

Revolutionising Gravity and Magnetic Data Management

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Moving beyond the status quo

Goal of integrating and utilising data (geophysical, GIS) to maximise its potential for business requirements

- Deliver global solution - centralised and organised system for gravity and magnetic data management
- Maximize value by making data easier to search and find - available to specialists and generalists
- Increase efficiency by establishing a clear system with standard processes for data publishing and archiving



Outline

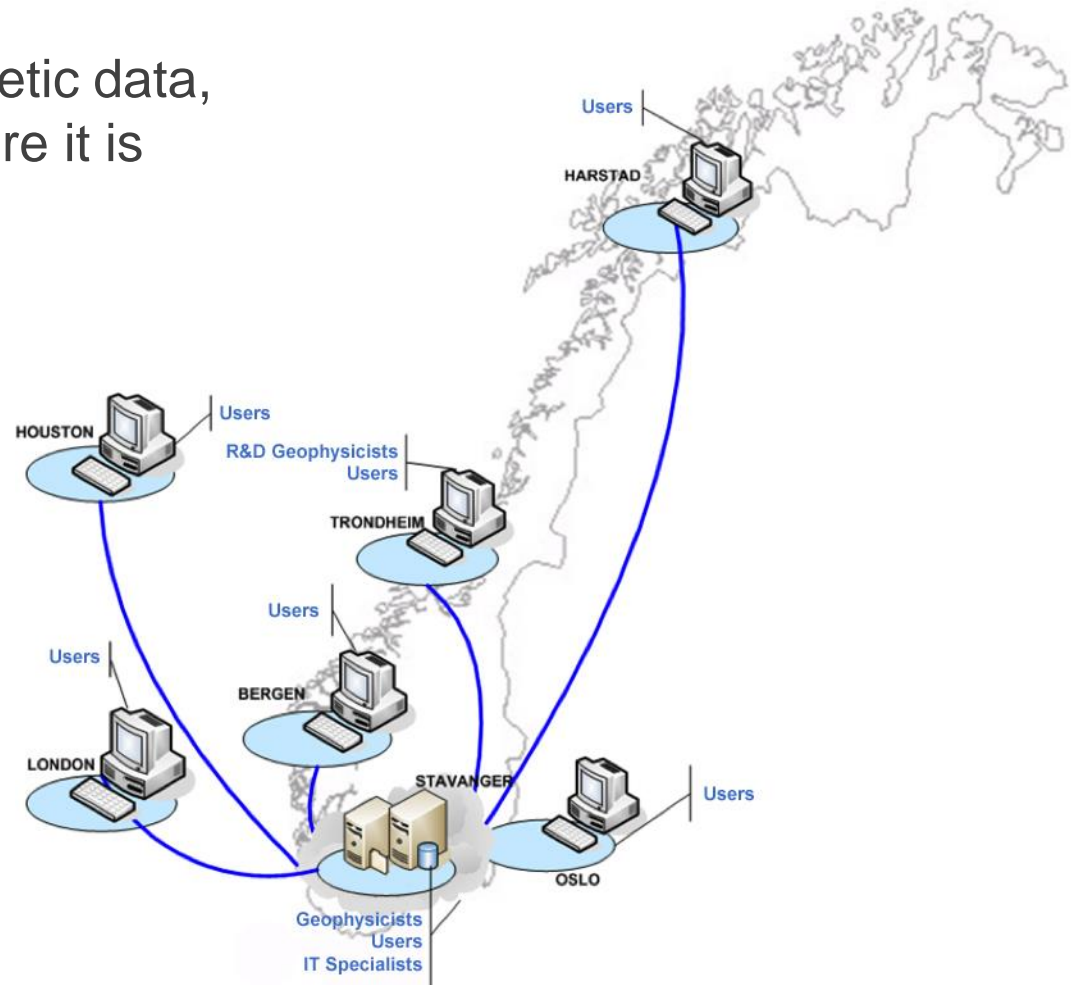
- Gravity and Magnetics in Statoil
- GravMag Data Challenges
- Data Solution Requirements
- Data Solution - Main Elements
 - Metadata Creation
 - Archiving and Publishing
 - Database Administration
 - Search and Retrieval
- Efficiencies and Opportunities

Gravity and Magnetics in Statoil

The use of gravity and magnetic data, and number of locations where it is used, has been increasing.

Users are specialists and generalists

- GravMag Specialists
- Geophysicists
- Geologists
- GIS Specialists



200 potential users in multiple locations

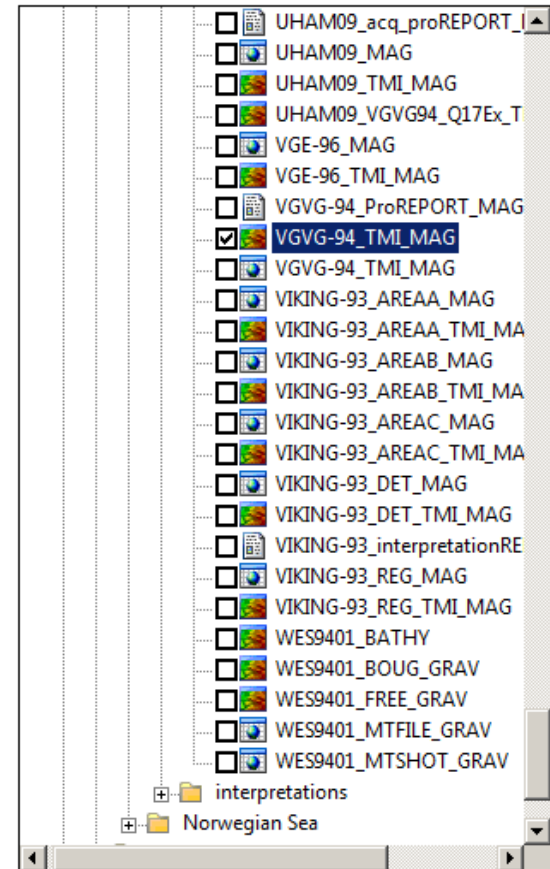
Gravity and Magnetics in Statoil

Data Volume & Types

- 3200 data sets (60 GB)
- Grids and Databases primarily
- PDF Reports
- Shape Files
- Images

Usage

- Early scale exploration – where there is very limited or no 2D seismic
- Assisting 2D seismic interpretation in filling in below the deepest seismic horizon
- QCing 3D velocity cubes by forward calculating their gravity response and comparing with measured data
- 3D forward modelling of complex salt structures, in some cases



GravMag Data Challenges

- No clear system for publishing and archiving data
- Complex system for data storage and retrieval
 - Exploration geophysics data and related data stored in separate locations and accessed by specialists via different systems (UNIX File Server, NGU DRAGON).
- No direct way for asset teams to access the data
 - Due to the complexity of data storage and retrieval, access to data was exclusively through the gravity and magnetic specialists.
- Specialists' time consumed by increasing volume of data requests and inquiries

Statoil/Hydro merger heightened the need for a better system

With the merger in 2007 we were fortunate to have a test version of the new DAP Server solution in place in order to check if data sets were duplicate or already stored.

Data Solution Requirements

We needed a data management solution that provided the following advantages:

- Central storage, with processes for data publishing and archiving
- Easy search and retrieval
- Visible and accessible to our asset teams, not only specialists
- Standard format - data in Geosoft format (industry standard for gravity and magnetic data)
- Ability to visualise the data

Data Solution - Main Elements

Implementation of a gravity and magnetic data management solution based on Geosoft DAP Server technology.

Metadata Creation

The Geosoft Metadata Editor (MDE) provides a very efficient way to enter all relevant required information

Archiving and Publishing

The MDE and DAP Server Administration Tool make data archiving and publishing easy to manage.

Data Base Administration

Microsoft's SQL Server Management Studio Express is used to keep track of the datasets, and to remove/replace them.

Search and Retrieval

The Seeker tool available in Geosoft Oasis montaj and Esri ArcMap makes data search and retrieval easy.

Meta Data Creation *with MDE*

The screenshot displays the Geosoft GravMag Metadata Editor (MDE) window. The interface is divided into two main panes: 'Data Packages' on the left and 'Details' on the right. The 'Data Packages' pane shows a list of data packages under 'My Data Packages', with 'ST367500_BOU_ALLM.grd' selected. The 'Details' pane is titled 'Data' and shows the following information:

- Path: F:\BcP
- Dataset: ST367500_BOU_ALLM.grd

Below this, there is a 'Metadata' section with a tabbed interface. The 'Data' tab is selected, showing the following metadata fields:

- Data source: Unknown
- Data format: Geosoft grid
- Scale / Resolution: 200m Cells
- Confidentiality: Confidential
- Data created by: Tore Vattekær
- Data creation date: 7. juli 2010
- Metadata created by: Tore Vattekær
- Metadata creation date: 7. juli 2010

At the bottom right of the 'Details' pane, there are 'Submit' and 'Save' buttons. The status bar at the bottom of the window indicates 'Connected'.

Next Step:

Meta Data Creation *with MDE*

Administrator Mode

Checking key details and deciding on 'Upload' or 'Reject'

Archiving and Publishing *in DAP*

The screenshot displays the GEOSOF DAP Administrator interface. At the top, the logo and navigation links (Home, Settings, Reports, Help) are visible, along with the user role 'Administrator' and a 'Logout' link. A 'List of Datasets (3439 of 3439)' table is shown on the left, with a 'Preview' window open for the dataset 'ST37500_BOU_ALLM_GRAV'. The preview window displays a color-coded map of a geographical area with coordinates (63.94, 63.56, 6.27, 6.73). To the right, the 'Dataset Properties' panel is visible, containing sections for 'General', 'Advanced', and 'Metadata'. The 'Advanced' section includes a 'Qualifier' field set to 'GRD' and a 'Preview' button highlighted with a red box. The 'Metadata' section includes a 'Stylesheet' dropdown and 'Preview' and 'Edit' buttons. The 'Page Preview' section includes 'Default Image', 'Preview', 'Set Redirect', and 'Set Coordinates' buttons.

Visual control
of data set

Only users with admin rights and access to the server can use this tool - one user at a given time.

Archiving and Publishing *in DAP*

The screenshot displays the GEOSoft DAP Administrator interface. At the top, the logo and navigation links (Home, Settings, Reports, Help) are visible. The user is logged in as 'Administrator'. The main area is divided into two panels: 'List of Datasets' and 'Dataset Properties'.

List of Datasets (3439 of 3439)

Search by dataset name [Advanced Search] [Clear Search]

Number of datasets: All datasets

Filters: All (3439) | **Verified (1)** | Published (3184) | Excluded (254) | Error (0)

<input type="checkbox"/>	Name	Type	Modified	Size (KB)
<input checked="" type="checkbox"/>	ST37500_BOU_ALLM_GRAV	Geosoft Grid [.grd]	2015-05-15	85

Buttons: Add Connector, Index Map, Package, Delete, Download, Replace

Dataset Properties

Buttons: Publish, Exclude, Update DAP Server

General

Name: ST37500_BOU_ALLM_GRAV
Size: 85 KB
Loaded: 2015-05-15 13:31:03
Modified: 2015-05-15 13:31:03
Status: Verified

Advanced

Qualifier: GRD [Convert to Document]
Hierarchy: Europe/Norway/Norwegian S [Edit]
Disclaimer: (Use default) [Preview]

Metadata

Stylesheet: (Use default) [Preview] [Edit]

Image Preview

Default Image [Preview] [Set Redirect] [Set Coordinates]

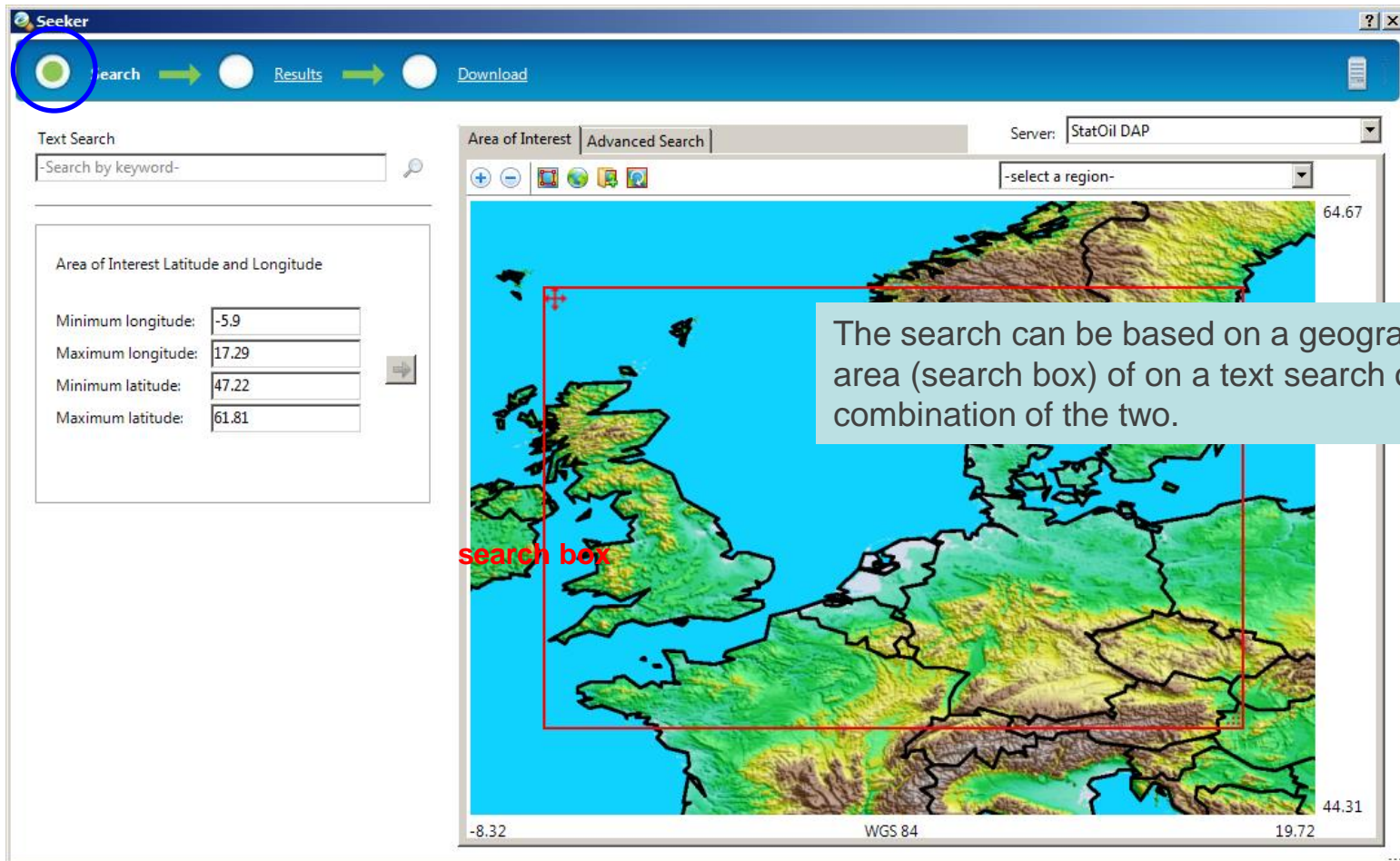
Administering

data sets:

- Publish
- Exclude
- Delete
- Replace
- Search

Only users with admin rights and access to the server can use this tool - one user at a given time.

Search and Retrieval *with Seeker*



The screenshot shows the Seeker software interface. At the top, there are buttons for 'Search', 'Results', and 'Download'. The 'Search' button is circled in blue. Below the buttons is a 'Text Search' section with a search box containing '-Search by keyword-'. To the right of the search box is a magnifying glass icon. Below the search box is a section titled 'Area of Interest Latitude and Longitude' with four input fields: 'Minimum longitude: -5.9', 'Maximum longitude: 17.29', 'Minimum latitude: 47.22', and 'Maximum latitude: 61.81'. To the right of these fields is a right-pointing arrow icon. The main part of the interface is a map of Europe with a red rectangular search box overlaid on it. The search box is labeled 'search box' in red text. The map shows topographic features and is labeled with coordinates: -8.32, 19.72, 44.31, and 64.67. The map is labeled 'WGS 84'. Above the map is a 'Server: StatOil DAP' dropdown menu and a '-select a region-' dropdown menu. A light blue text box is overlaid on the map with the text: 'The search can be based on a geographical area (search box) or on a text search or a combination of the two.'

Seeker is accessible through Geosoft's **Oasis montaj** data processing and interpretation software as well as through **ArcMap** (provided the Geosoft plug-in has been installed).

Search and Retrieval *with Seeker*

The screenshot displays the Seeker software interface. At the top, a navigation bar includes buttons for Search, Results (highlighted with a blue circle), and Download. Below this, the 'Text search: Not Active' status is shown. The 'Server' dropdown is set to 'StatOil DAP'. A list of files is displayed on the left, with 'VGVG-94_TMI_MAG' selected and highlighted by a red box. To the right, a 'Preview' window shows a topographic map of the North Atlantic region, with a red rectangular box indicating the area of interest. The map includes coordinate markers: 64.67 at the top right, 44.31 at the bottom right, and -8.32 at the bottom left. The text 'WGS 84' is centered at the bottom of the map area.

Seeker

Search → Results → Download

Text search: Not Active

Server: StatOil DAP

- UHAM09_acq_proREPORT_I
- UHAM09_MAG
- UHAM09_TMI_MAG
- UHAM09_VGVG94_Q17Ex_T
- VGE-96_MAG
- VGE-96_TMI_MAG
- VGVG-94_ProREPORT_MAG
- VGVG-94_TMI_MAG
- VGVG-94_TMI_MAG
- VIKING-93_AREAA_MAG
- VIKING-93_AREAA_TMI_MA
- VIKING-93_AREAB_MAG
- VIKING-93_AREAB_TMI_MA
- VIKING-93_AREAC_MAG
- VIKING-93_AREAC_TMI_MA
- VIKING-93_DET_MAG
- VIKING-93_DET_TMI_MAG
- VIKING-93_interpretationRE
- VIKING-93_REG_MAG
- VIKING-93_REG_TMI_MAG
- WES9401_BATHY
- WES9401_BOUG_GRAV
- WES9401_FREE_GRAV
- WES9401_MTFILE_GRAV
- WES9401_MTSHOT_GRAV

interpretations

Norwegian Sea

Preview Metadata

64.67

44.31

-8.32 WGS 84 19.72

Search and Retrieval *with Seeker*

The screenshot displays the Seeker application interface. At the top, a navigation bar includes buttons for Search, Results (highlighted with a blue circle), and Download. Below this, the 'Text search: Not Active' status is shown. The 'Server' dropdown is set to 'StatOil DAP'. A file list on the left shows various files, with 'VGVG-94_TMI_MAG' selected and highlighted by a red box. The right pane shows the metadata for this file, including the title 'VGVG_TMI_MAG', abstract, and detailed metadata sections like Description, Data, and Coordinate System.

ISO 19139

Title: VGVG_TMI_MAG
Abstract: Country Norway Region: North Sea Content: Magnetic Anomaly (nT)

Metadata:
[Description](#)
[Data](#)
[Coordinate System](#)
[Metadata File](#)
[Lineage](#)

- Description

Keywords:
Magnetics
Airborne Geophysics
Total Field
Europe
Norway
North Sea

File format: Geosoft Grid

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- Data

Data source: Unknown
Confidentiality: Confidential
Scale/Resolution: 100 m Cells
Created by: Jan Nylund
Creation date: 2009-11-19

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- Coordinate System

Search and Retrieval *with Seeker*

The screenshot shows the Seeker application window. The top navigation bar has three buttons: 'Search', 'Results', and 'Download'. The 'Download' button is highlighted with a blue circle. Below the navigation bar, the 'DAP' (Download and Apply Properties) section is visible, listing the dataset 'VGVG-94_TMI_MAG'. To the right, the 'Download properties' section contains several configuration options:

- Destination folder: f:\data\temp\columbia_anh\
- Dataset name: VGVG-94_TMI_MAG
- Dataset type: Geosoft default (*.grd)
- Display: Download and open, Download only
- Apply to all: Apply to all
- Windowing: Window to Area of Interest, Do not window
- Apply to all: Apply to all
- Coordinate System: Original, Reproject to current map
- Apply to all: Apply to all
- Resolution: Original (100 m), Recommended (158.3333) (100 - 95000)
- Estimated uncompressed file size: 1.6 MB

A light blue callout box on the right side of the 'Download properties' section contains the text: **Select :**
- Format
- Location
- Windowing
- Resolution

At the bottom right of the window, there is a 'Download All' button.

Efficiencies and Opportunities

Efficiencies

- Centralised data storage - one singular official storage facility
- Less time spent searching and retrieving data sets - finding data no longer depends on one or two persons' memory.
- Accessible to all ArcMap and Geosoft users in Statoil
- Number of inquiries for data coverage has been significantly reduced

Opportunities

- Add more data types - can be extended to include EM data
- Integration with GIS - can add integration between DAP Server and Esri
 - Esri LYR Files
 - Esri ArcGIS Image Services