SAIHC 13, CAPE TOWN

C-MAP®

FROM BATHYMETRIC DATA MANAGEMENT TO CHART PRODUCTS

AUG 2016

CHALLENGE

▶ Supplying Hydrographic tools
  ▪ Customer requirements

▶ Centralized Bathymetric Database
  ▪ Store
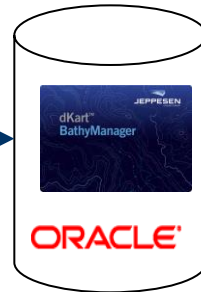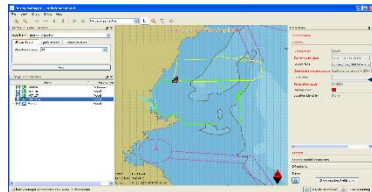 ▪ Manage
  ▪ Derived products

CONCEPT…

Effective management of Hydrographic data, survey data and other data sources, is important to ensure quality and effectiveness for product compilation and quality.

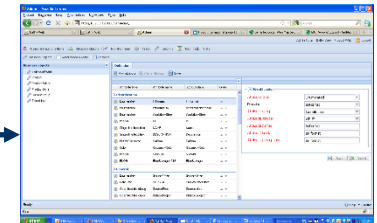dKart BathyManager System allow management, storage, processing and quality control of :

- Individual models
- Continuous models (VCM)
- Other models (e.g. Sounding selected, Contours and Areas, etc.)
- Fairsheets
- Metadata control
- Integration with Chart compilation
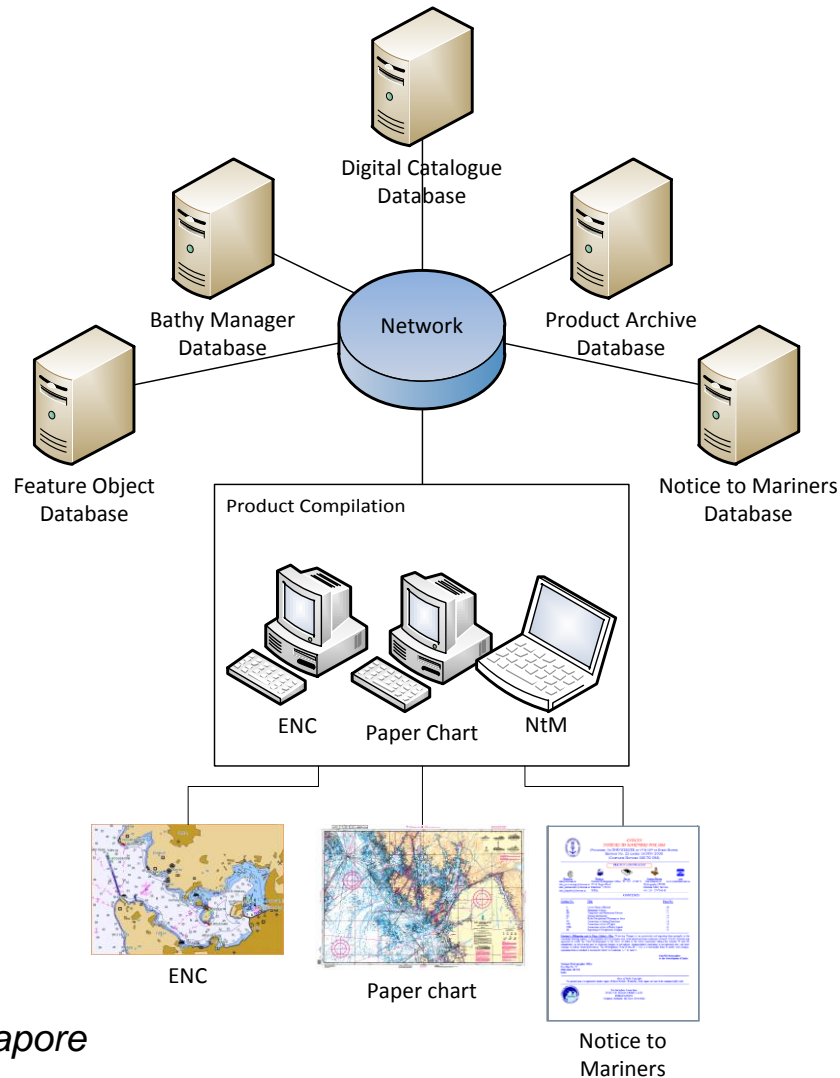
DKART BATHYMANAGER SOLUTION

Bathy Manager

Admin Portal

INTEGRATED HYDROGRAPHIC MANAGEMENT SYSTEM

As installed and in use at
Maritime & Port Authority Singapore

BATHYMETRIC CONCEPTS

▶ Individual model:

- Configurable metadata schema (for IM)
- Configurable nodal schema (for soundings in IM)

▶ Virtual continuous model

▶ Bathymetric workflow

▶ Other models

▶ Task scheduling

INDIVIDUAL AND CONTINUOUS MODELS

► An Individual Model (IM) contains the data of an individual hydrographic survey. Depending on what stage of the processing cycle an IM is at, it may contain metadata, a hull and measured depths or heights which may or may not have been interpolated or resampled.

► A Continuous Model (CM) is a continuous bathymetric surface which theoretically may cover the entire earth. The surface is represented by X, Y, Z points. X and Y are projectionless (WGS84) lat/lon co-ordinates. Z represents depths (if negative relatively to the vertical datum of the CM) or heights (if positive relatively to the vertical datum of the CM). Z-values are recalculated to the vertical datum of the CM

INDIVIDUAL MODELS

Individual models

An Individual Model contains the data of an individual survey. Depending on its processing state, it may contain metadata, a hull and measured depths or heights which may or may not have been processed.

► Types:
► Multi/Single-beam.
  ▪ They contain soundings of a multi (high density)/single beam surveys.
► Laser altimetry.
  ▪ It contains soundings of a survey performed using the radar or laser altimetry technique.
► Trackline.
  ▪ It contains one or more Track lines assigned to an Individual Model
► Model.
  ▪ A model contains modeled bathymetric data in raster or vector format

INDIVIDUAL MODELS

Register Survey
- Create empty IM holder
- Define Metadata schema and IM type

Import Survey
- Import Survey file

Generate hull
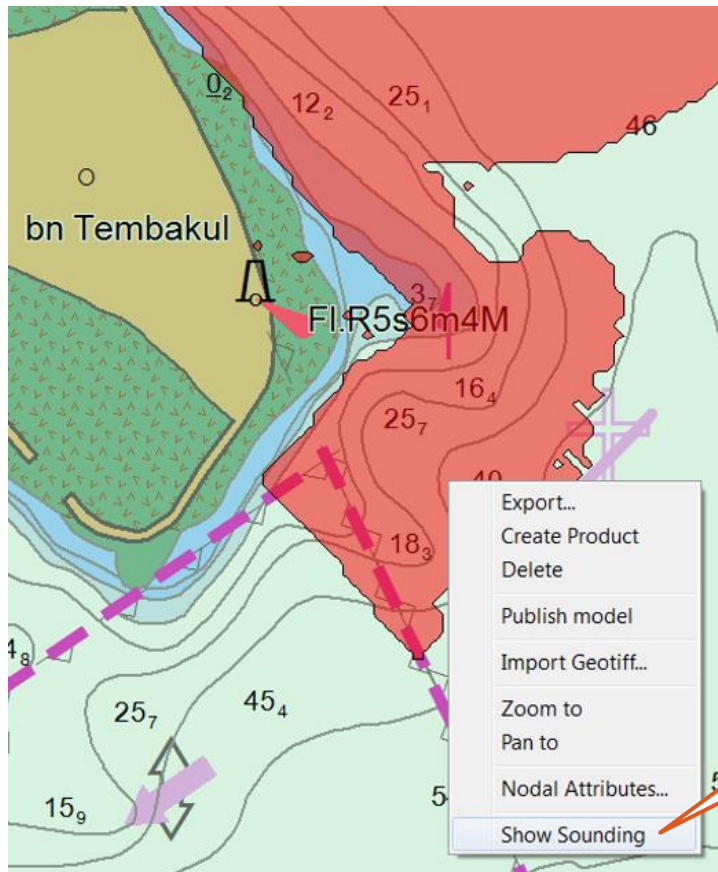- Create hull in database

Generate model
- Complete model process

Archive model
- After approval, save model

INDIVIDUAL MODEL VISUALISATION

▶ Select nodal attribute for visualisation

Nodal attributes

INDIVIDUAL MODEL VISUALISATION

▶ Assigning color scale values

BUILDING INDIVIDUAL MODELS

CONTINUOUS MODEL MANAGEMENT

The Virtual Continuous Model

A continuous model (CM) is a continuous, de-conflicted, database-stored, bathymetric surface which theoretically may cover the entire globe. In the VCM a database-driven approach is used to create multiple bathymetric surfaces from survey data. The Continuous Model is virtual because no physical copies of the data are made; rather a mapping is set up to the original data.

VIRTUAL CONTINUOUS MODELS

▶ Seamless coverage

▶ One depth and at each location

▶ De-conflicted individual models

▶ Survey priority definition

BUILDING VIRTUAL CONTINUOUS MODELS

▶ IM selection:

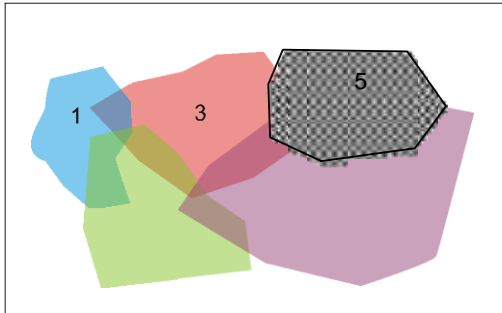- System selects IM not included into a VCM

▶ IM priorities:

- System apply default sorting of IM's priority
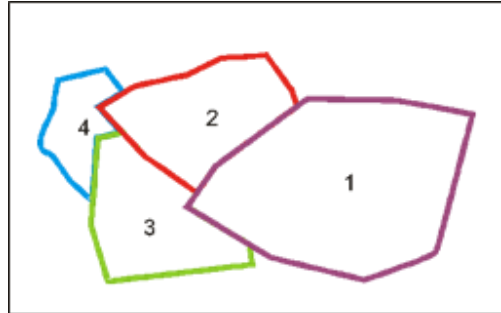- Verified by operator, prior to VCM rebuild

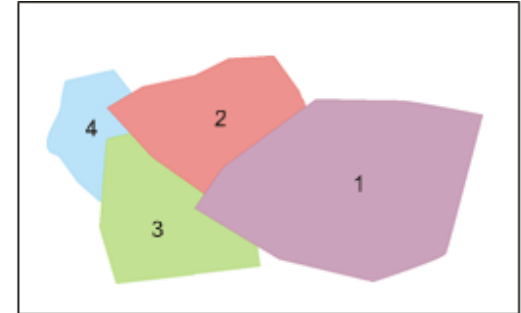▶ IM segment generation:

- Creates as seamless coverage : VCM

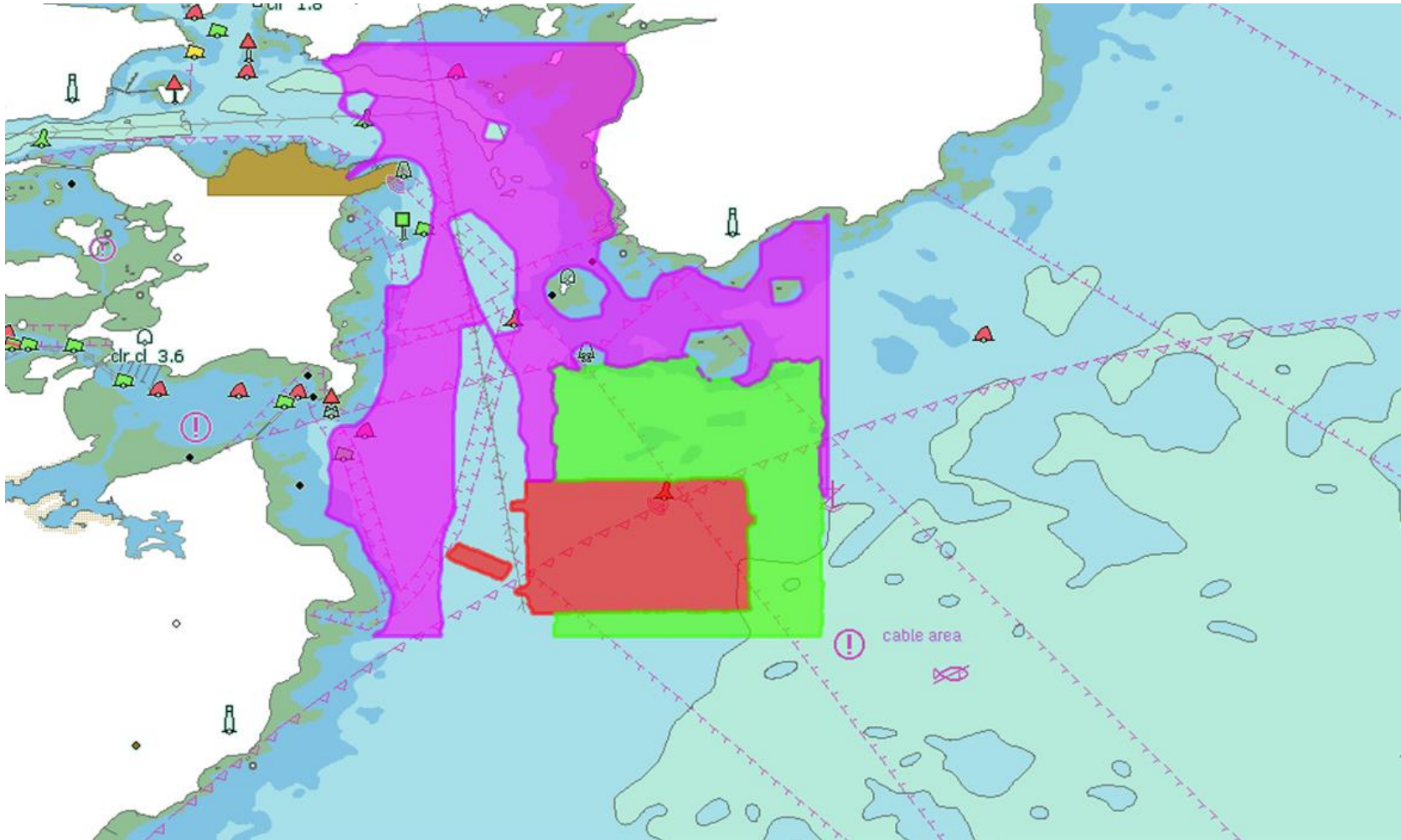# CONTINUOUS MODEL MANAGEMENT CONT.

IM Sources

Defined priority

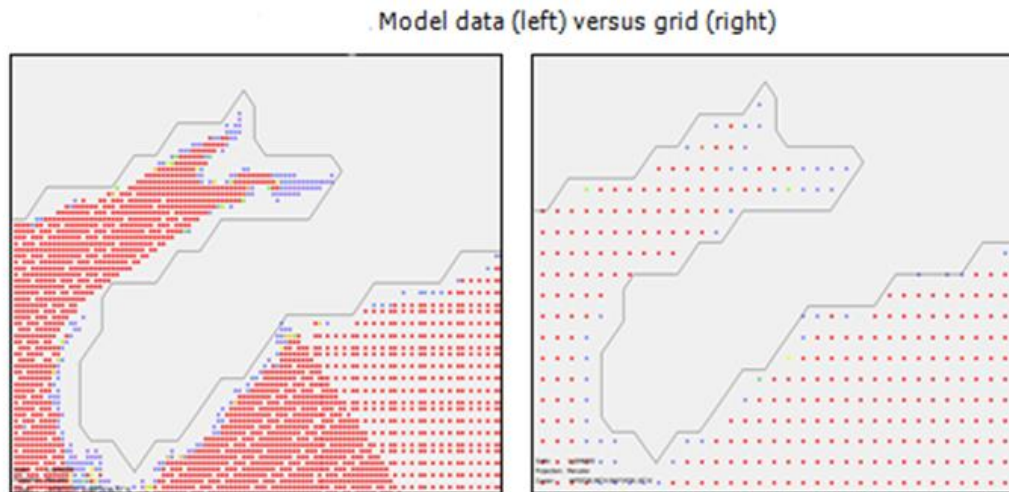VCM Result

VIRTUAL CONTINUOUS MODEL

BATHYMETRIC WORKFLOW

▶ Register, import, model, archive, publish IM

▶ Utilizing IM

- Building advance queries (geographic, type, depths)
- Object identification (sidescan overlays)

▶ Define and activate VCM

▶ Generate bathymetric products from IM and VCM:

- Gridded products
- Selected sounding products
- Contour and depth areas products
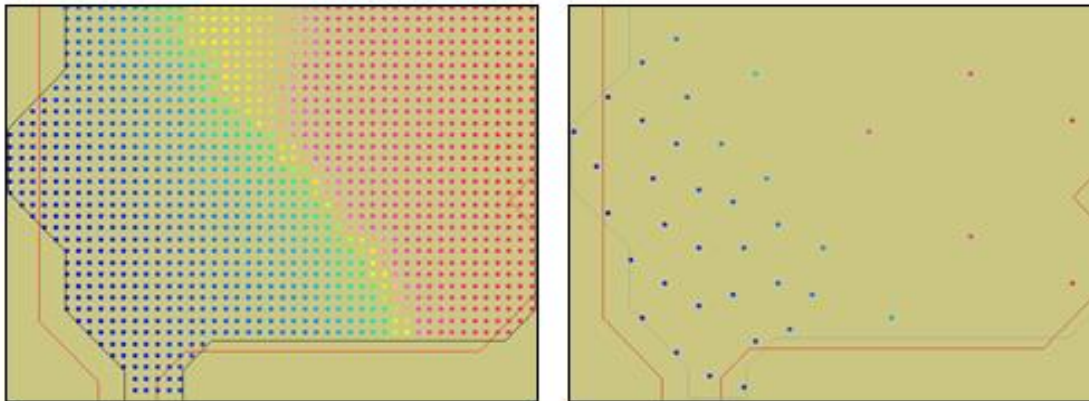- Difference products

BATHYMETRIC PRODUCTS

Gridded products: Product is based on a grid which has a regular array of soundings with a spacing or grid size (meters).
These can be resampled or interpolated.

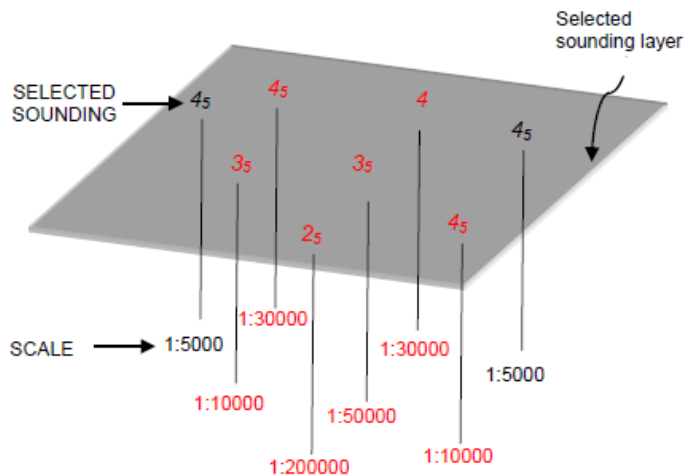Model data (left) versus grid (right)

BATHYMETRIC PRODUCTS CONT.

<u>Selected sounding products:</u> Soundings in a model maybe to dense of normal use, the user can create a sounding product based on "user defined critera" (deep/shoal bias, distance criteria etc). These Sounding selected products can be used directly for fairsheet creation. (eg 1000, 2500 etc)

Soundings of a source model (left) versus selected soundings (right)

BATHYMETRIC PRODUCTS CONT.

▶ an example of the sounding extracted for Nautical Chart with the scale of 1:10 000. All the sounding with the scale set at 1:10 000 and smaller shall be extracted. Sounding with the scale set at 1:5000 shall not be extracted.
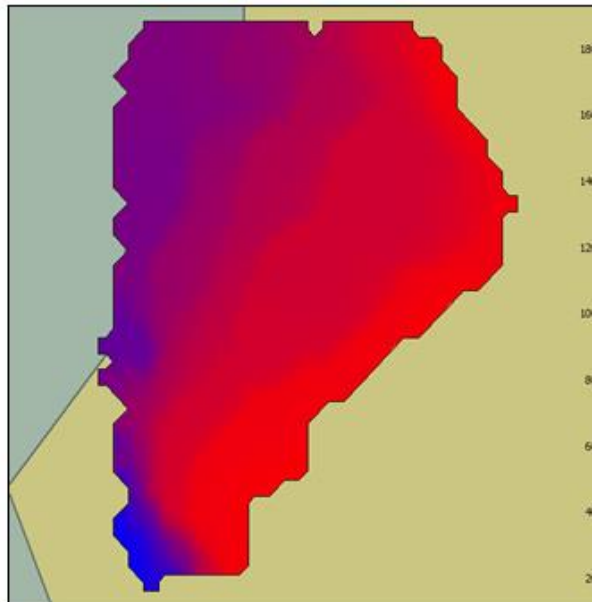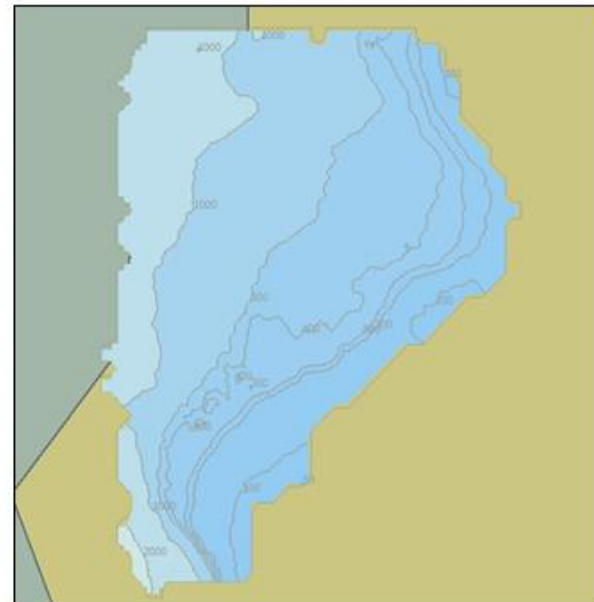

DB extraction to paper chart production tool

BATHYMETRIC PRODUCTS CONT.

Contour and depth areas products: products are created based on standard S57 DEPARE and DEPCNT objects for use in ENC and paperchart production.
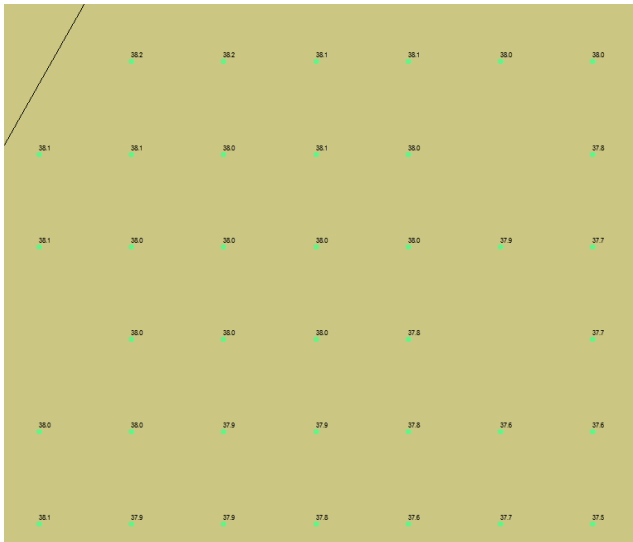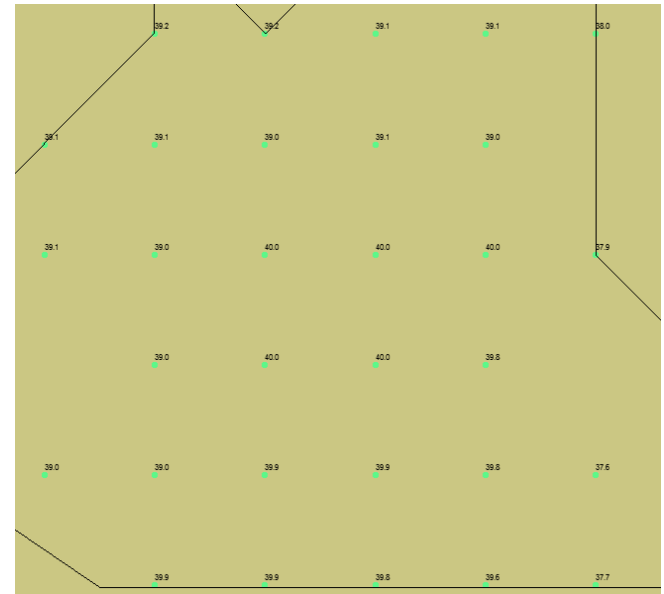
Input

Product

BATHYMETRIC PRODUCTS CONT.

<u>Difference products:</u> the ability compare one IM against another. This will indicate where the difference between surveys (I.E. old vs new)
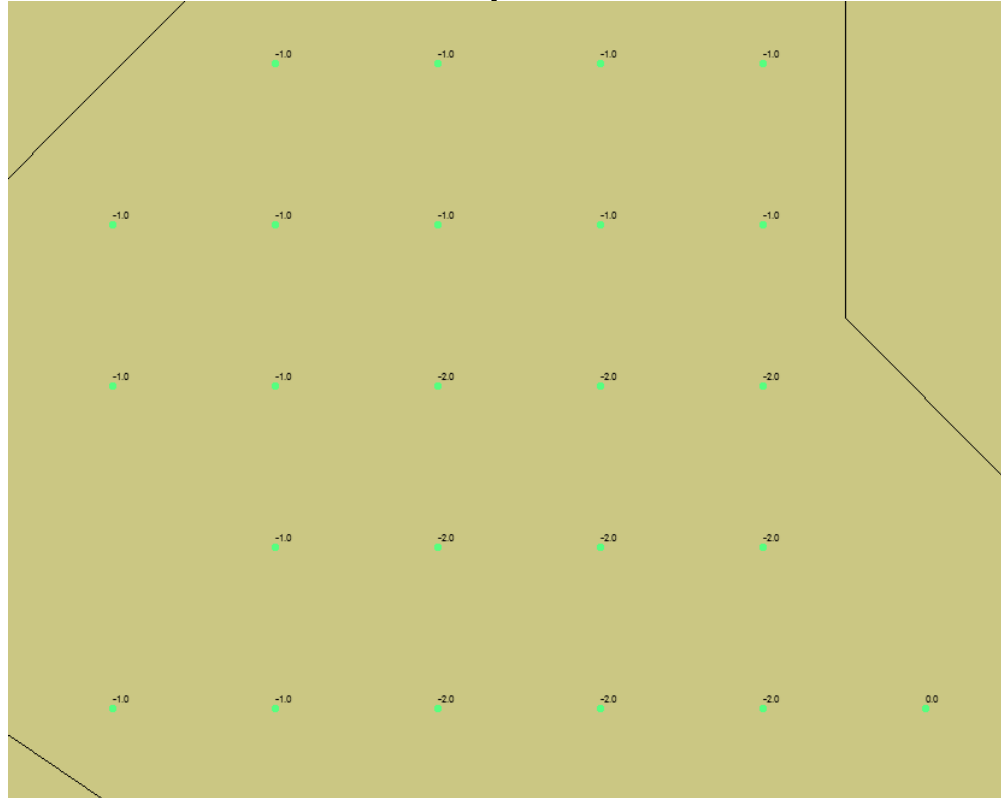

Old survey
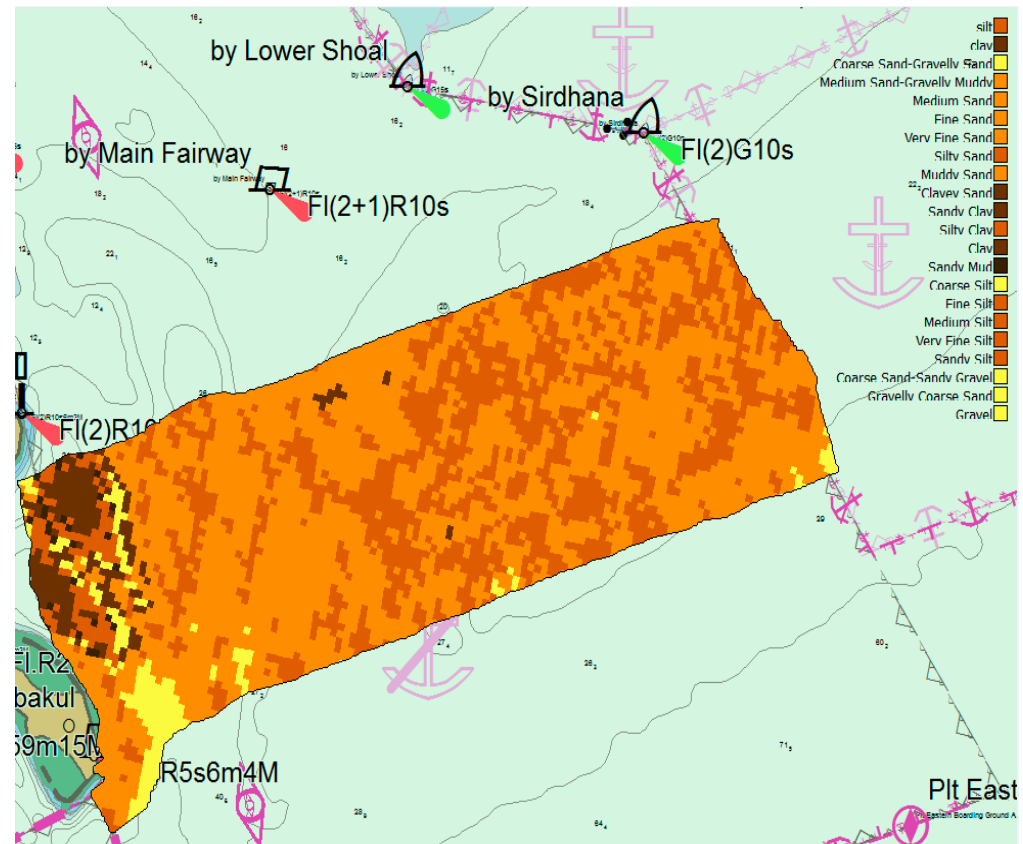
New survey

BATHYMETRIC PRODUCTS CONT.

Difference indicated as actual sounding OR meter difference

SEABED CLASSIFICATION PRODUCTS

▶ Color assigned based on enumeration class

DKART OFFICE INTEGRATION

▶ BathyManager database available from production systems

▶ Products can be extracted, on fly, from production system

▶ Fairsheet, Updates and other add-hoc products can be collected from BM Database

▶ Special products, such as
  ▪ Seabed classification charts
  ▪ High resolution Coastline (and other objects)

▶ Integrated with Feature Object database

▶ Product Maintenance process fully integrated

Thank you
for your attention

For further information or questions,
please contact:

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