

Oasis montaj Field User Guide



Oasis montaj Field

Oasis montaj Field is the Seequent solution for processing geophysical data in the field during data collection, and building a master survey database. Oasis montaj Field allows you to import, filter, grid, display your survey data in two and three dimensions. It also allows to you to log progress reports and export data and maps for sharing with the office or other parties.

In order to get started with Oasis montaj Field, you need to complete a few simple steps:

Create your Seequent ID

Your Seequent ID is your business email address that is registered with Seequent. Your Seequent ID (email+password) gives you secure access to your Oasis montaj subscription, Seequent Central, online services, and support resources. A Seequent ID with an active subscription is required to run the Oasis montaj Field application installed on your computer. If you already have a Seequent ID, you can install and use Oasis montaj Field.

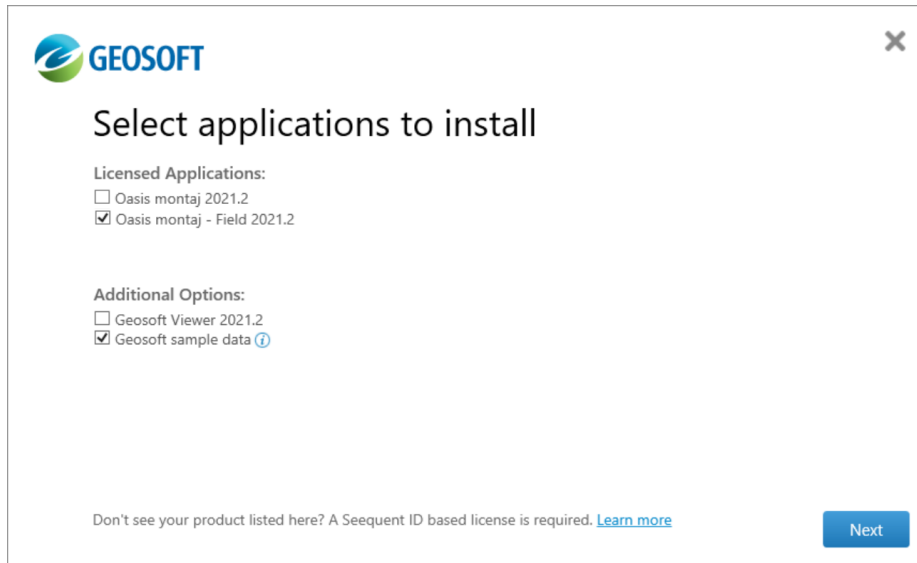
If you don't have a Seequent ID, please create one [here](#).

Download Oasis montaj Field

Once you have created your Seequent ID, you can download Oasis montaj Field from My Seequent. My Seequent is the home for software downloads, learning, training and support for Seequent Products. The installer for Oasis montaj is available [here](#).

Installing Oasis montaj Field

When the Oasis montaj installer download is complete simply double-click on the installer. In the interface that appears, check the box next Oasis montaj - Field version. Depending on your subscription you may see other licensed applications that are available to install.



1. Once you have selected the application(s) to install, click the **Next** button.
2. In the next window that appears, check both options
3. Click **Install the application**

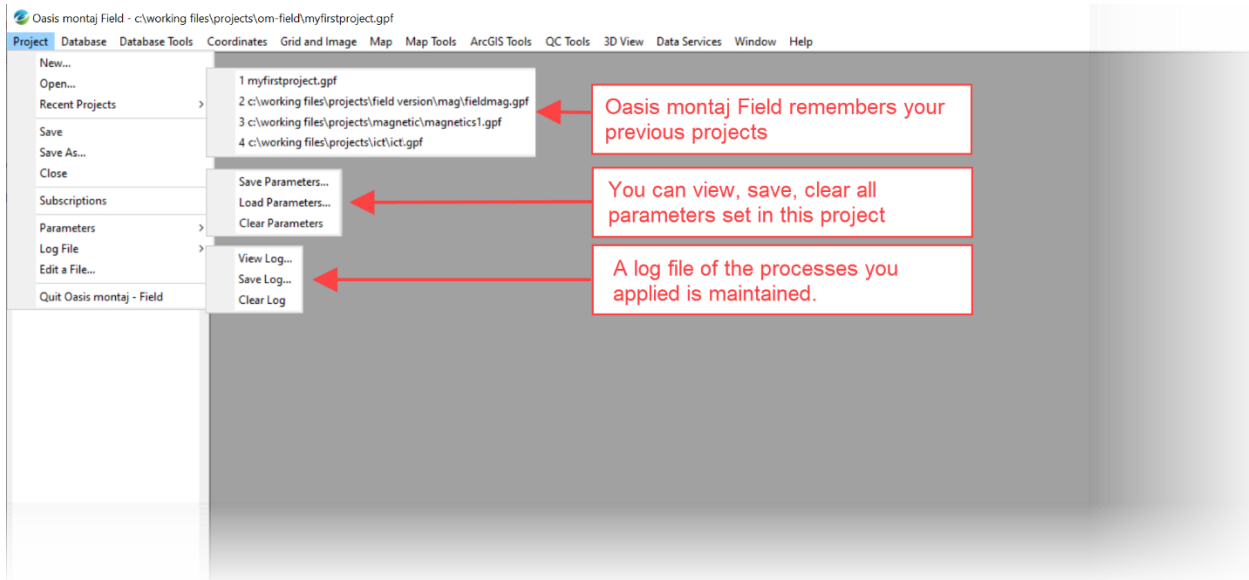
Oasis montaj Field Menu Overview

Oasis montaj Field offers a comprehensive set of tools that are accessed from a series of menus, each of which is introduced in this section.

Project Menu

From the Project menu you can:

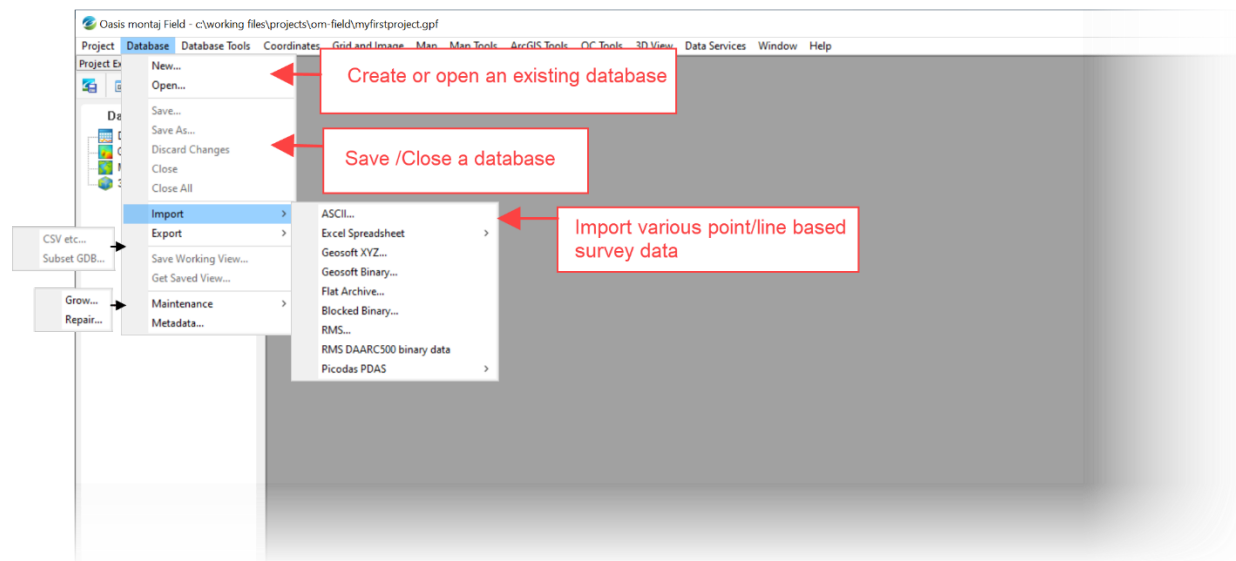
- Create, open and save Geosoft project files (*.gpf). These GPFs are entirely compatible with Oasis montaj.
- Manipulate the project parameters
- View and/or Update your subscription
- Inspect the project log file
- Check your subscription and its expiry



Database Menu

In the Database menu you can:

- Open an existing Geosoft database
- Create an empty database and import data into it
- Import from several standard Geophysical formats
- Export to standard formats
- Save and Load customized views of the database
- Repair and grow a database



Notes:

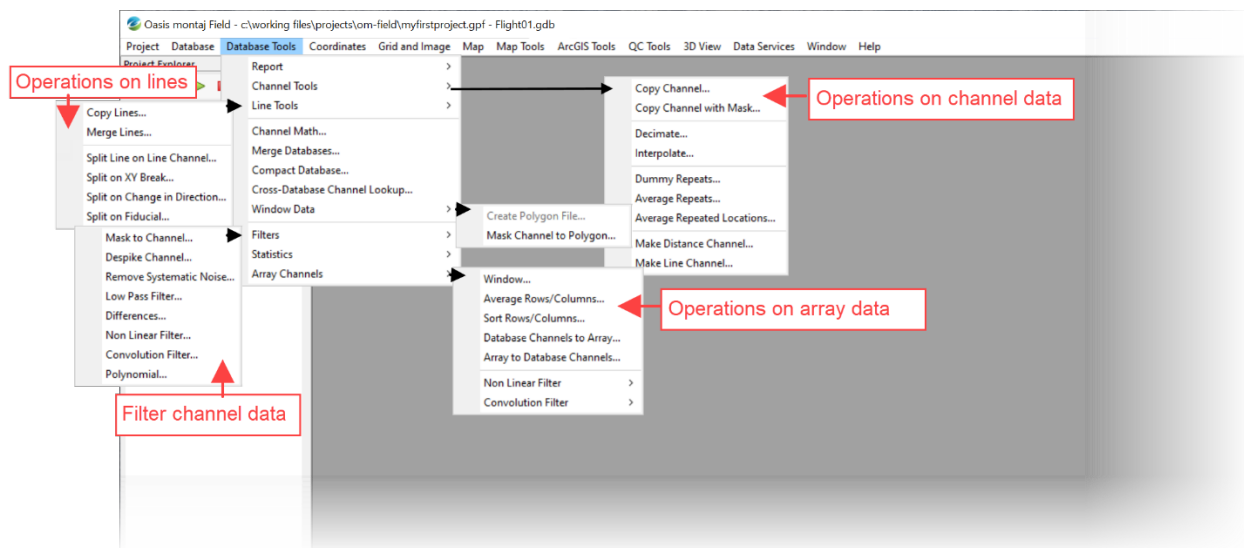
- You cannot modify environment settings such as fonts and shortcuts, which are set to the same defaults used in Oasis montaj
- Certain tools are disabled until their prerequisite data is loaded
- Once imported, you can view both scalar and array sensor data

Database Tools Menu

Once you have imported your survey data, you will likely want to perform the following tasks:

- View the data in profile form
- Merge positioning and survey data into a single database
- Remove spikes
- Remove systematic noise
- Remove repeats
- Mask bad data related to sensor lock or lack of satellite coverage
- Remove unnecessary rows from the database
- Run a report on the data
- Calculate and apply custom math operations
- Apply filters on scalar and/or array data

The tools available under the **Database Tools** menu facilitate all the above tasks.



Coordinates Menu

Coordinate Systems and projections which are supported in Oasis montaj are also supported in Oasis montaj Field.

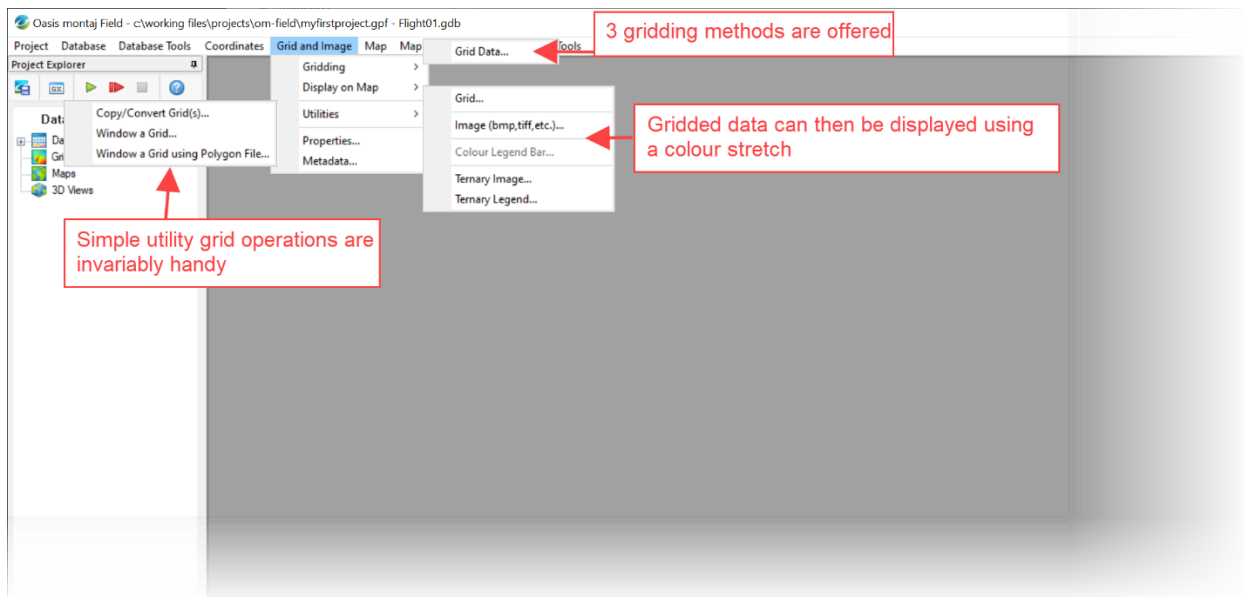
- To perform operations that require geo-location, such as projection and gridding, you must assign the channels that contain easting & northing information as **Coordinate Channels**. Providing the elevation is optional, although some tools require it
- Normally locational information is recorded in geographic units, however the X & Y channels for most processes in Oasis montaj field must be in projected ground units. Reprojecting data from geographic to projected coordinates is simple in Oasis montaj Field
- The Geoid height of the geographic location can be calculated to represent the datum.



Grid and Image Menu

Oasis montaj Field offers a subset of the gridding methods available in Oasis montaj, which will allow you to inspect your data visually and compare it to your line locations on a map. This menu offers:

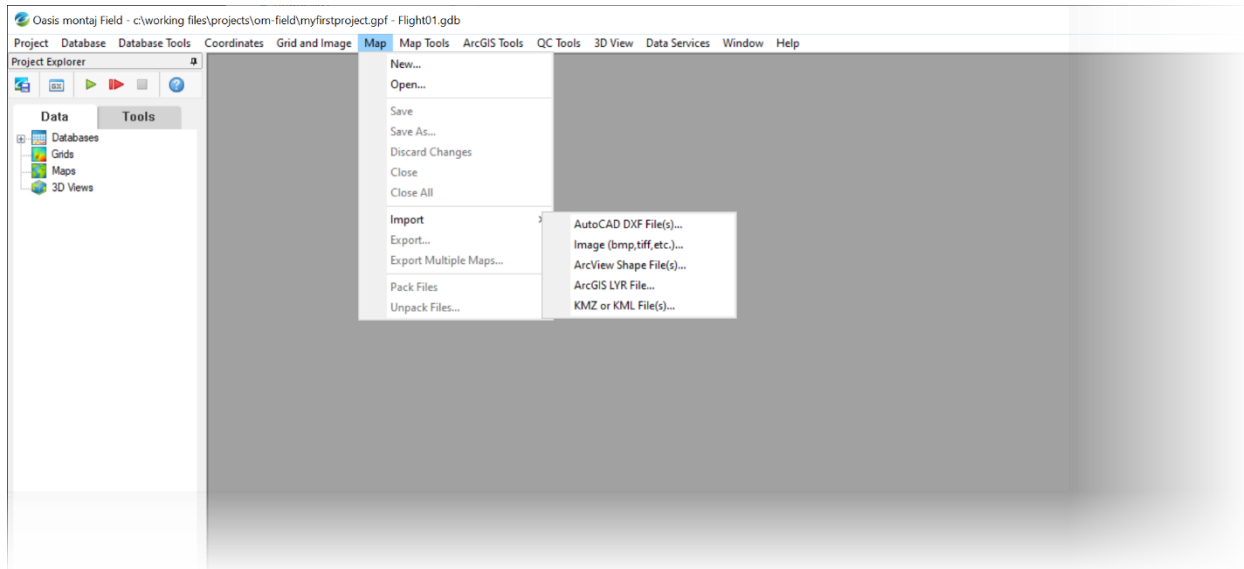
- Three of the most common gridding methods applied to geophysical data
- The ability to window gridded data
- Utilities to convert gridded data to a multitude of other standard formats
- Display gridded data using many different colour ramps, as well as a shaded relief mode



Map Menu

In the Map menu you can:

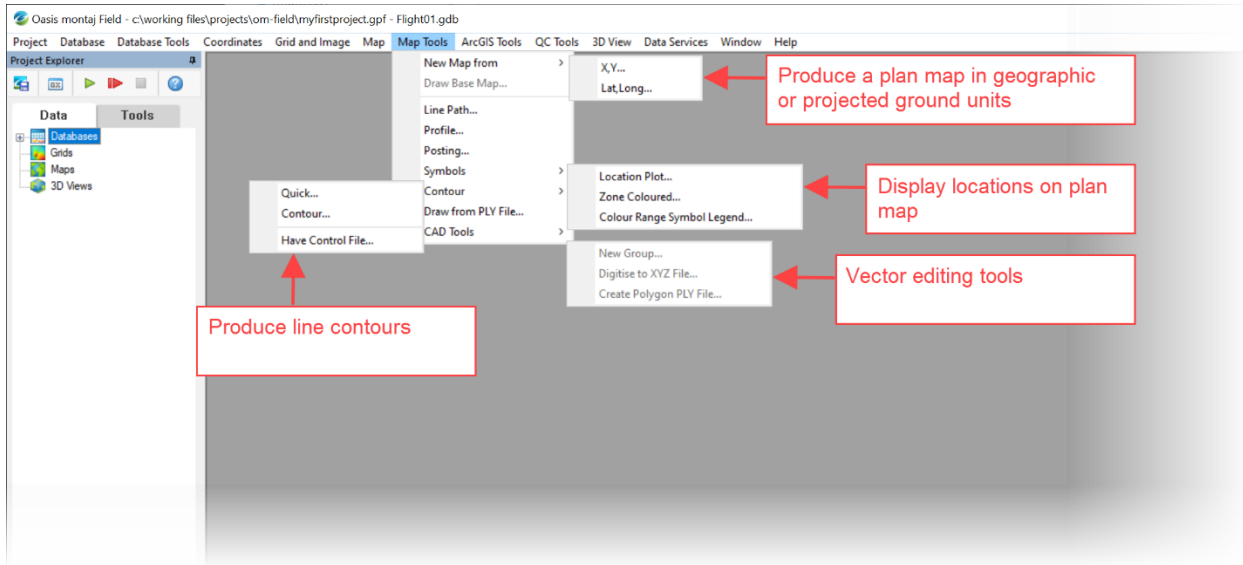
- Create a standard plan map
- Import layouts and structural information from other formats
- Export maps to other standard formats
- Combine all data files represented on a map into a single "packed map" file to share with other users



Map Tools Menu

In the Map Tools menu you can:

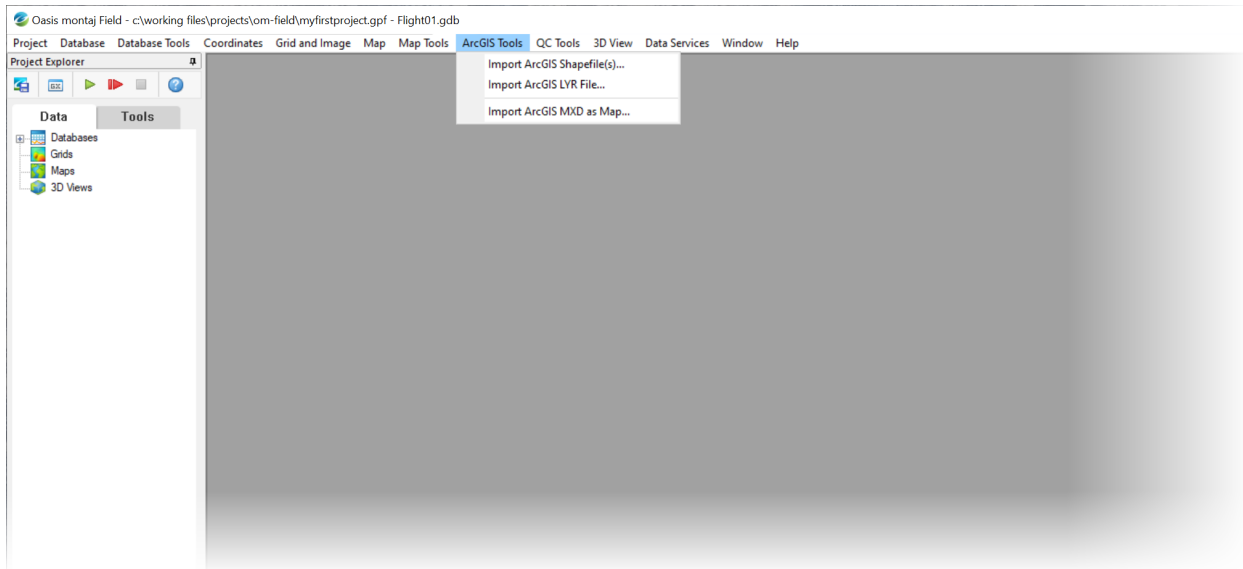
- Plot survey information
- Annotate maps
- Draw vector data
- Digitize data
- Contour grids



ArcGIS Tools Menu

In the ArcGIS Tools menu you can:

- Import and display ArcGIS vector data on maps produced in Oasis montaj Field
- Edit vector files in the Oasis montaj project



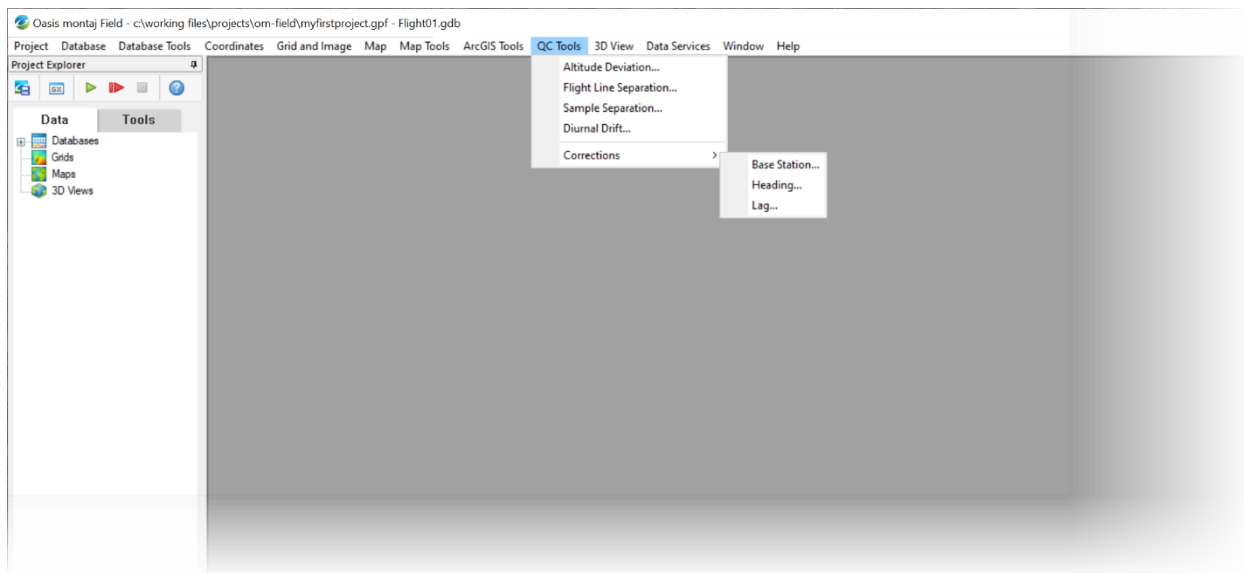
QC Tools Menu

A subset of QC tools allows you to inspect if the survey is within project specifications by performing the following tests:

- Altitude deviation
- Line separation
- Sample spacing

Furthermore, you can apply standard magnetic data corrections such as:

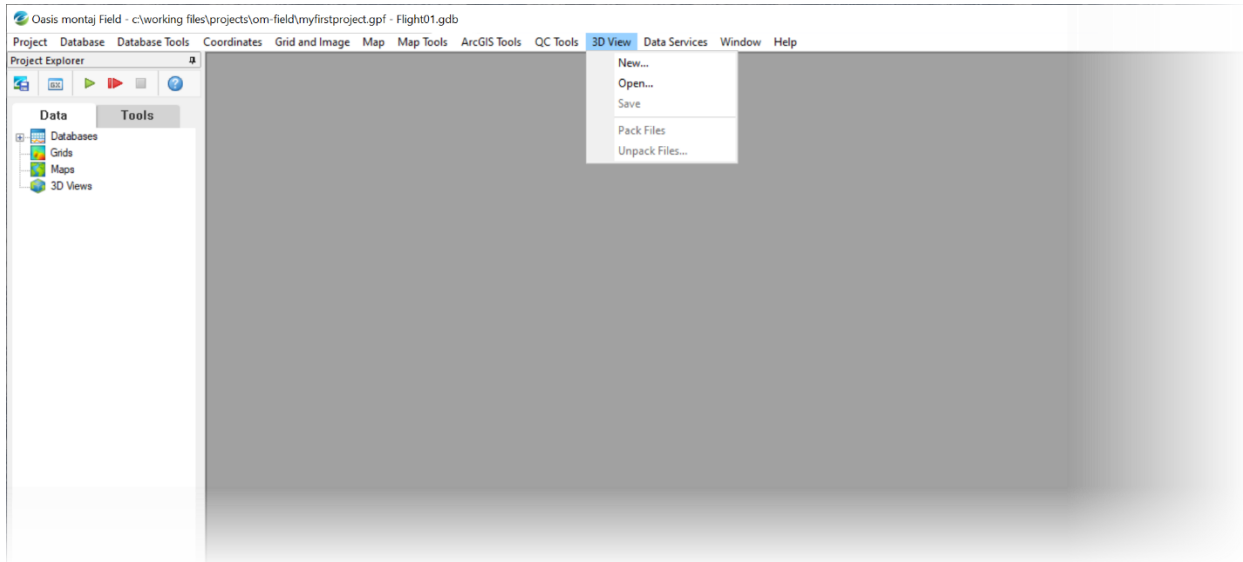
- Diurnal
- Base station
- Heading
- Lag



3D View Menu

In the 3D View menu you can:

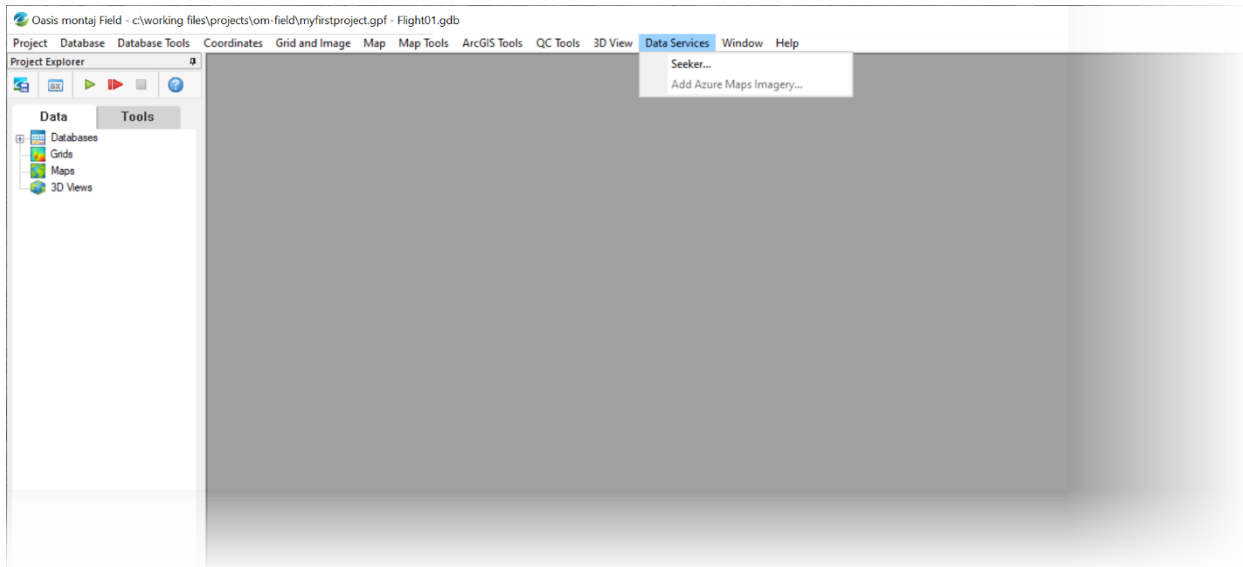
- Plot 3D survey line paths
- Plot a relief surface
- Pack all 3D objects within a 3D View into a single file to share with others



Data Services Menu

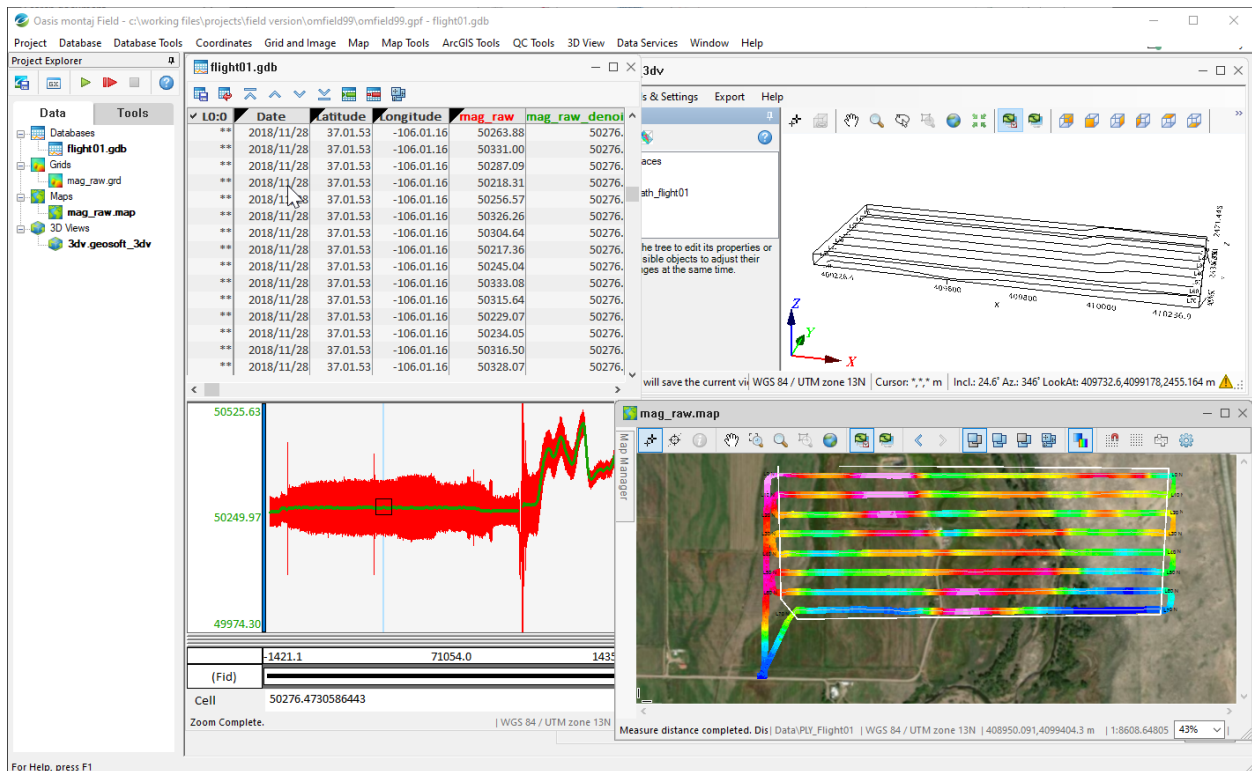
The Data Services menu allows you to download and display:

- Public domain geoscientific data
- Azure Maps imagery



Data Linking

The Oasis montaj project workspace allows you to work with 3D views, 2D plan maps and databases at the same time. The data within each of these windows is linked to any others that are open; the position of the cursor is tracked live in all windows. Windows can be stacked, tiled or even moved out of the Oasis montaj Field user interface and onto a secondary monitor.



Example Workflow

In this section we will walk you through the different stages of a typical workflow in Oasis montaj, which involves processing some sample magnetic survey data.

The workflow will consist of the following steps:

1. Create a Geosoft project
2. Import magnetic data into a database
3. Assign an appropriate coordinate system to the database
4. Display the survey lines on a map
5. Display the data in a database profile window
6. Apply a filter to the data to remove noise
7. Decimate the data
8. Mask "bad" data
9. Remove redundant or unnecessary data
10. Break the data into separate lines
11. Grid the data and display the grid on a map
12. Run QC tests and apply corrections to the data
13. Download and display satellite imagery on the map
14. Display the data in a 3D view
15. Merge corrected data into a master database

This is not a comprehensive tutorial, rather it intends to provide you with the fundamentals to help you get started.

Create a Geosoft project

When working in Oasis montaj Field, the folder in which you save the Geosoft project file to will be the location that all tools and processes point to when loading data. Because of this it will save you time if you store all of your data within the same folder (or sub folders within) that the project is saved to.

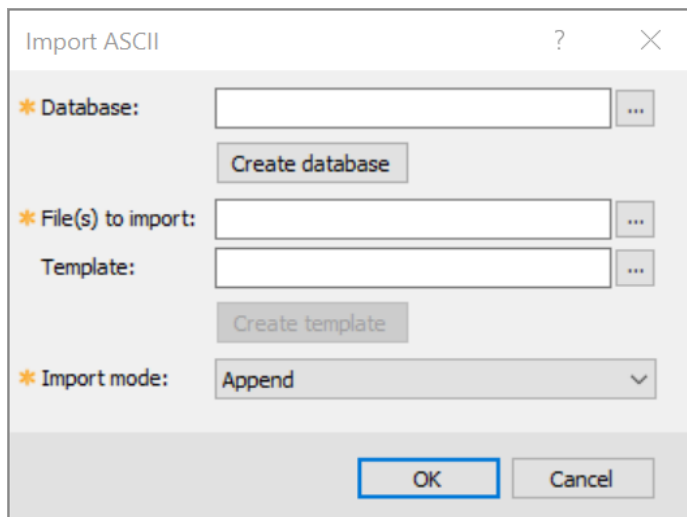
1. Create a working folder and store your survey data within
2. From the **Start** menu, launch Oasis montaj Field
3. In the window that appears click on **Create new project**
4. Navigate to your working folder
5. Provide a *name* for the project file
6. An empty project workspace appears, within which all menus are displayed



Import Survey Data

Some instruments such as Geometrics magnetometers offer the option to dump the survey data directly into a Geosoft database. Generally though, survey data is in an ASCII or binary format with a constant number of items per record. In this case we will import an ASCII data file (*.csv) with a constant number of fields.

1. From the **Database** menu, select **Import >ASCII**
2. You will be prompted to create a blank database in which to import the survey data.
3. In the dialog that appears, click on **Create database**
4. Provide a *name* for the database. Standard practice is to use the same base name as the imported file.
5. Click **OK**
6. Accept all the default parameters.
7. A blank database is created that we can import the data into.



8. Select the **File to import** *Flight01.csv*
9. Click on the Create template button

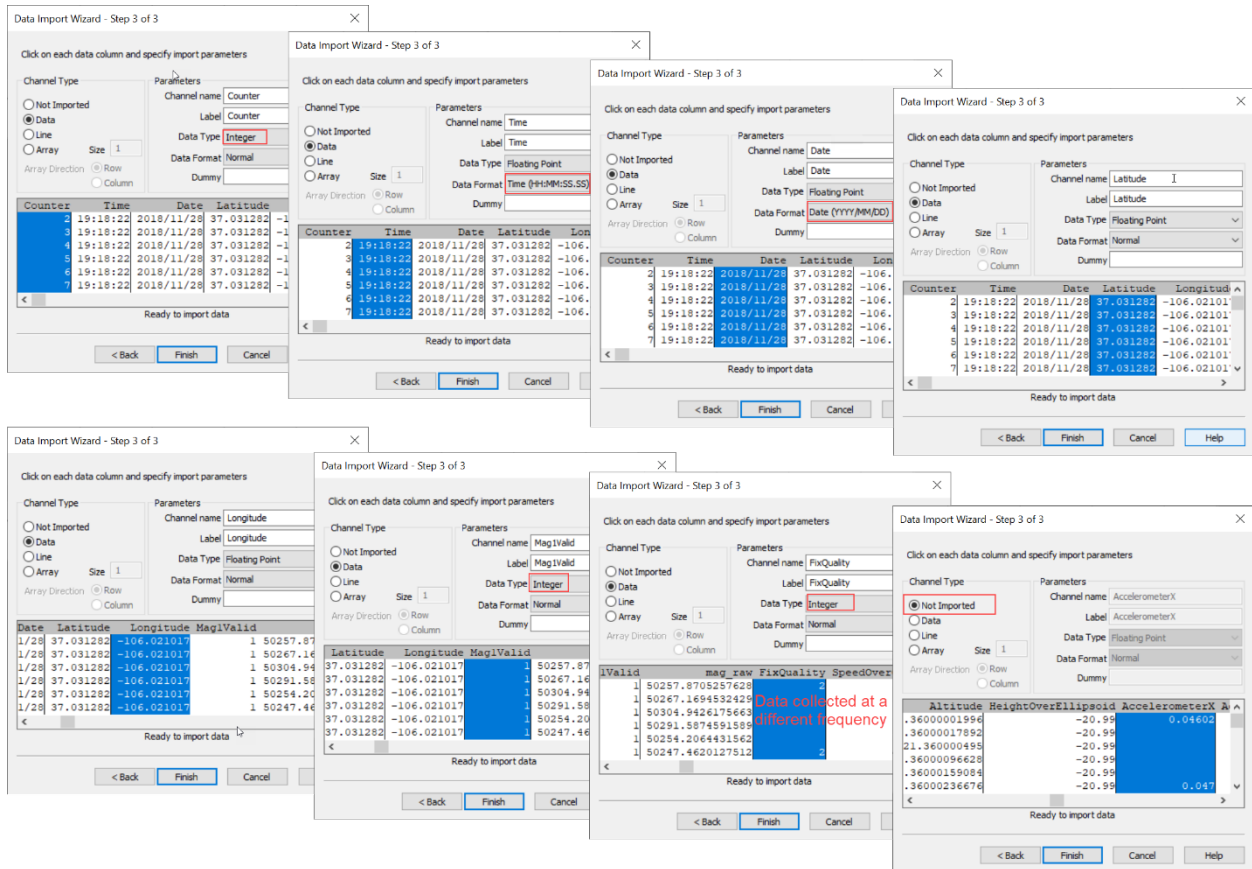
This opens the **Data Import Wizard**, which allows you to set the import parameters to suit the incoming data structure. Once created, the template file can be re-used to import other data with the same structure

10. In the **Data Import Wizard** that appears, modify the **Start import on row** parameter to a value of 2. Leave all other parameters at their defaults and click **Next**
11. In **Step 2** of the **Data Import Wizard**, click **Next**; there is nothing to modify here

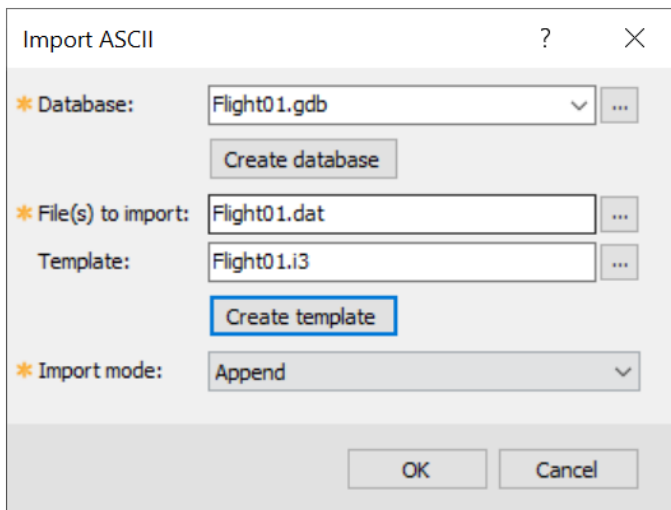
The first two steps of the import wizard define the incoming file type and internal structure. Step 3 of the import wizard allows you to specify which data fields to import and how that data appears in the database channels.

By default, all channels would be imported as double precision float values, but it is not necessary to keep all the data at the highest precision, neither will you need to import all of the data fields. Furthermore all channels need not start at the same time or be recorded at the same time interval. The Geosoft database format is flexible and supports this variability. It is recommended to keep a database as concise as possible. We will proceed to change the format of some channels and not import some data fields.

12. Move through the data columns and change the suggested defaults. The figures below highlight some necessary edits, such as:
 - a. Set the *Counter* channel to an **Integer Data Type**
 - b. Ensure that the *Date* and *Time* channels are set to *Date* and *Time Data Format* respectively
 - c. Geographic coordinate (*Latitude* and *Longitude*) channels can be displayed in degrees/minutes/seconds format, but it is often easier to work with them when displayed as double precision numbers. You can modify the **Data Format** after the data is imported
 - d. If your data contains null-values, you can specify these in the dummy field. These values will be replaced with the non-value equivalent in the Geosoft database, which is an asterisk (*)
 - e. Data in the Geosoft database is binary and is stored in a columnar order. This allows to specify the start and increment of each data column individually and independent of each other
 - f. The fields of the input file that are of no relevance can be omitted from the import by selecting the **Not Imported** option. For the sample data, no channels need to be omitted from the import



13. Click **Finish** to exit the import wizard and return to the **Import ASCII** dialog



The **Import Mode** is only relevant if you want to add new data into a database that already contains data. In that case, using the **Append** option is best, as it will append the new data to the existing data, rather than overwriting it.

14. Click **OK** to complete the import

LFlight01	Counter	Time	Date	Latitude	Longitude	Mag1Valid	mag_raw	FixQuality	SpeedOverGround	Altitude	HeightOverEllipsoid	Acceleror
0.0	2	19:18:22	2018/11/28	**	**	1	50257.8705257628	2	0.07	2421.3600001996	-20.99	
1.0	3	19:18:22	2018/11/28	**	**	1	50267.1694532429	*	0.07	2421.36000017892	-20.99	
2.0	4	19:18:22	2018/11/28	**	**	1	50304.9426175663	*	0.07	2421.36000049500	-20.99	
3.0	5	19:18:22	2018/11/28	**	**	1	50291.5874591589	*	0.07	2421.36000096628	-20.99	
4.0	6	19:18:22	2018/11/28	**	**	1	50254.2064431562	*	0.07	2421.36000159084	-20.99	
5.0	7	19:18:22	2018/11/28	**	**	1	50247.4620127512	2	0.07	2421.36000236676	-20.99	
6.0	8	19:18:22	2018/11/28	**	**	1	50302.7045901490	*	0.07	2421.36000329212	-20.99	
7.0	9	19:18:22	2018/11/28	**	**	1	50297.8834881642	*	0.07	2421.36000436500	-20.99	
8.0	10	19:18:22	2018/11/28	**	**	1	50248.9317809307	*	0.07	2421.36000558348	-20.99	
9.0	11	19:18:22	2018/11/28	**	**	1	50251.0393942718	*	0.07	2421.36000694564	-20.99	
10.0	12	19:18:22	2018/11/28	**	**	1	50285.6649778991	2	0.07	2421.36000844956	-20.99	
11.0	13	19:18:22	2018/11/28	**	**	1	50289.8582704563	*	0.07	2421.36001009332	-20.99	
12.0	14	19:18:22	2018/11/28	**	**	1	50255.6309424314	*	0.07	2421.36001187500	-20.99	
13.0	15	19:18:22	2018/11/28	**	**	1	50253.0947272678	*	0.07	2421.36001379268	-20.99	
14.0	16	19:18:22	2018/11/28	**	**	1	50275.1913959598	*	0.07	2421.36001584444	-20.99	
15.0	17	19:18:22	2018/11/28	**	**	1	50262.5261819092	2	0.07	2421.36001802836	-20.99	
16.0	18	19:18:22	2018/11/28	**	**	1	50260.3017915425	*	0.07	2421.36002034252	-20.99	
17.0	19	19:18:22	2018/11/28	**	**	1	50260.1123145839	*	0.07	2421.36002278500	-20.99	
18.0	20	19:18:22	2018/11/28	**	**	1	50277.6997946620	*	0.07	2421.36002535388	-20.99	
19.0	21	19:18:22	2018/11/28	**	**	1	50273.2923087198	*	0.07	2421.36002804724	-20.99	
20.0	22	19:18:22	2018/11/28	**	**	1	50246.2186876587	2	0.07	2421.36003086316	-20.99	
21.0	23	19:18:22	2018/11/28	**	**	1	50252.4555518565	*	0.07	2421.36003379972	-20.99	
22.0	24	19:18:22	2018/11/28	**	**	1	50273.9001908281	*	0.07	2421.36003685500	-20.99	
23.0	25	19:18:22	2018/11/28	**	**	1	50298.4352017435	*	0.07	2421.36004002708	-20.99	
24.0	26	19:18:22	2018/11/28	**	**	1	50266.5023809085	*	0.07	2421.36004331404	-20.99	
25.0	27	19:18:22	2018/11/28	**	**	1	50238.2172716721	2	0.07	2421.36004671396	-20.99	

15. Click on the **Save** icon on the database toolbar (or use **Ctrl_S**) to save the database

In this case the magnetic survey is imported as a single line or group of data; this group is called *LFlight01*. We will break the magnetic data into its separate lines later in the workflow.

The black triangles to the right of a channel name indicate that the channel is protected, which means that you cannot modify the data. Should you need to modify the data of a channel you can right click on the channel header cell and click on the **Protected** option. It is best practice to make a copy of the channel and edit this copy.

The double asterisk in a data cell indicated that the cell is not wide enough to show the entire numeric or string value. You can widen the column by clicking and dragging it's border.

The single asterisk in a data cell indicated that either the corresponding value is a non-value (dummy) or the sample increment of this field is bigger than the minimum increment. For example, the *FixQuality* channel is recorded at every 5th sample interval relative to the other channels. The asterisks in this channel indicate that there are no values (hence the dummy values) at those rows.

Counter	Time	Date	Latitude	Longitude	Mag1Valid	mag_raw	FixQuality	SpeedOverGround	Altitude	HeightOverEllipsoid	AccelerometerX	AccelerometerY
0.0	2	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	1	50257.871	2	0.07	2421.36	-20.99	0.04602
1.0	3	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	1	50267.169	*	0.07	2421.36	-20.99	*
2.0	4	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	1	50304.943	*	0.07	2421.36	-20.99	*
3.0	5	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	1	50291.587	*	0.07	2421.36	-20.99	*
4.0	6	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	1	50254.206	*	0.07	2421.36	-20.99	*
5.0	7	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	1	50247.462	2	0.07	2421.36	-20.99	0.04700
6.0	8	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	1	50302.705	*	0.07	2421.36	-20.99	*
7.0	9	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	1	50297.883	*	0.07	2421.36	-20.99	*
8.0	10	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	1	50248.932	*	0.07	2421.36	-20.99	*
9.0	11	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	1	50251.039	*	0.07	2421.36	-20.99	*
10.0	12	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	1	50285.665	2	0.07	2421.36	-20.99	0.04834
11.0	13	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	1	50289.858	*	0.07	2421.36	-20.99	*
12.0	14	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	1	50255.631	*	0.07	2421.36	-20.99	*
13.0	15	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	1	50253.095	*	0.07	2421.36	-20.99	*
14.0	16	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	1	50275.191	*	0.07	2421.36	-20.99	*
15.0	17	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	1	50262.526	2	0.07	2421.36	-20.99	0.04620
16.0	18	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	1	50260.302	*	0.07	2421.36	-20.99	*
17.0	19	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	1	50260.112	*	0.07	2421.36	-20.99	*
18.0	20	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	1	50277.700	*	0.07	2421.36	-20.99	*
19.0	21	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	1	50273.292	*	0.07	2421.36	-20.99	*
20.0	22	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	1	50246.219	2	0.07	2421.36	-20.99	0.04773
21.0	23	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	1	50252.456	*	0.07	2421.36	-20.99	*
22.0	24	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	1	50273.900	*	0.07	2421.36	-20.99	*
23.0	25	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	1	50298.435	*	0.07	2421.36	-20.99	*
24.0	26	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	1	50266.502	*	0.07	2421.36	-20.99	*
25.0	27	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	1	50238.217	2	0.07	2421.36	-20.99	0.04706

You can change the displayed number of decimals and the number format by right clicking on a channel and selecting edit. For example you can change the Longitude and Latitude from decimal degrees to DD:MM:SS representation.

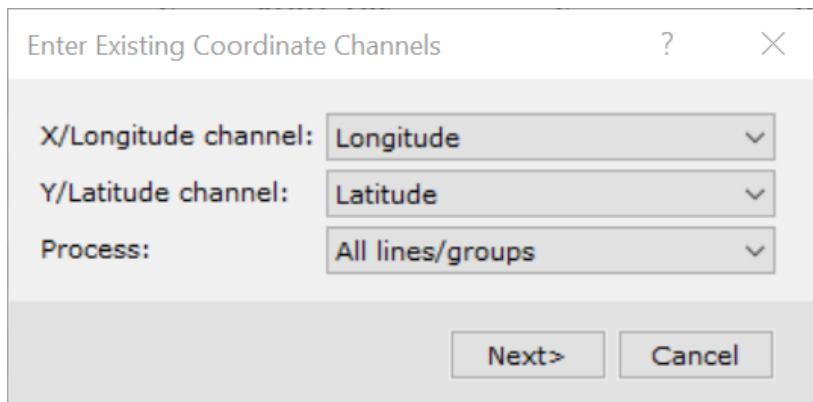
Note that all Oasis montaj Field tools have a comprehensive help file, which can be accessed by clicking on the ? icon at the top right of a dialog.

Setting and Reprojecting a Coordinate System

You will have observed that the incoming data is geo-located using Geographic coordinates. In most cases involving smaller-scale surveys such as this, it is better to work with the data in projected coordinates, where the unit of measurement is in metres or feet.

In Oasis montaj Field, we can easily reproject the data from a Geographic system into a Projected system, which creates a new set of coordinate channels in the database:

1. Open the **Coordinates** menu and select **New Projected Coordinate System**. The **Enter Existing Coordinate Channels** dialog appears



Enter Existing Coordinate Channels

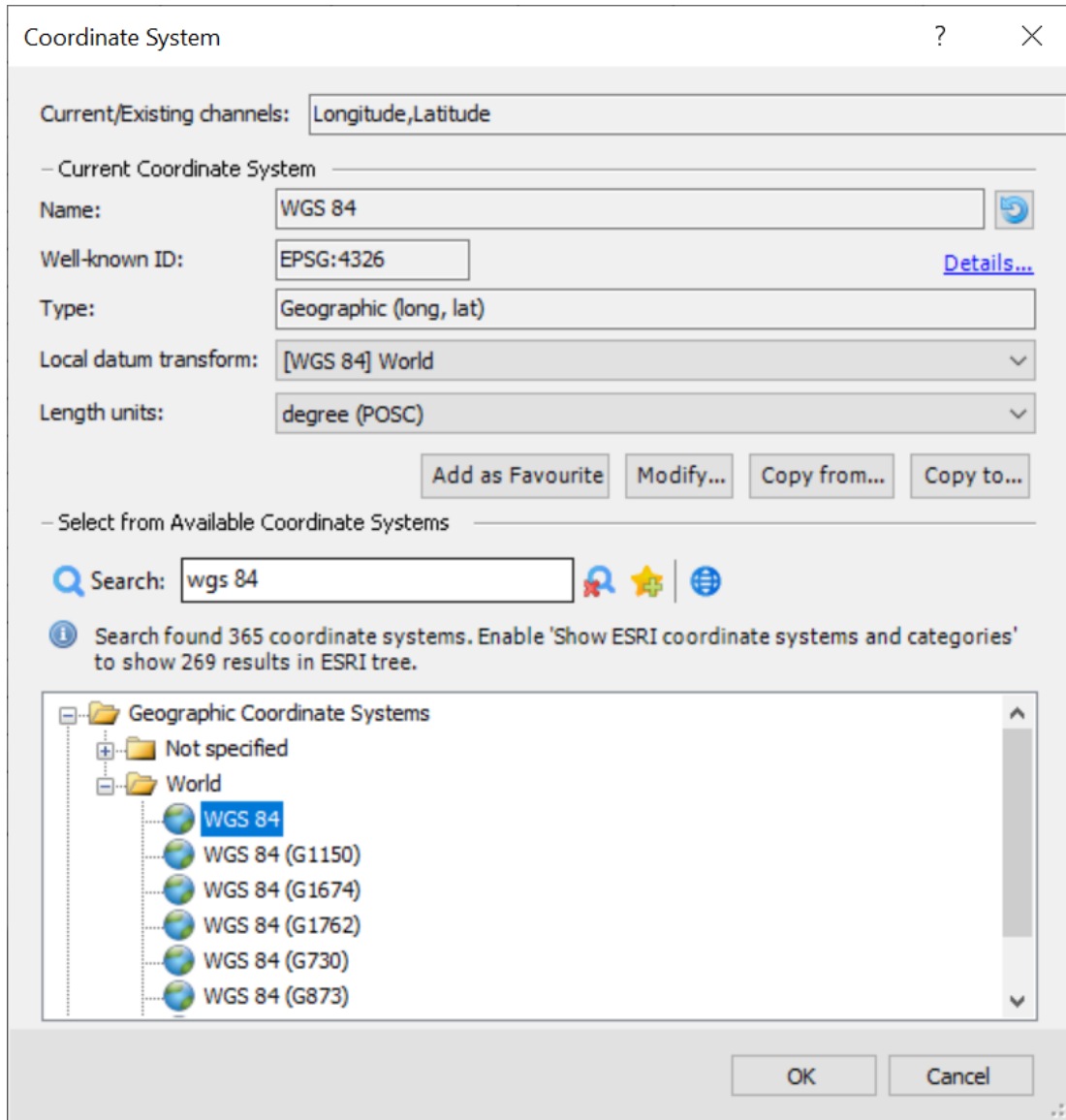
X/Longitude channel: Longitude

Y/Latitude channel: Latitude

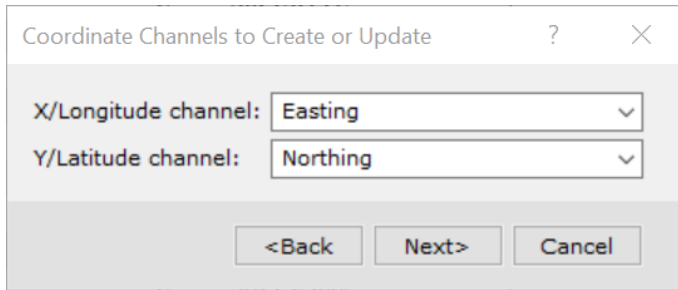
Process: All lines/groups

Next> Cancel

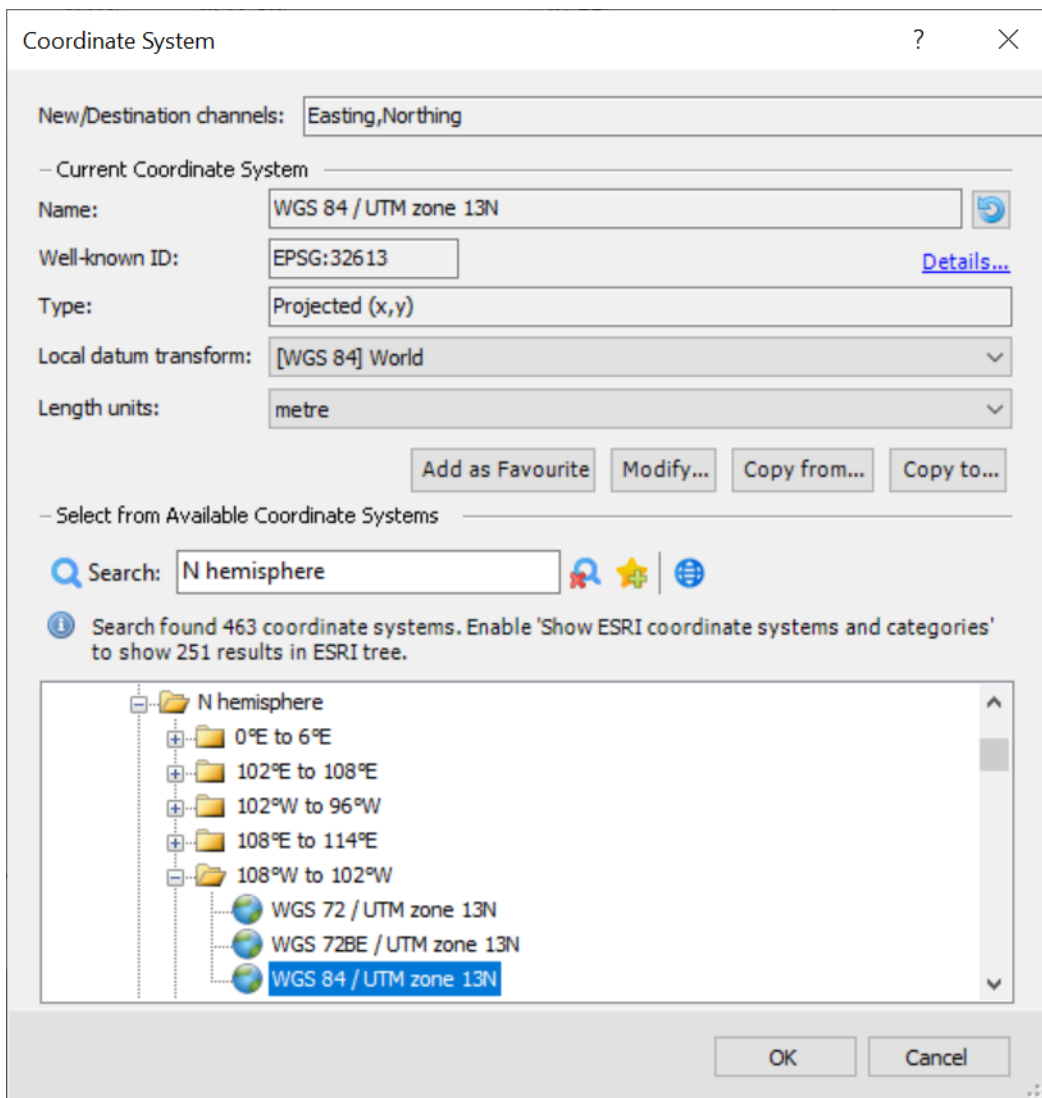
2. From the dropdown list for the **X/Longitude** and **Y/Latitude channels**, select *Longitude* and *Latitude* respectively
3. Click **Next**. The Coordinate System dialog appears.



4. In the **Search** field of the dialog, type the geographic coordinate system of the survey and then press the Enter key. Most often, this system will be the standard U.S. Department of Defense *WGS 84*, as it is with the sample data. The pane that displays the coordinate systems will update to show relevant systems
5. Select **WGS 84**
6. Click **OK**. The **Coordinate Channels to Create or Update** dialog appears.



7. In the **X/Longitude channel** field, type *Easting* and in the **Y/Latitude channel** field, type *Northing*
8. Click **Next**. The **Coordinate System** dialog opens again, this time so we can set the desired projected coordinate system



9. In the **Search** field, type *N hemisphere* and press Enter.
10. In the **Coordinate Systems** pane, expand the *Projected Coordinate systems* folder.
11. Navigate to and select the desired coordinate system, which in this case is *WGS 84 / UTM Zone 13*

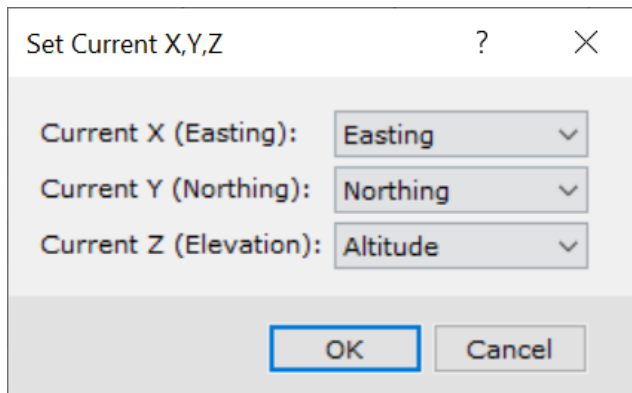
To filter down the list of projected coordinate systems further, you can enter the zone (13N). If you do not know the zone, you can start with a general geographic location such as N Hemisphere, expand it and find the zone based on the longitudinal extent of your survey.

Note that a selected coordinate system can be added to a list of favourites, by clicking on the **Add to Favourites** icon. Once you add a system, a Favourites folder will appear at the top of the Coordinate Systems pane and display all favourites within, making it easier to find systems that you use often.

12. Click **OK**

The Easting and Northing channels are added to the database. The final step is to set these channels as the database coordinate channels, meaning that these channels will be used whenever the data is gridded, plotted on a map or in a 3D view.

13. Go to the **Coordinates** menu and select **Set Current X,Y, Z,,** which opens the corresponding dialog



14. Use the dropdown lists to set the **Current X, Y and Z** channels as *Easting, Northing, Altitude* respectively
15. Click **OK**

The designated coordinate channels are denoted in the database by blue x, y and z icons within the channel header cells, as shown below.

Easting x	Northing y	Altitude z
409189.82	4098829.92	2421.36
409189.82	4098829.92	2421.36
409189.82	4098829.92	2421.36
409189.82	4098829.92	2421.36

Rearranging Database Channels

You can rearrange database channels within a database to suit your requirements. For example, you might want to group your coordinate channels so that you can view them together.

1. Click once on the header cell of *Easting* channel to select it, then press your spacebar. Repeat this process for the *Northing* channel. This action does not delete the channels from the database, it just removes them from the display
2. Move the cursor to the channel immediately to the right of the *Longitude* channel, right-click on the channel header cell, then select **Insert Column**. Repeat this to produce a second empty channel
3. Right-click on the first empty cell, select the **List** option and then select *Easting* from the list of hidden channels. Repeat this to display the *Northing* channel in the other empty channel

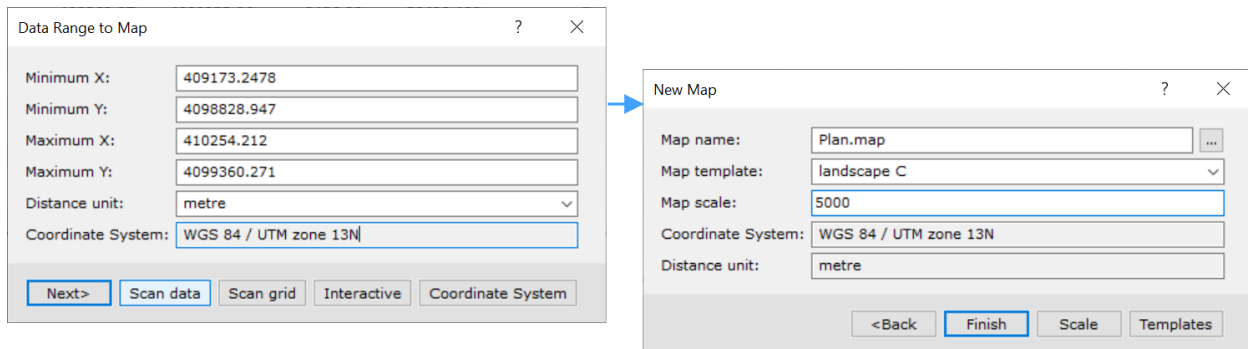
Counter	Time	Date	Latitude	Longitude	Easting	Northing	Mag1Valid	mag_raw	FixQuality	SpeedOverGround	Altitude	HeightOverEllip
0.0	2	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	409189.82	4098829.92	1	50257.871	2	0.07	2421.36
1.0	3	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	409189.82	4098829.92	1	50267.169	*	0.07	2421.36
2.0	4	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	409189.82	4098829.92	1	50304.943	*	0.07	2421.36
3.0	5	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	409189.82	4098829.92	1	50291.587	*	0.07	2421.36
4.0	6	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	409189.82	4098829.92	1	50254.206	*	0.07	2421.36
5.0	7	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	409189.82	4098829.92	1	50247.462	2	0.07	2421.36
6.0	8	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	409189.82	4098829.92	1	50302.705	*	0.07	2421.36
7.0	9	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	409189.82	4098829.92	1	50297.883	*	0.07	2421.36
8.0	10	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	409189.82	4098829.92	1	50248.932	*	0.07	2421.36
9.0	11	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	409189.82	4098829.92	1	50251.039	*	0.07	2421.36
10.0	12	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	409189.82	4098829.92	1	50285.665	2	0.07	2421.36
11.0	13	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	409189.82	4098829.92	1	50289.858	*	0.07	2421.36
12.0	14	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	409189.82	4098829.92	1	50255.631	*	0.07	2421.36
13.0	15	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	409189.82	4098829.92	1	50253.095	*	0.07	2421.36
14.0	16	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	409189.82	4098829.92	1	50275.191	*	0.07	2421.36
15.0	17	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	409189.82	4098829.92	1	50262.526	2	0.07	2421.36
16.0	18	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	409189.82	4098829.92	1	50260.302	*	0.07	2421.36
17.0	19	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	409189.82	4098829.92	1	50260.112	*	0.07	2421.36
18.0	20	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	409189.82	4098829.92	1	50277.700	*	0.07	2421.36
19.0	21	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	409189.82	4098829.92	1	50273.292	*	0.07	2421.36
20.0	22	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	409189.82	4098829.92	1	50246.219	2	0.07	2421.36
21.0	23	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	409189.82	4098829.92	1	50252.456	*	0.07	2421.36
22.0	24	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	409189.82	4098829.92	1	50273.900	*	0.07	2421.36
23.0	25	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	409189.82	4098829.92	1	50298.435	*	0.07	2421.36
24.0	26	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	409189.82	4098829.92	1	50266.502	*	0.07	2421.36
25.0	27	19:18:22	2018/11/28	37.01.52.62	-106.01.15.66	409189.82	4098829.92	1	50238.217	2	0.07	2421.36

Note that the Easting and Northing channels are not protected, like the other channels. Channels are automatically set to Protected only when they are created by importing data, otherwise you need to assign Channel Protection yourself.

Display the Survey Line Path on a Map

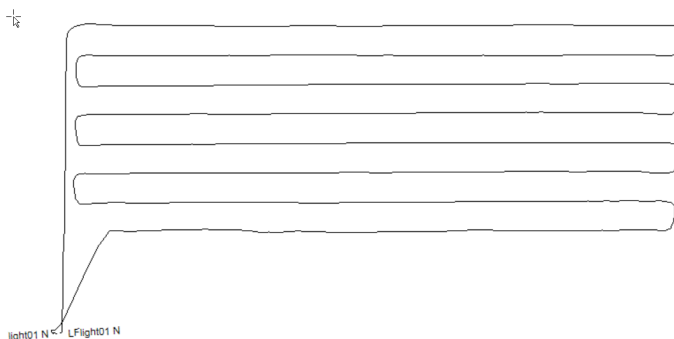
Once the data is geolocated, it is a good idea to view the survey lines on a map to assess their precision. We will now create a map and plot the line path on it.

1. Open the **Map Tools** menu and then select **New Map from > X,Y**. The **Data range to Map** dialog appears
2. Click on the **Scan Data** button. This option will interrogate the database and populate the dialog accordingly, which sets the extents of the map
3. Click **Next>**. The **New Map** dialog appears
4. Enter a name for the map in the **Name** field
5. Select an appropriate **Map template**. This configures the map based upon the chosen orientation and paper size. *Landscape A4* is suitable for the sample data
6. Click **Scale** to calculate the smallest map scale that fits the template.
7. You can adjust the scale to the nearest round number that is greater than the calculated scale (e.g. **5000** if you choose a *Landscape A4* template)
8. Click **Finish**. This will create a blank, scaled, 2D map



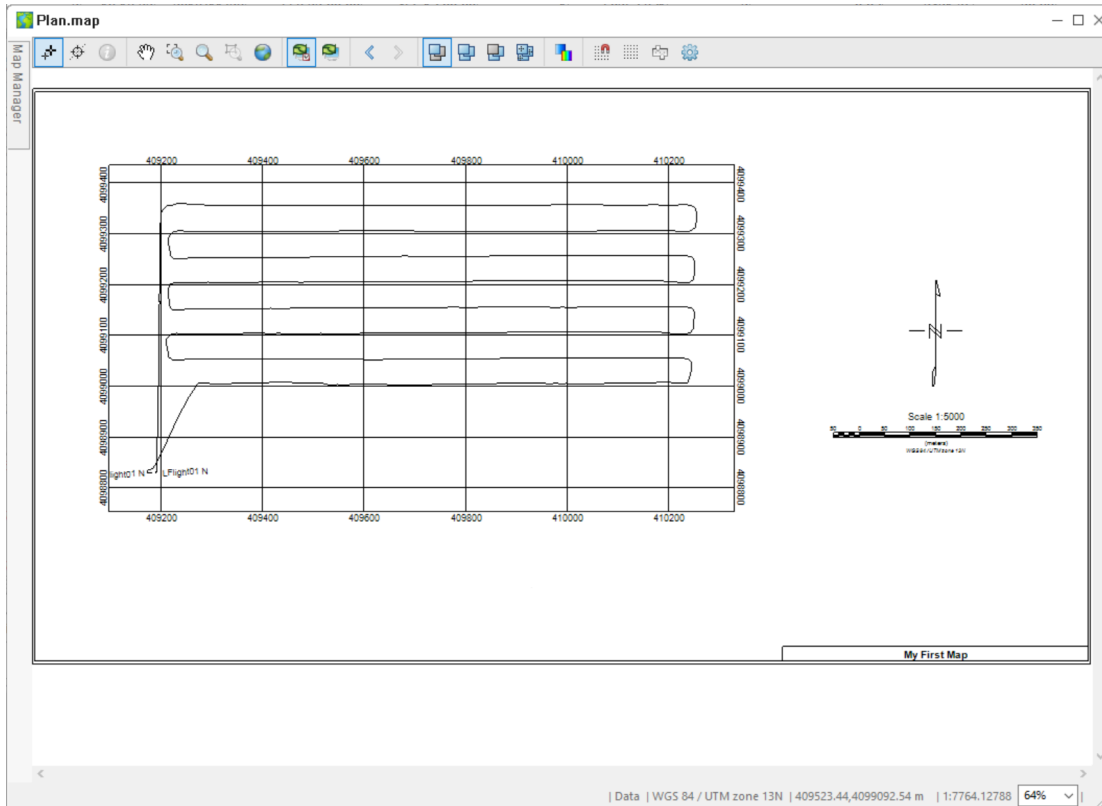
Now we will plot the survey line path on the map.

19. Open the **Map Tools** menu and select **Line Path**, to open the **Line Path** dialog
10. Accept all of the default parameters and click **OK** to plot the line path



We can also create a reference grid, north arrow, scale bar and title block for the map, by creating what we call a **Base Map**.

11. Open the **Map Tools** menu and select **Draw Base Map**
12. In the **Draw Base Map** dialog, accept all of the default parameters and click **Next**.
13. In the second dialog, click **Next** and then click **Finish** to plot the base map.



Map elements such as the scale bar and north arrow can be moved around, by clicking on them to select them, then dragging them to a different area of the map.

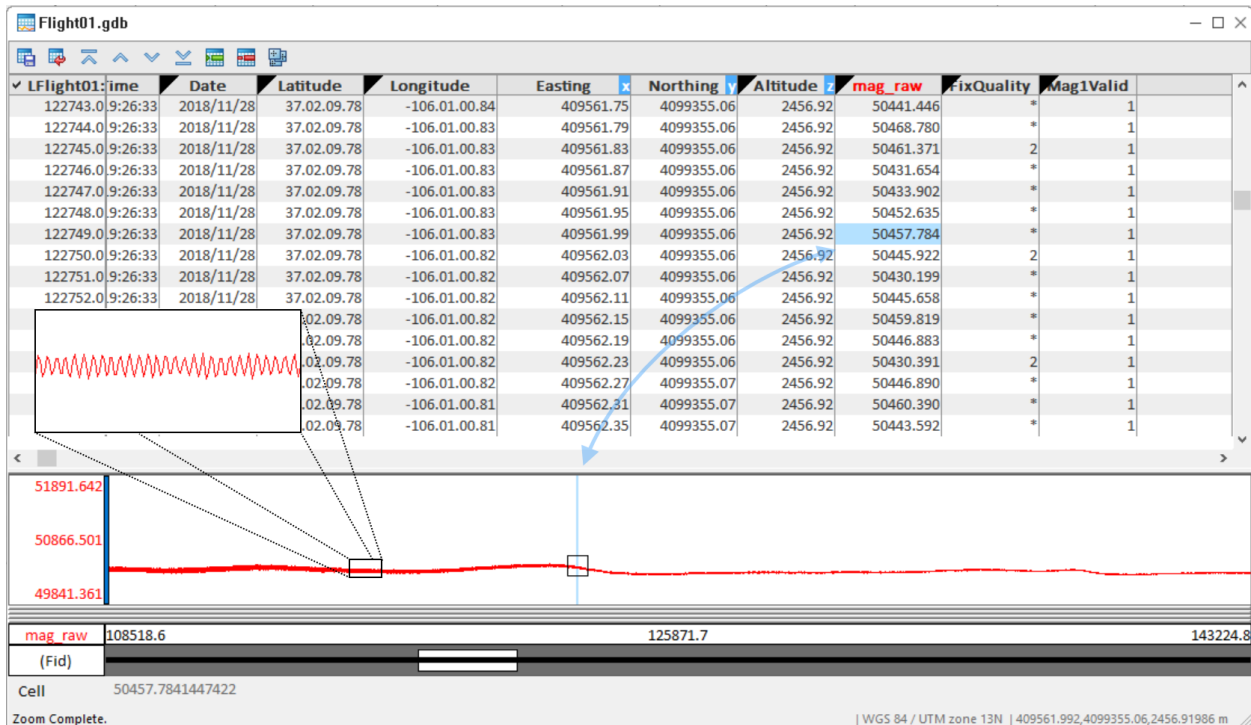
If you are happy with the map, press **Ctrl_S** to save the map.

Display a Profile Window in a Database

Displaying geophysical data in a profile window can be very useful for identifying bad or noise data, as well as for designing database filters. We will now display a profile window in the database.

1. In the **Flight01** database, right-click on the header cell of the *Mag1Data* channel
2. From the list of tools select **Show Profile**

The profile will be displayed in a profile window, which opens at the base of the database window.



When you click on the profile, the cell containing the corresponding data value is highlighted. If you have your map visible, the map cursor will also move to the corresponding location on the line path.

Right-click within the profile window and explore the various options such as zooming and changing the profile scaling.

Applying a Filter to a Database Channel

Spikes and systematic noise can be removed from a database channel manually, but it is easier to remove noise by using a combination of filters. We will now create a filter to remove spikes from the sample data.

1. Open the **Database Tools** menu and select **Filters > Despike Channel**
2. Select the **Input channel** (*Mag1Data*) to despike and provide a name for the **Output channel**
3. The **Time** channel will be set automatically should there be a channel with that name in the database. Otherwise, select your time channel. The time data should be in units of *hours*
4. The **Over number of seconds** channel is set to 3 by default, which should be appropriate for removing spikes from your data, however you may need to adjust this based on assessing the results
5. Click **OK** to run the filter

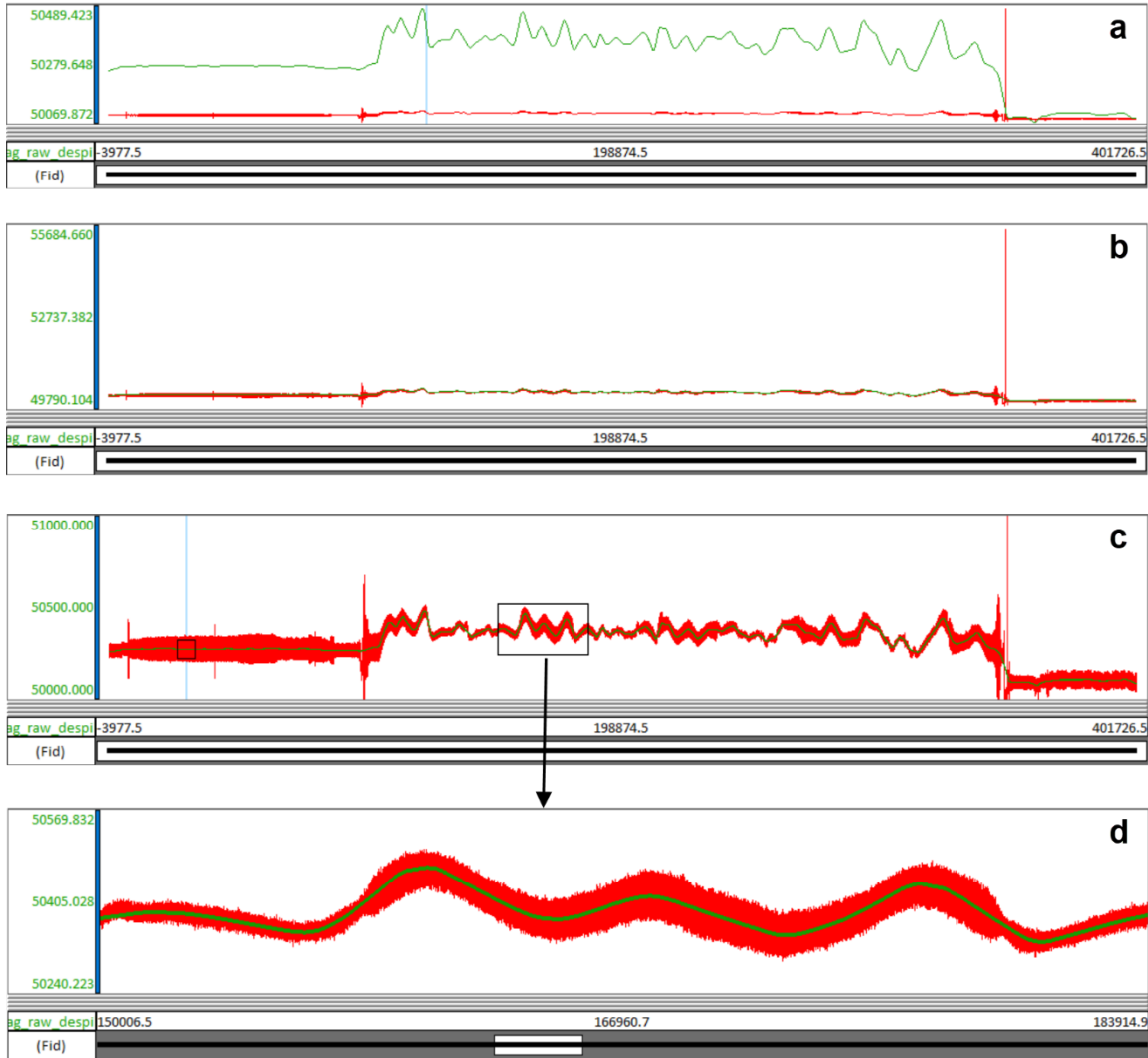
The resulting filtered profile is displayed in the same pane as the input profile. By default each profile is scaled to fill the vertical space. If the extents of the profiles are very different you cannot directly compare them (see pane "a" in the Figure below).

6. To display the input and output channels on the same scale, right click in the profile window and select **Y Axis Options**
7. Select **Same axis scale for all profiles** then click **OK**

The profiles are now on the same scale, as shown in pane "b" of the Figure below. You will likely not see much detail because the scale of the profile window is set to accommodate the largest spike in the input data.

8. Manually reset the minimum /maximum in the profile pane by clicking on the numbers at the left end of the profile window and typing a new value. For the sample data, a minimum of *50000* and a maximum of *51000* work well (see pane "c" in the Figure below)

You can also use the **Zoom** tool (right-click in the profile window and define a box around the area of interest with your mouse) to get a closer look at profile sections, as shown in plate "d" of the figure below.



Please note also the following:

- The horizontal scale of the profile window is by default set to the fiducial channel (record number) in the database, however it can be changed to a different channel by right-clicking in the profile window and selecting **X Axis Options**.
- For the sample data, the output channel (green profile in the Figure above) is free of spikes but also systematic noise, which has been removed using the **Remove Systematic Noise** filter (*Database Tools Menu > Filters > Remove Systematic Noise*) to remove the high frequency noise present in this data.

Reducing the Size of a Database

Databases containing geophysical data are often large in size. There are a couple of ways in which we can manage this in Oasis montaj Field, without affecting data quality:

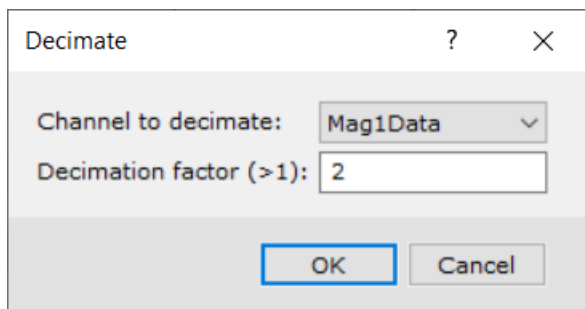
- Decimating a database
- Compacting a database

Note that neither of these steps are required for the sample data.

Decimating a Database

Magnetic and other airborne data is often collected at very high frequencies, i.e. 1KHz, which is often a lot higher than is required for interpreting geology. Oasis montaj Field allows you to desample the data and make the database smaller, without losing the detail required for interpretation.

Decimating a database can be done by opening the **Database Tools** menu, selecting **Channel Tools**, and then selecting **Decimate**. The tool allows you to decimate the data by any factor greater than one; a factor of two would remove every second sample and so on.

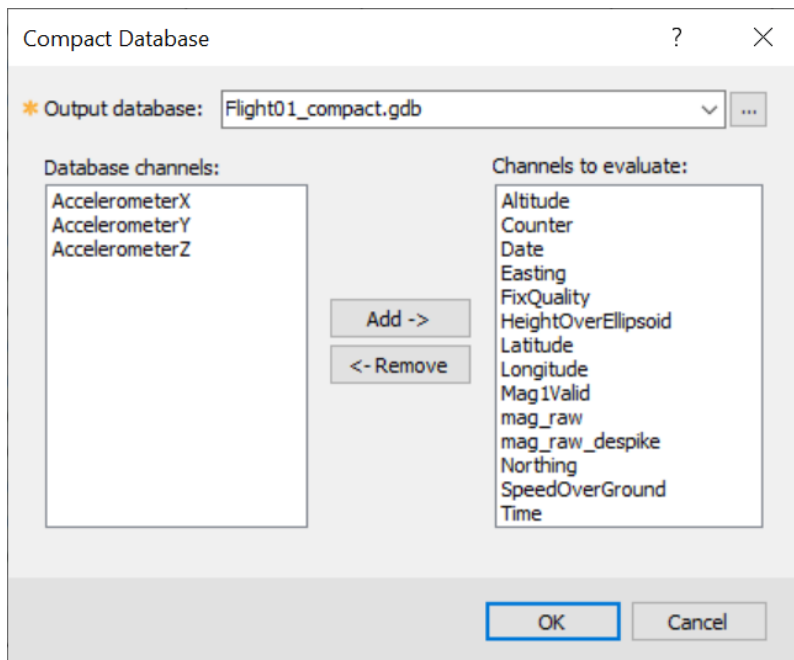


For more information on this tool, please refer to the application help.

Compacting a Database

Compacting a database allows you to remove any data records that contain dummy values from the database.

1. Open the **Database Tools** menu and select **Compact Database**
2. Select the channel(s) you would like to analyse to a new compact database. Data records with dummies in any of these channels will be removed from the output database
3. Click **OK** to run the compaction



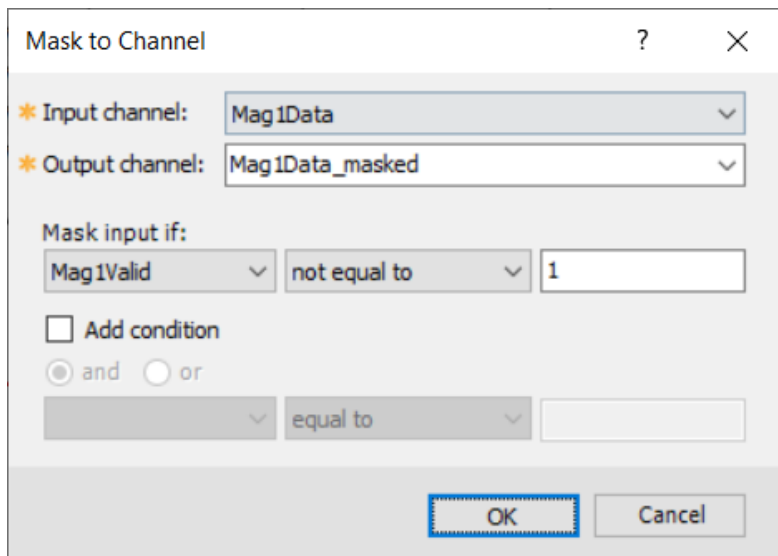
When the output database is created, a pop up report will appear that informs you how much smaller (as a percentage) the output database is compared to the original.

Masking Flagged Data

Often when collecting data, a couple of "flag" channels are recorded, which indicate if satellite coverage is sufficient for accurate positioning and if the sensor is functioning properly. Oasis montaj Field offers a simple conditional tool that allows you to mask out sensor data according to one or more flag channels. In the sample data, there are several such channels, including *FixQuality* and *Mag1Valid*.

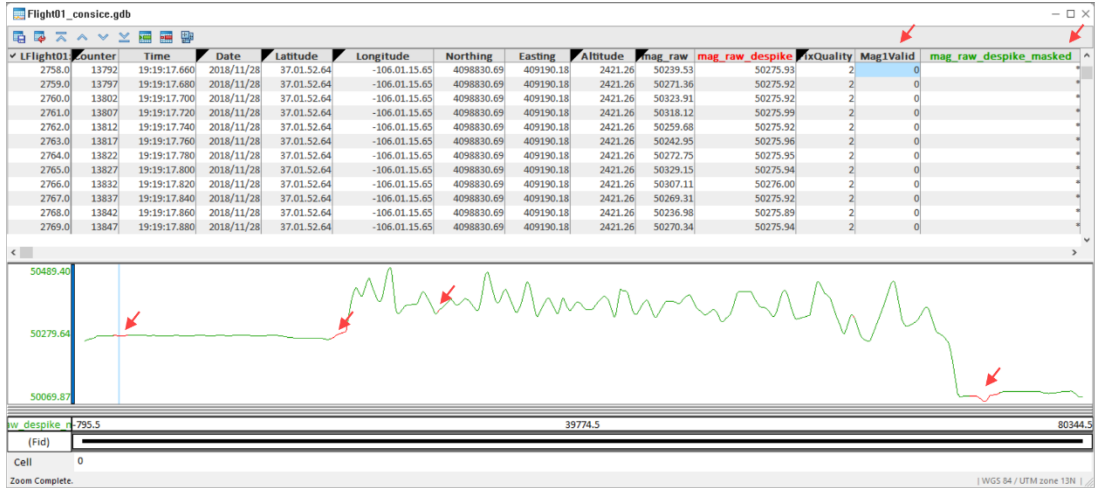
For the sample data, let's assume that a *Mag1Valid* value of 1 indicates the sensor is operating properly. We could use the tool to create a conditional filter to mask out data that does not satisfy this criteria:

1. Open the **Database Tools** menu and select **Filters**, then **Mask to Channel**
2. Select the **Input** channel
3. Provide a name for the **Output channel**, or select a channel from the list to write to
4. Create the **Mask input** condition as shown in the dialog below



5. Click **OK**

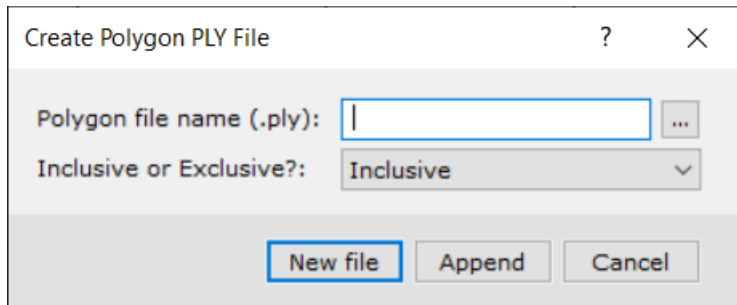
The act of masking in this case replaces the input data with a dummy value, where either of the conditions are not met. In the example below, sections where the data have been masked are highlighted.



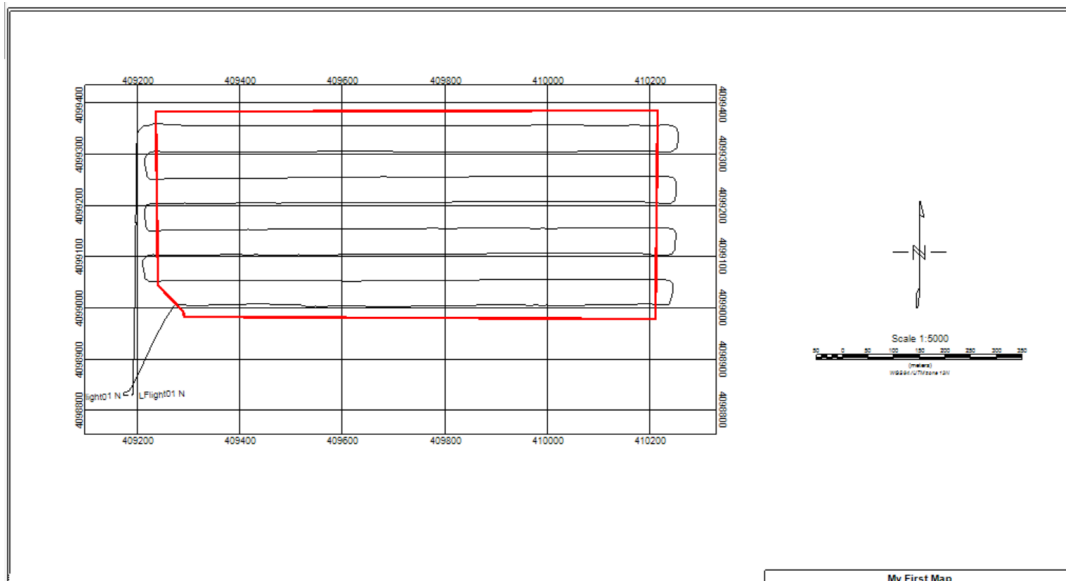
Removing Unwanted Survey Path Segments

All raw data from airborne surveys will contain data that is recorded while the aircraft is taking off, turning around between survey lines and landing. The takeoff, turnaround and Landing segments of the survey can be removed by creating a polygon file (or import one from ArcGIS) that covers the desired area of interest, then windowing the database to the polygon, so that data which lies outside the polygon is replaced by dummy values.

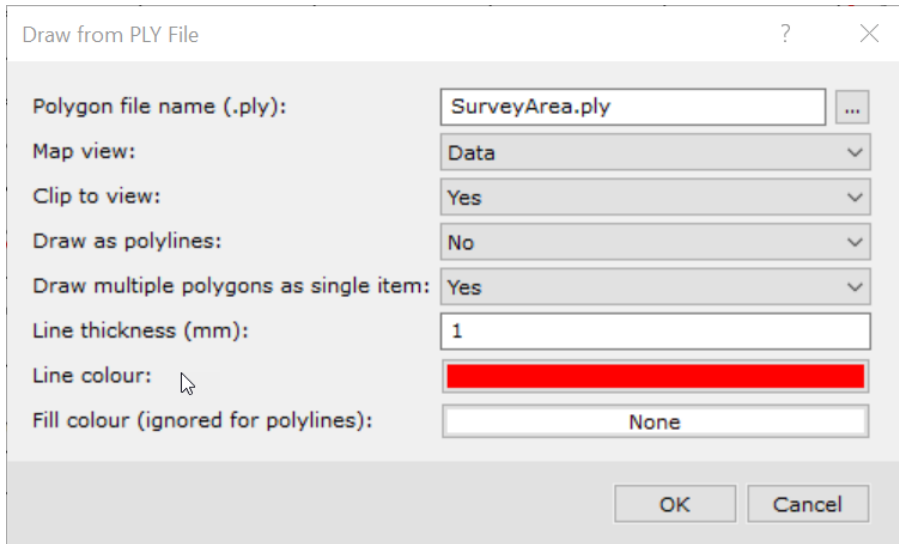
1. Ensure that the map created previously is selected
2. Open the **Database Tools** menu, select **Window Data** and then select **Create Polygon File**



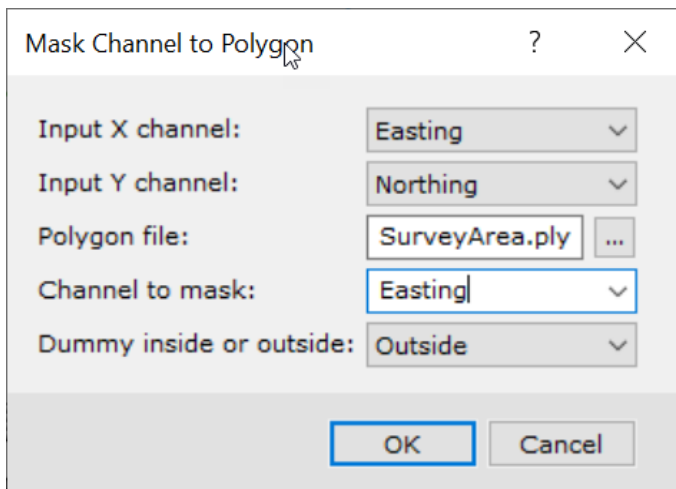
3. Provide a **Polygon file name**
4. Click **New File**
5. You will be prompted to draw the polygon on the map. Draw it to exclude the undesirable segments (as shown in red below)



6. To display the polygon on the map, open the **Map Tools** menu and select **Draw from PLY file**



7. Load the polygon file you just created as the input
8. For contrast, select a colour other than black
9. Accept the other default parameters
10. Click **OK**
11. To window the database, open the **Database Tools** menu, select **Window Data** and then **Mask Channel to Polygon**



12. Load the **Polygon file** and select the **Channel to mask** as *Easting*
13. Ensure that (in this case) that **Dummy Outside** is selected
14. Click **OK**

Break Data into Separate Lines

Magnetic data that is recorded and imported into Oasis montaj Field as a single, continuous line (such as the sample data) should be broken up into separate parallel flight lines for further processing and interpretation. This can be achieved in Oasis montaj field using several different methods:

- Split a line based on a line channel (which contains line numbers)
- Split on X,Y breaks; data will be broken up based on assessing the data for gaps of a specified size between X and Y coordinates
- Split on change in survey direction
- Split on fiducial numbers

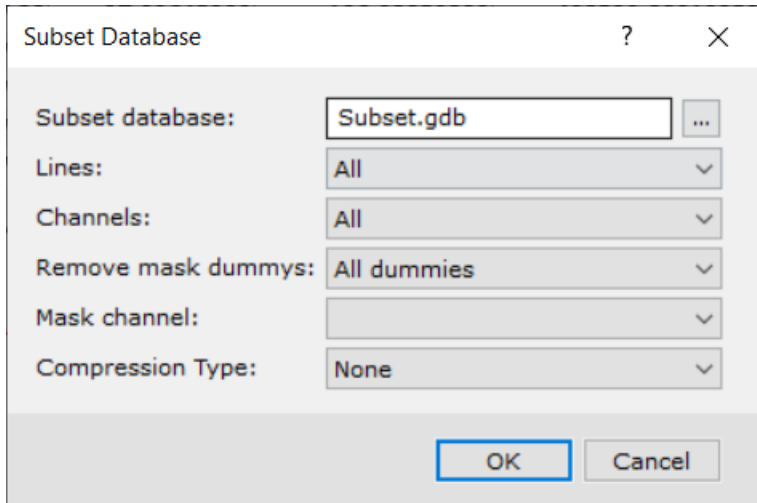
As the sample data does not contain a line channel, the split on X,Y breaks method is the easiest to use.

1. Open the **Database Tools** menu, select **Line Tools** and then **Split on XY Breaks**

2. In this case, we can simply specify a **Down line distance tolerance** of 5 metres. The specified distance should always be shorter than the turnarounds
3. Set the line number syntax to **Sequential**
4. Leave the other parameters as they are
5. Click **OK**

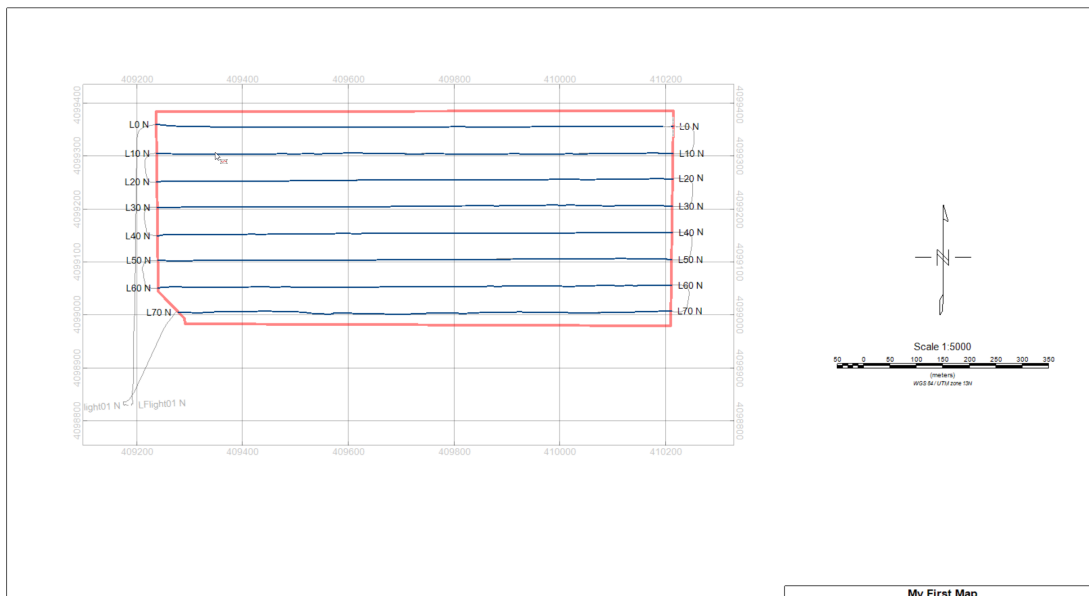
The database is now broken down into individual lines, however the dummy segments that coincide with takeoff, turnaround and landing zones are still included in the database. These dummy segments can be eliminated in the process of creating a subset database:

1. Open the **Database** menu, select **Export** and then **Subset GDB**



1. Provide a **Subset database** name
2. For the **Remove mask dummies** option, select **All dummies**
3. Set the **Mask channel** as *Easting*
4. Leave the remaining parameters at their defaults and click **OK**

Plotting a line path on the map now, using the subset database, will show the separated lines.

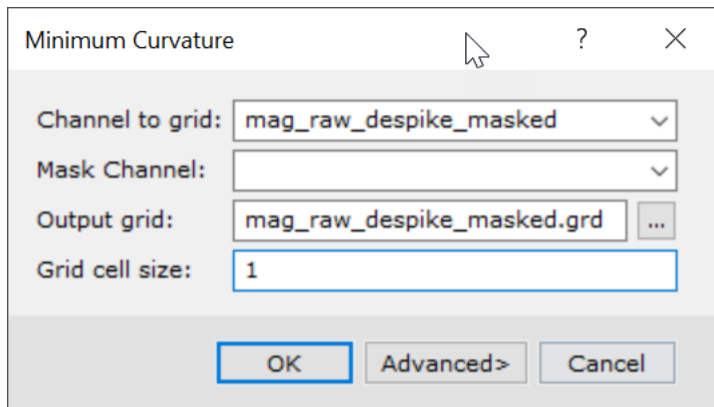


Gridding Sensor Data

Gridding the data allows us to look for signs that the sensor data suffers from effects such as lag, heading or instrument drift. We will first demonstrate gridding in version 9.10 of Oasis montaj Field, after which we will demonstrate the same process in version 2021.2, where the gridding interface has changed significantly.

Gridding in Version 9.10

1. Ensure the correct (filtered, masked, line separated) database is selected
2. Open the **Grid and Image** menu, select **Gridding** and then **Minimum Curvature**

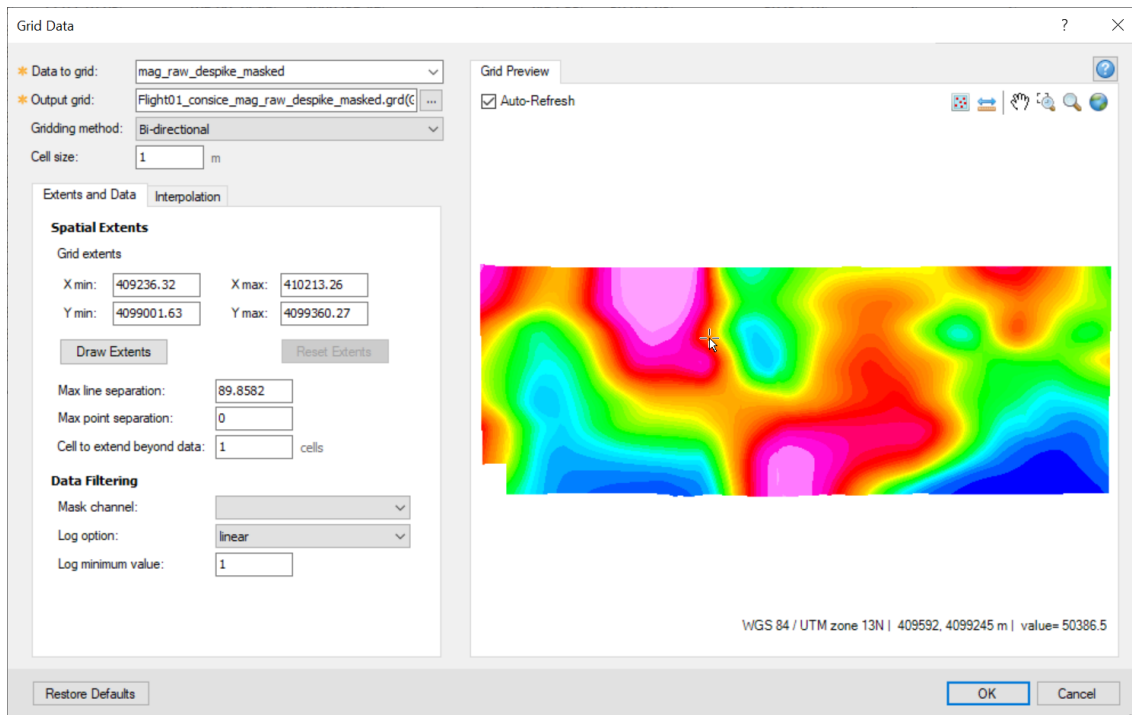


1. For the **Channel to grid**, select the appropriate database channel
2. Leave the **Mask channel** empty
3. Specify a name for the **Output grid**
4. Leave the **Grid Cell size** field empty. This allows the program to calculate an appropriate cell size based on the gridding method and sample distribution across the area of interest
5. Click **OK**

The grid will be created and displayed in a temporary grid window. We will display it on the map shortly.

Gridding in Version 2021.2

1. Ensure the correct (filtered, masked, line separated) database is selected
2. Open the **Grid and Image** menu, select **Gridding** and then **Grid Data**



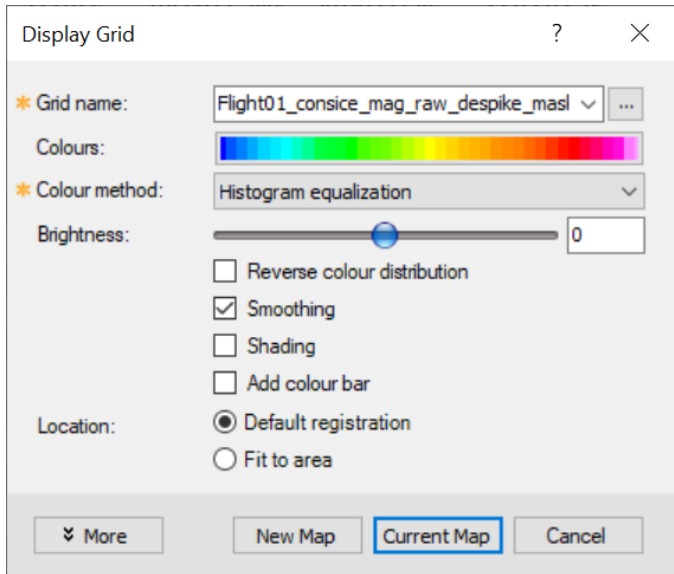
The biggest change in the gridding interface is the presence of a preview window, which allows you to see the effects of changing gridding parameters in real time.

3. For the **Channel to grid**, select the appropriate database channel
4. Specify a name for the **Output grid**
5. Choose an appropriate **Gridding method**. Bi-directional gridding is most appropriate for data that is distributed along parallel lines, whereas minimum curvature allows for more random data distributions (i.e. you could use it to grid the sample data before it was broken into separate lines)
6. Leave the **Grid Cell size** field empty. This allows the program to calculate an appropriate cell size based on the gridding method and sample distribution across the area of interest
7. When the preview looks reasonable, click **OK**

Displaying the Grid on a Map

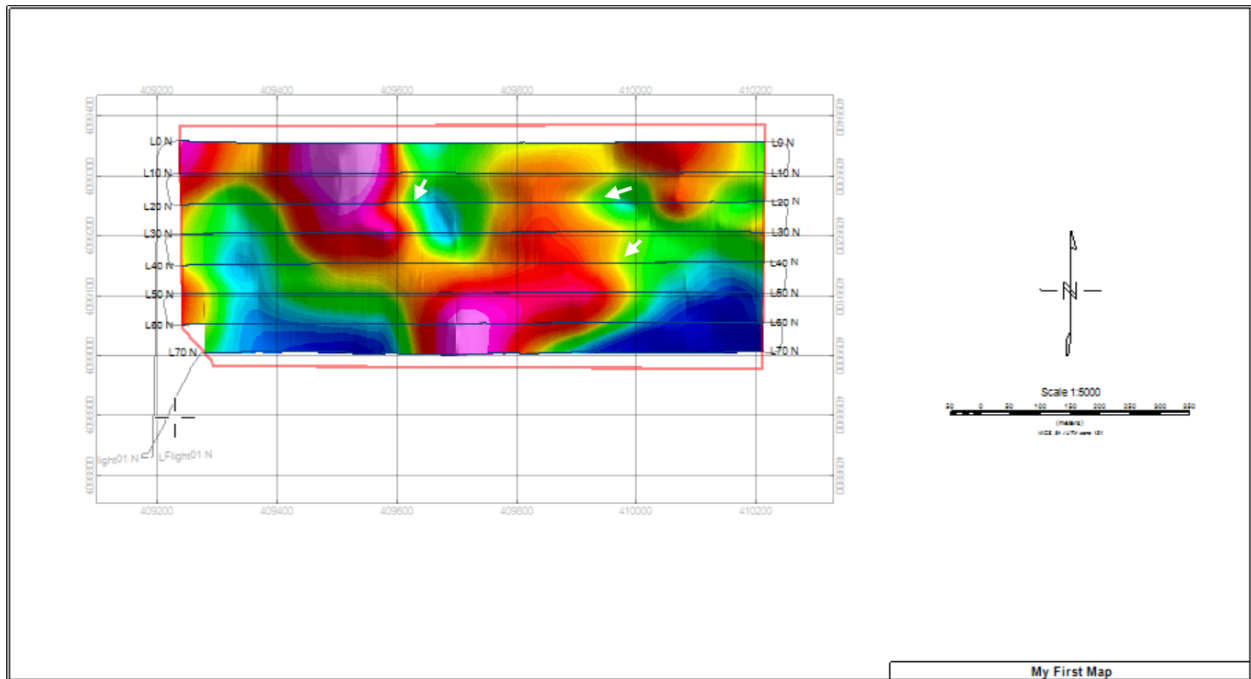
We recommend, when assessing the quality of gridded data, to display it on a map using colour shading, which accentuates any problems that may occur in the grid, particularly when displayed in conjunction with the survey line path.

1. Ensure the correct map is selected
2. Open the **Grid and Image** menu, select **Display on Map** and then **Grid**



3. For the **Grid name**, select the desired grid from the drop down menu (all grids in the current project will be shown)
4. Check the **Smoothing** option
5. Leave the other parameters as they are
6. Click **Current Map**

The grid will be displayed on the map.



When inspecting the data, you may notice:

- Altitude deviation observed as a change in the amplitude of the the same anomaly on adjacent lines
- Flight line separation manifested as irregular gaps between survey lines that should otherwise be parallel and equidistant
- Sample separation manifested as change in the resolution along line
- Drift issues manifested as a long wavelength trend
- Heading issue manifested as local anomalies directly correlated to the line path and direction
- Time lag manifested as herringbone between survey lines

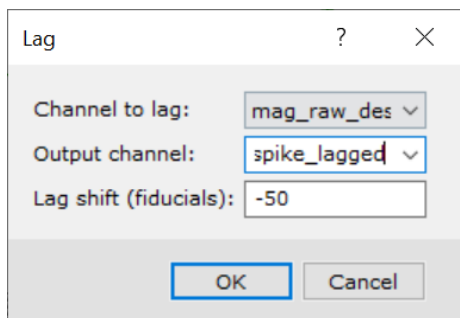
Running QC Tests

The **QC Tools** menu offers a set of comprehensive tools to eliminate and/or minimize the problems with the data described on the previous page. Depending on the nature of the problem to correct, you may also revisit the filters in the **Database Tools** menu. If none of these tools exactly cater to the need, then explore the **Channel Math** tool in the **Database Tools** menu and apply your own math expressions to the data.

In this section we will describe the **Lag** correction tool. Lag errors are caused by the differing positions of magnetometer (or other) sensor and positioning equipment within the aircraft and possible electronic delays in recording one or both values. Lag in magnetic data manifests as changes in the location of edges of an anomaly between adjacent survey lines, as highlighted by the white arrows in the image on the previous page. It is often referred to as a "herringbone effect" because of the appearance.

Performing a Lag Correction

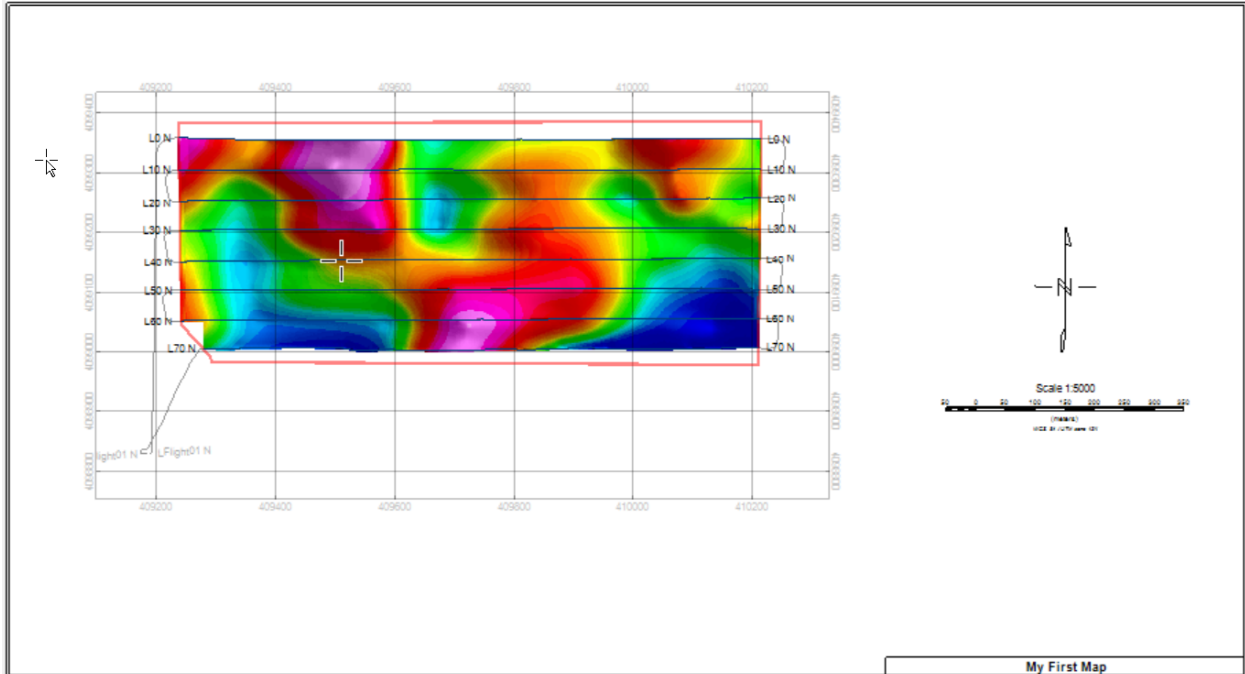
1. Ensure that the database and the map are open and selected
2. Open the **QC Test** menu, select **Corrections** and then select **Lag**



3. Select the appropriate **Channel to lag** from your database
4. Provide an **Output channel** name
5. Provide the number of fiducials representing the **Lag shift**

The lag shift can be estimated by choosing an anomaly in the data that crosses several survey lines, then measuring the offset from line to line using the **Measure Distance** tool, which can be launched by right clicking on a map. You will need to understand the direction in which the survey lines were acquired. A positive lag will shift the data back in time, and negative lag will shift the data forward in time.

6. Click **OK**
7. Proceed to grid the output channel and display it on the map. You would expect the herringbone effect eliminated or subdued, as shown below



You are invited to explore the other correction tools as they all follow a similar logic to the Lag tool.

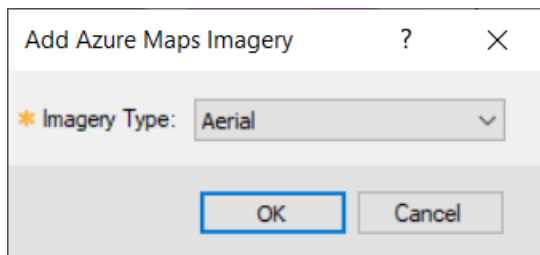
Accessing Public Geoscience Data

Oasis montaj Field allows you to download and overlay Azure Maps satellite imagery, terrain grids, and vector files delineating natural and infrastructure outlines. Data can be accessed from the **Data Services** menu, which offers two options:

- **Seeker** - this option launches a tool which lets you search for and download various geoscientific data, which is hosted on our public DAP server. If you have a map open when you launch it, Seeker will automatically search based on the extents of the map. Within Seeker you can also connect to other public data repositories, such as Web Map Services, which many government agencies use to share data
- **Add Azure Maps Imagery** - the option allows you to display Azure Maps satellite imagery onto your map

Now we will cover how to display Azure Maps imagery on the map.

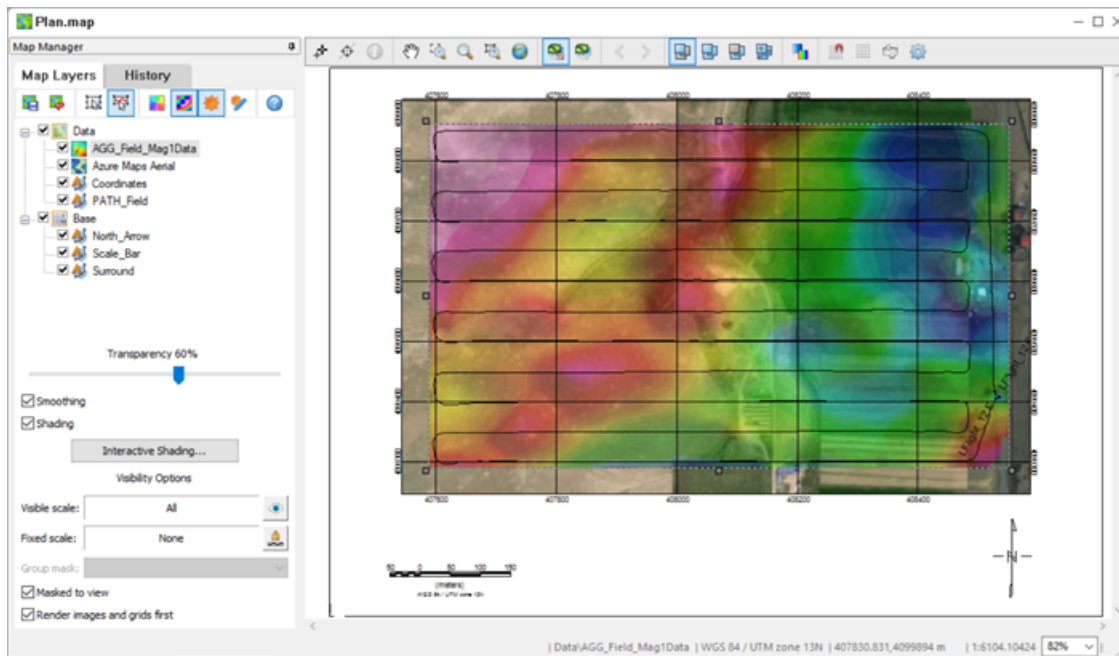
1. Ensure your map is open
2. Open the **Data Services** menu and select **Add Azure Map Imagery**



3. Select the **Imagery type Aerial**
4. The imagery is added to the map



5. Expand the **Map Manager** tab at the top left of the map to view the data layers
6. You can use the Map Manager to move map layers up/down, turn them on/off and set their transparency. More information can be found the help file

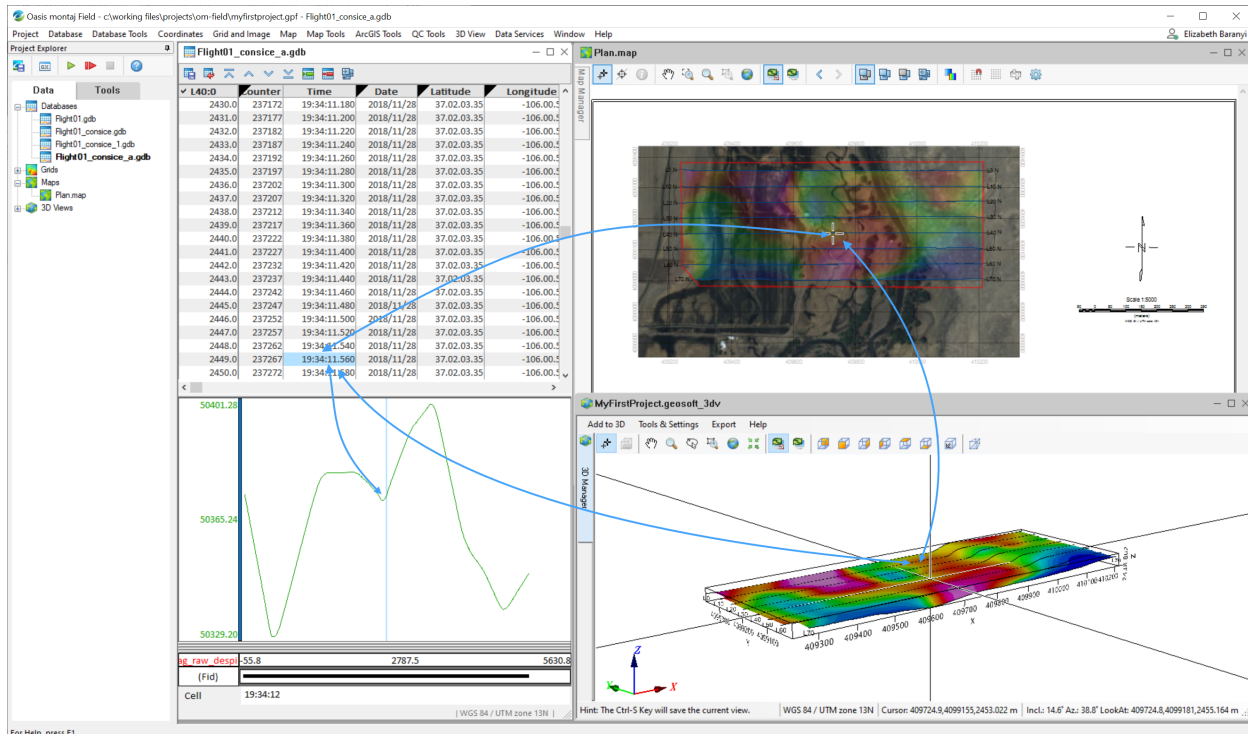


In the above example, the Map Manager is pinned open. The magnetic grid layer has been moved above the Azure Maps imagery within the Data View, so it is visible. A 60% transparency has been applied to the magnetic grid so the satellite imagery can be seen.

Working with 3D Views

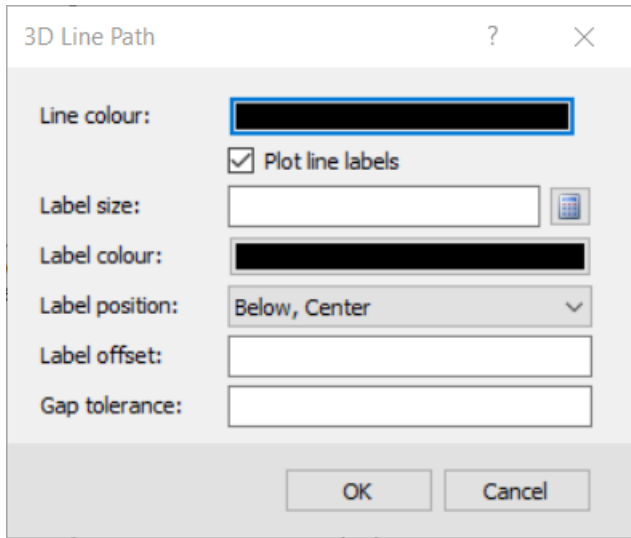
3D Views allow you to view and integrate data in three dimensions. In Oasis montaj Field, you can plot a 3D line path from your survey database, plot geophysical data as 3D aware symbols and overlay gridded data on a 3D relief surface.

Data in a 3D view is linked to both maps and databases, allowing you to easily view, track and analyse your data.

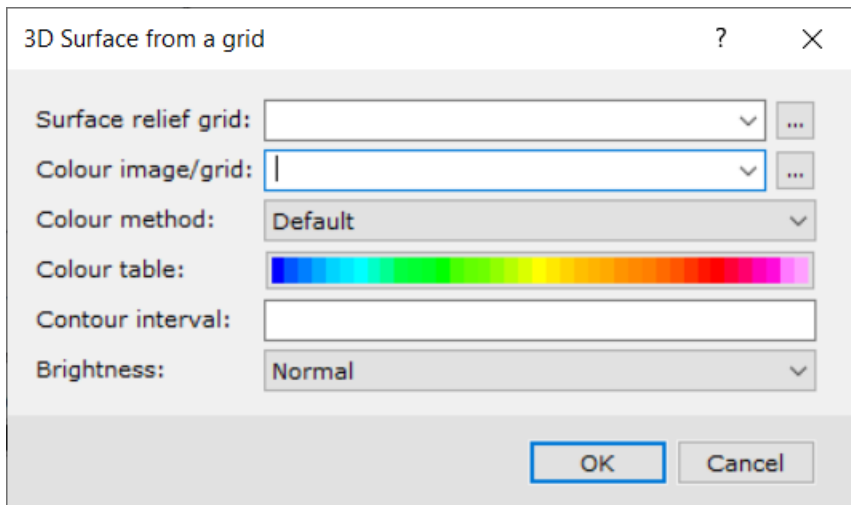


A relief surface requires a grid that contains topographic elevations across your area of interest. This can be created by gridding sensor elevation data from your data (and subtracting the flight height if necessary), or through downloading a SRTM grid for your field area from **Seeker**. Here we will walk through how to create a new 3D view and add data such as a relief surface and a 3D line path.

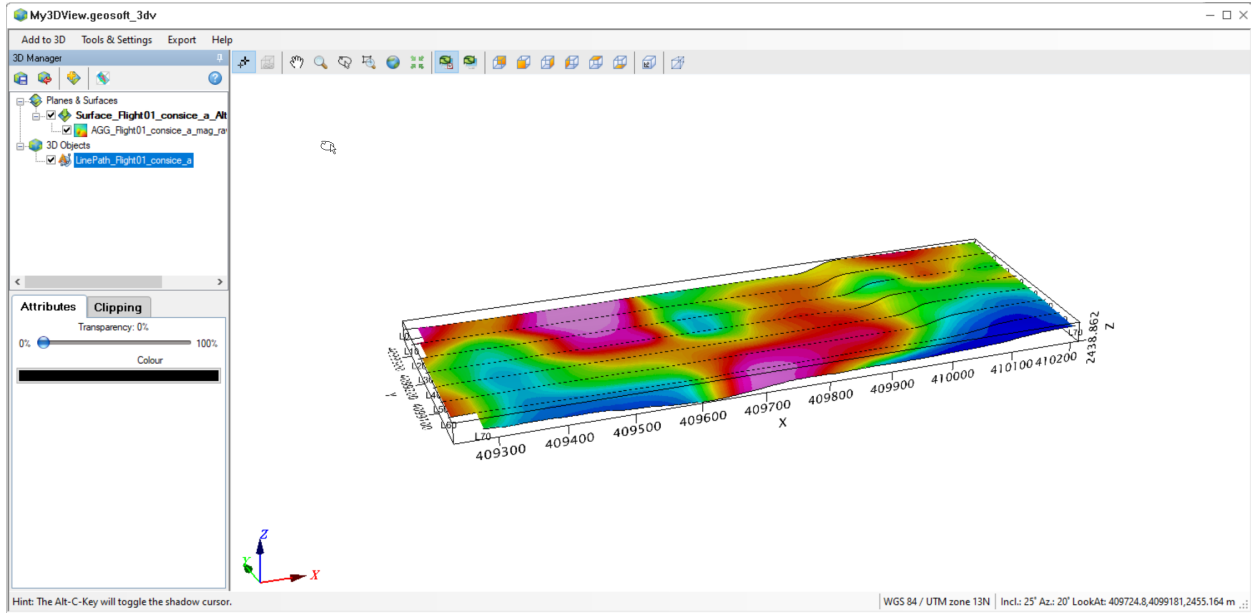
1. Open the **3D View** menu and select **New**
2. Provide a **Name** for the 3D View and click **OK**. An empty 3D view is created
3. In the 3D view, open the **Add to 3D** menu and select **3D Line Path**



4. Accept the default parameters and click **OK**. The survey path is displayed in the 3D view
5. Open the **Add to 3D** menu and select **Relief Surface**



6. Provide a **Surface relief grid** (gridded topography data)
7. Provide the **Colour image grid** (e.g. gridded magnetic data)
8. Accept the remaining default parameters and click **OK**

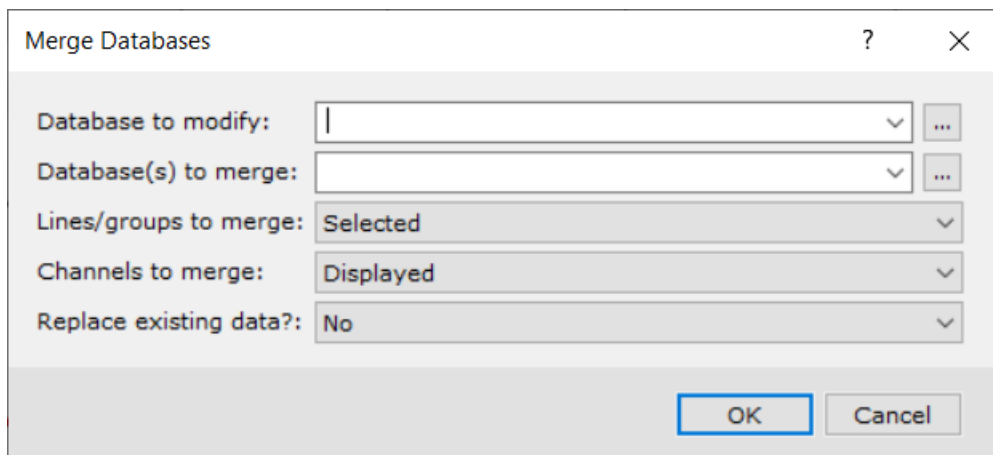


The magnetic data grid is displayed in three dimensions along with the survey lines. Take some time to familiarise yourself with navigating the 3D view, using your mouse (and mouse wheel) along with the navigation tools provided on the **3D view toolbar**. More information on these tools can be found in the Application help.

Merging Databases

Geophysical surveys can occasionally be divided into sub areas, within which data is acquired independently of the other sub areas in the survey. In such cases, where each sub area is processed separately, you can use Oasis montaj field to merge the databases into a single, master database:

1. Open the **Database Tools** menu and select **Merge Databases**



Merge Databases

Database to modify: ...

Database(s) to merge: ...

Lines/groups to merge: Selected

Channels to merge: Displayed

Replace existing data?: No

OK Cancel

1. Provide the name of or load the **Database to modify** (i.e. the master database)
2. Load the **Database(s) to merge** (you can load multiple databases by Ctrl+selecting them using the browse tool)
3. Accept the remaining default parameters and click **OK**