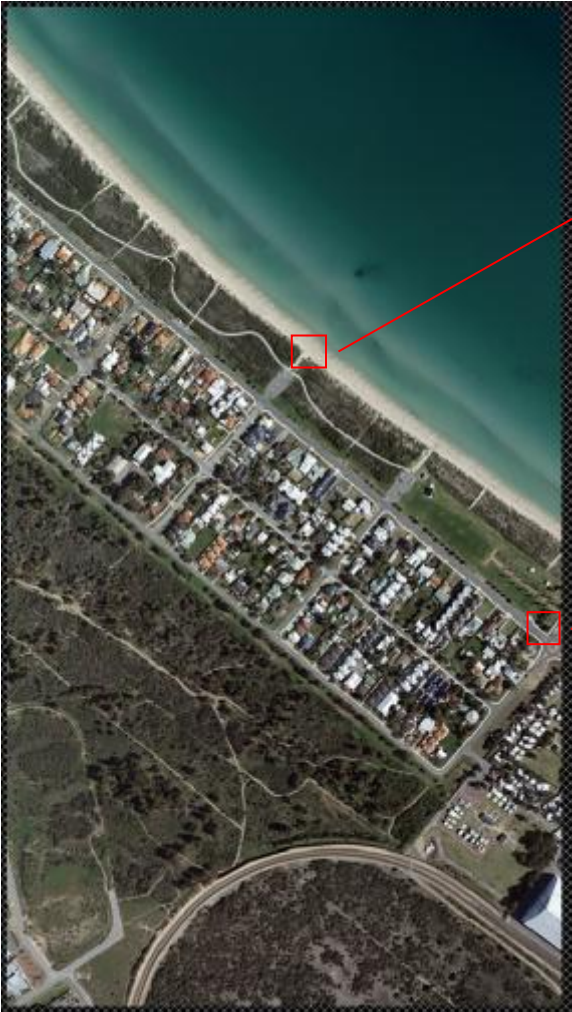
IIC Technologies has been awarded “**Stereo Digital Aerial Photography of coastal belt of Indian mainland**” by Society of Integrated Coastal Management (SICOM) (A nodal agency under Ministry of Environment & Forests, Government of India for implementation of “Integrated Coastal Zone Management Project (ICZM)”)

This component will also support **Capacity Building and Project Management which will include the staffing and management of the National Project Management Unit (NPMU)**, ensure adequate financial and resource management systems, implementation of the communication plan and Right to Information related activities, and monitoring and evaluation studies.



The scope of work :

- 3 aircraft
- Photo acquisition – 9 cm GSD
- Post processing of raw image
- Preliminary aerial triangulation
- DEM and ortho photo generation



***Sometimes the capacity builders do not  
have enough capacity***

**Government – Industry - Academia**

**Thanks You**