Koninklijke Marine

Needle in a haystack

Hydrographic Service Royal Netherlands Navy

Jan Schaap

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Introduction and background NLHO

Data route

Data validation

Future developments

Finding the needle in the haystack

Content

DIENST DER
HYDROGRAFIE
EX USU NAUTAE

Introduction and background

IMO-convention **S**afety **O**f **L**ives **A**t **S**ea:

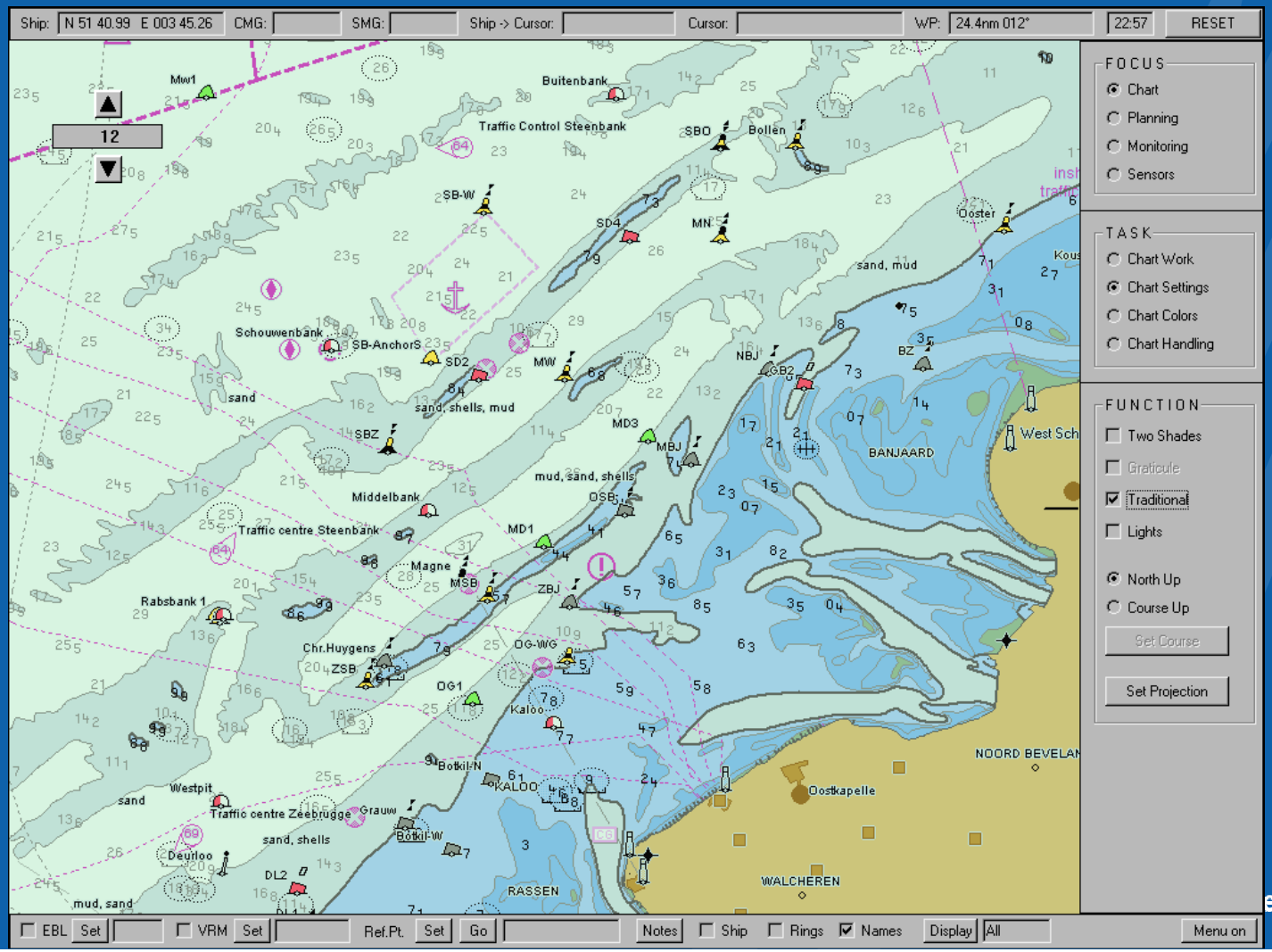
- Obligation for coastal states:

"Contracting Governments undertake to arrange for the collection and compilation of hydrographic data and the publication, dissemination and keeping up to date of all nautical information for safe navigation."

- NLHO fulfills obligation for NL
  - Electronic and paper navigational charts, Nautical Publications
  - North Sea, the Dutch Antilles, Aruba, Surinam
  - High seas, rivers and ports.

Introduction and background

ENC Dutch Coast



Introduction and background

Needed: Up-to-date and validated data:

- Nautical (bouys, wrecks etc.)
- Bathymetric/oceanographic

Correct: legal liability

Vital importance Netherlands:

- accessibility (main) ports
- safe passage through our coastal area

Information easily accessible to end-user

Introduction and background

Berge Stahl
Length 360 meter
Width 65 meter
Draught 25 meter
Weight 365.000 ton

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Data route

Main sources:

- Own ships
-
- Ministry of Transport & Public Works (“Rijkswaterstaat”)

Data route

NL Survey ships

HNLMS Snellius

HNLMS Luymes

Data route

From SBES to MBES around 2003

- Multiplication in volume
- Exchange and storage devices media

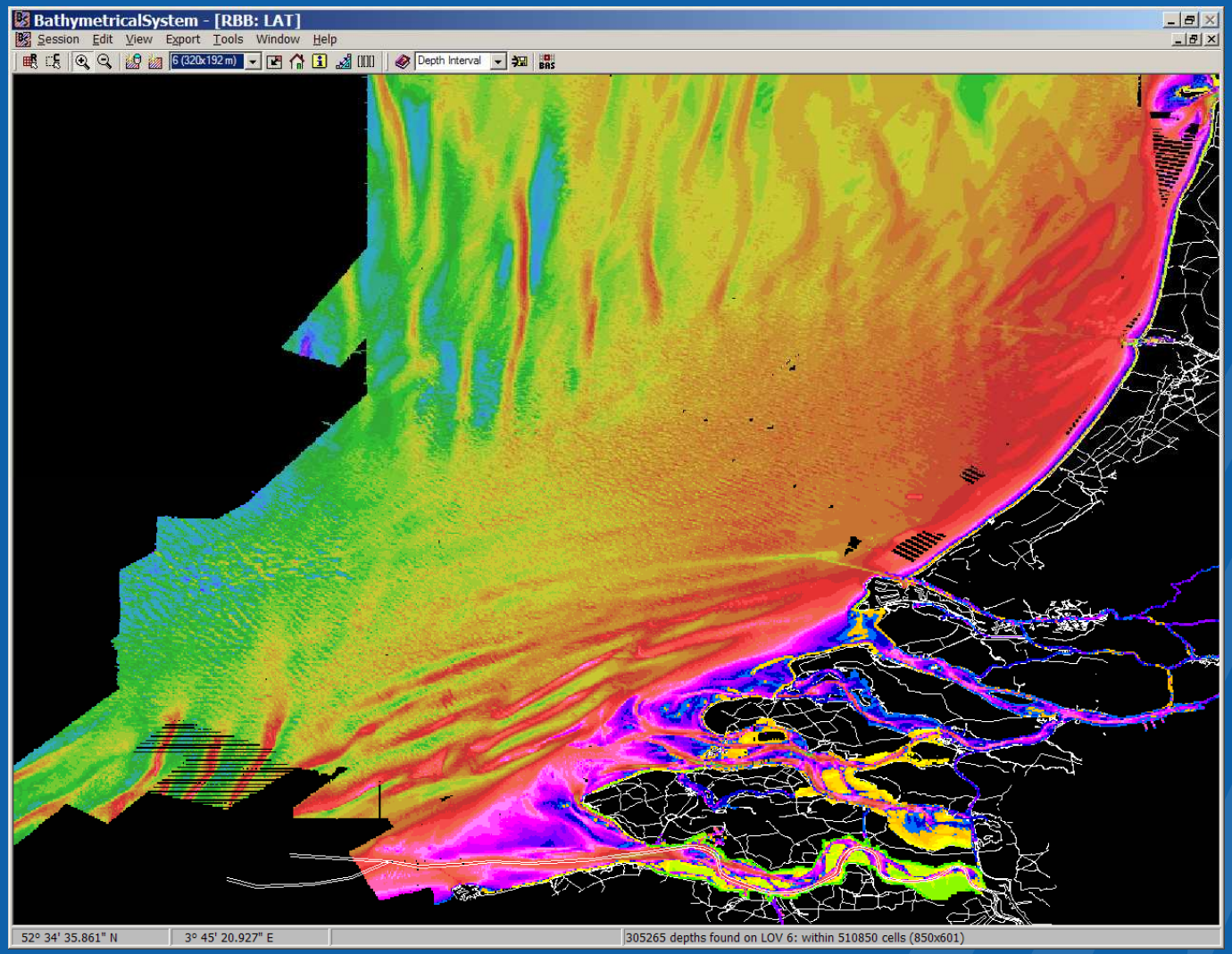
On board

- Processing – tidal corrections – overlap – cleaning etc.
- automatic pruning processes > loss of important data
- all data to office

Office

- Inspection and validation
- Binned 3*5 m, reduction
- Storage mean/minimum depth per bin plus metadata
- Processed to cartographic representations

Data route



Bathymetric
Archive
System

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Data validation

Compliance IHO S44

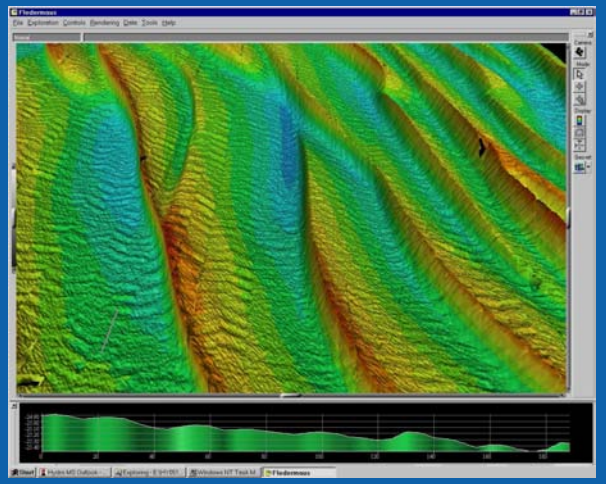
First: Comparison previous surveys in BAS
- Immediate charting action required?

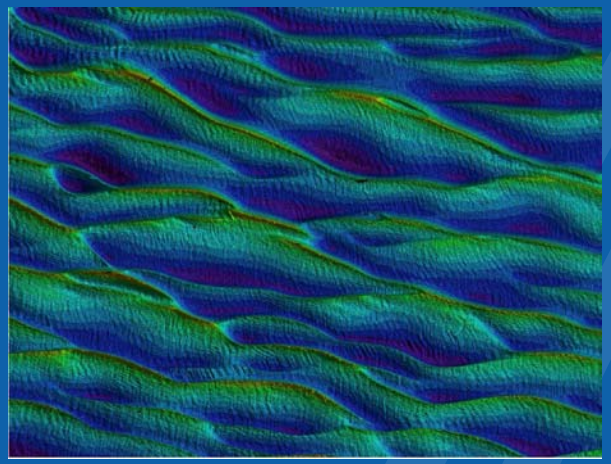
Second: Identify and inspect artifacts in the data
- Visual
- Operator skills necessary
- Subjective interpretation
- lack of algorithms

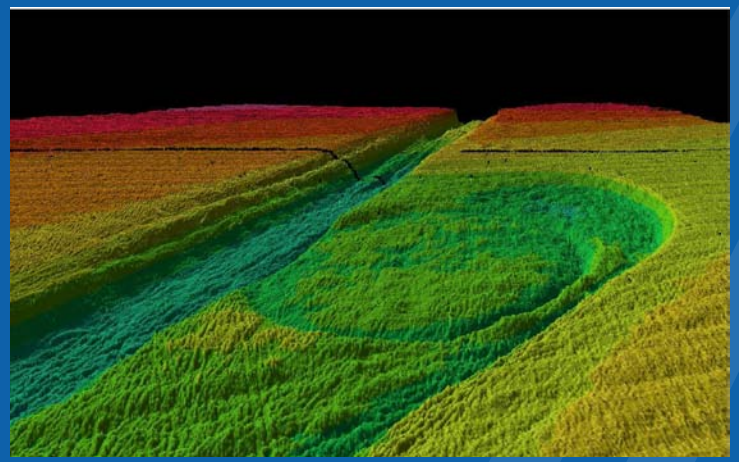
Visualize survey as single picture

Data validation

Fledermaus







Data validation

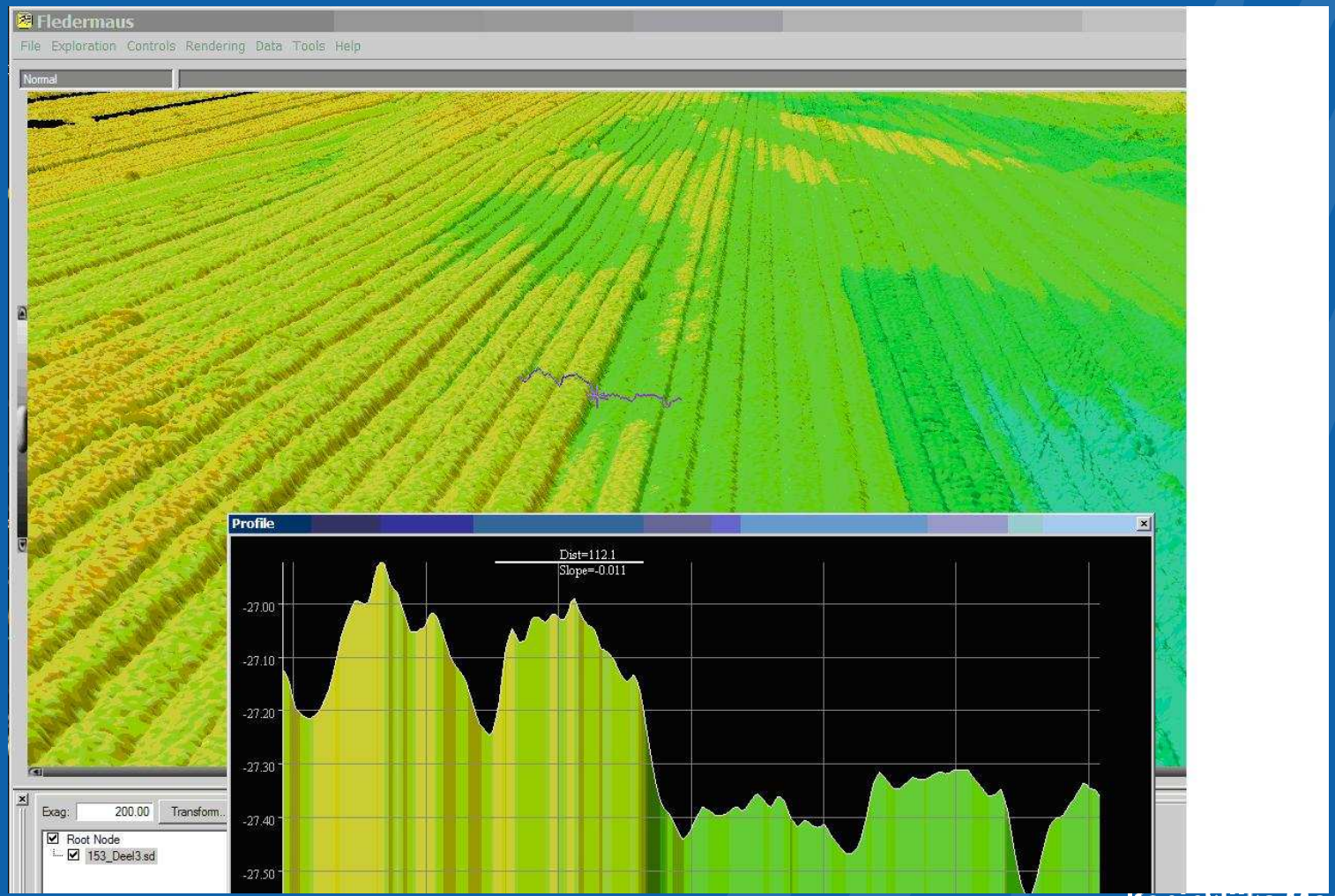
Subjective interpretation

Identifying errors

- Tidal corrections
- Incorrect sound velocity profile
- Poor weather conditions

Data validation

Example Smile effect



Data validation

Recognition depends largely on quality of visualization

Need for qc software, auto error and feature identification, quantification

No black box, interaction man-machine needed

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Developments

More data to be expected!!

- multiple AUV per survey vessel
- Interferometric sonar systems
- Water column imaging
- Seabed dynamics at NLHO

Developments

- Water column imaging

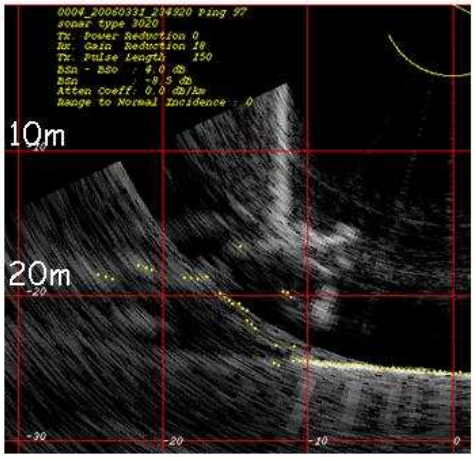
Estimating the minimum clearance over the masthead

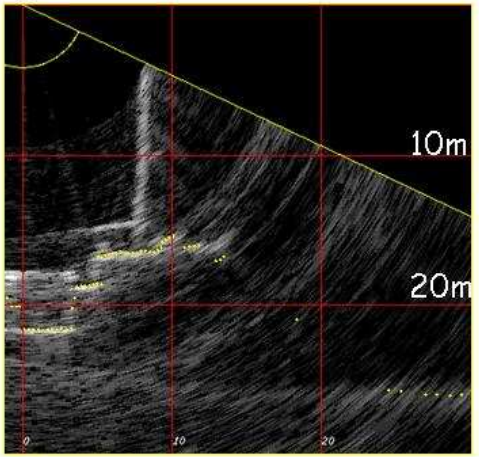
MV G.B. Church

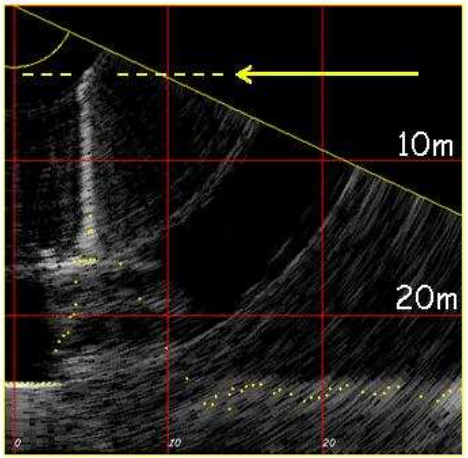
EM3002

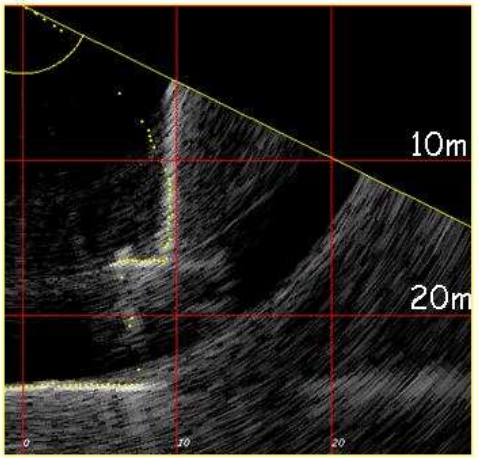
CCGS Otter Bay
March 2006

(yellow dots indicate real-time bottom tracking)



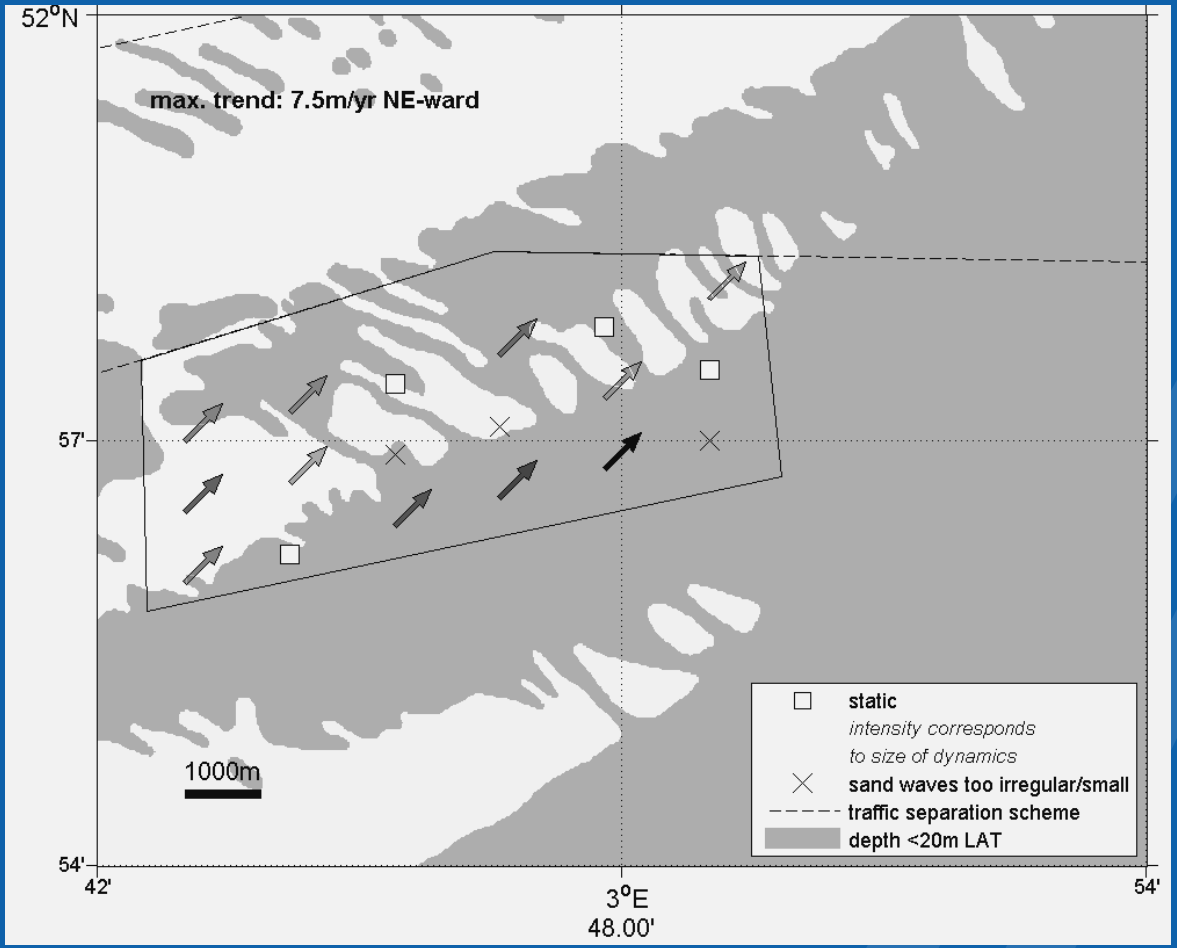






Developments

- Seabed dynamics at NLHO



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Finding the needle in the haystack

Finding the needle in the haystack

Selecting that single sounding from millions

Finding the needle in the haystack

- Automated process can help

- Knowlegde of relevant morphological and topographical features

Finding the needle in the haystack

- Automated process can help

- Knowlegde of relevant morphological and topographical features

- Essential to distinguish between artifacts

Finding the needle in the haystack

- Automated process can help

- Knowlegde of relevant morphological and topographical features

- Essential to distinguish between artifacts and real world features

Conclusion

At the moment

"good enough for Government work"

Larger quantities of data at the horizon

Need to be evaluated and stored

Anticipate

However, human factor needed