Help file:

The program consists of three parts. A GUI for easier creation of masks and placing of reference points, display_operations which allows you to view the created masks and field_format which applies the masks to the data.

<u>**GUI:**</u>

In order to use the GUI and other functions navigate to the folder that contains these functions and drag and drop the file named "run_this_to_add_current_folder_to_matlabs_search_path" so that matlab will know where to find the necessary files without the need to keep them in the current working directory.

Then type 'Convention_Code_v1_0' into the terminal to launch the program (without the quotations marks).

The first thing to do is to load data by selecting Data->Select data-> data type. Choose the correct data type according to the type of data you intend to import. A file manager will pop up allowing you to select the file that you would like to implement. The program is capable of processing .dat files created by the LaVison software or the .vc7 files that the software uses. Fem is not implemented at the moment due to the difficulty in displaying irregularly spaced data.
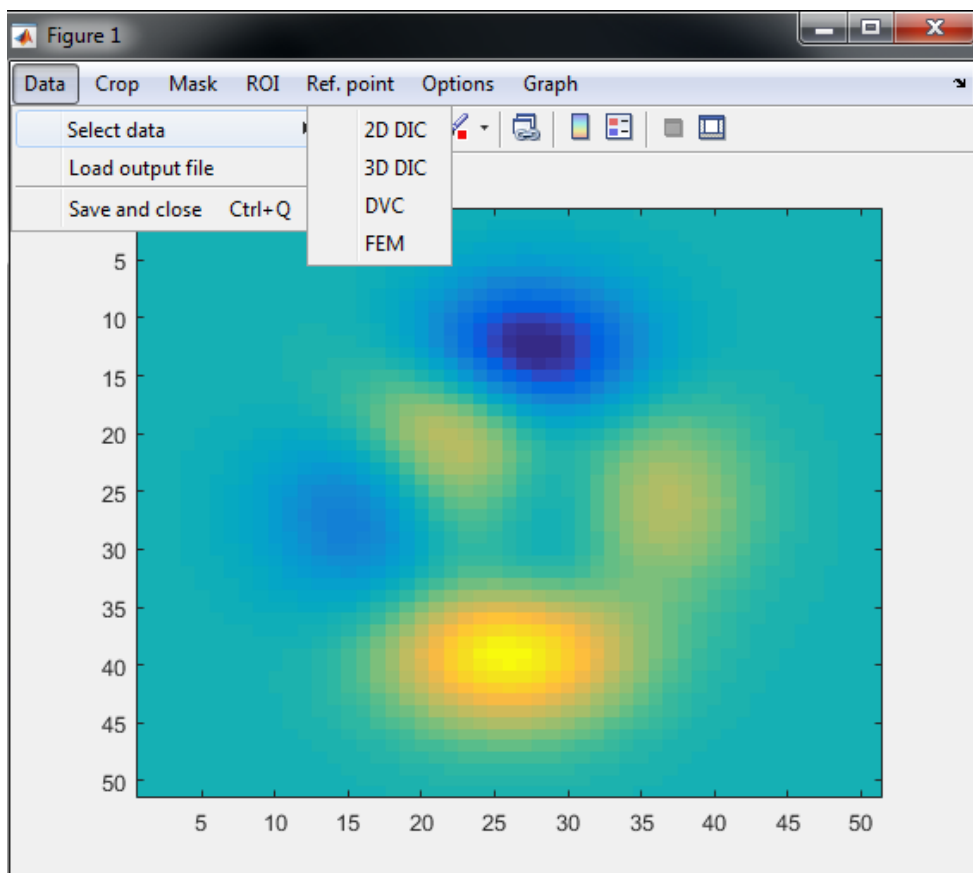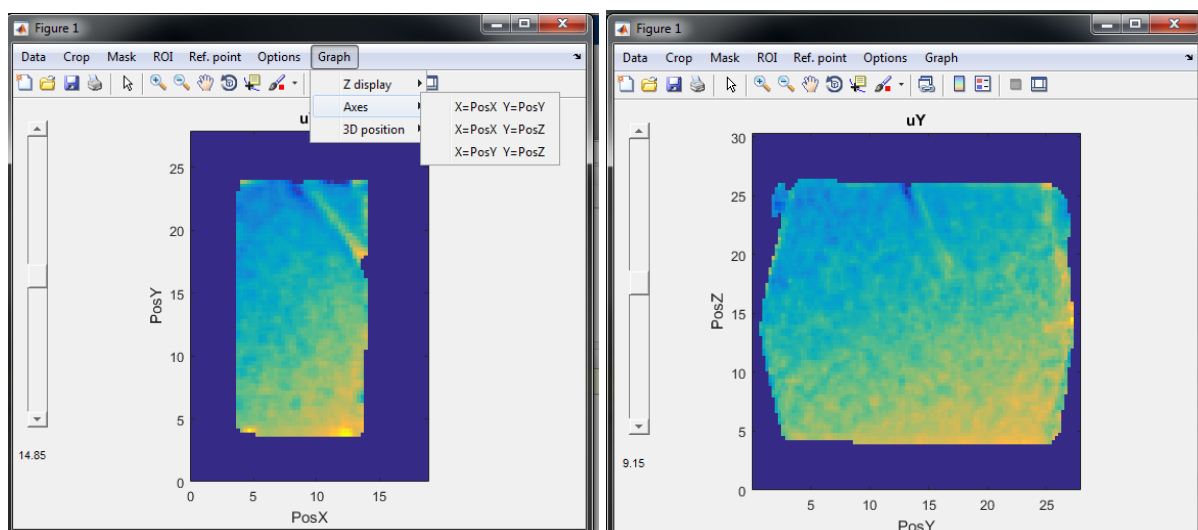

For DVC data:

Once the data is selected it should load into the program and be displayed on the figure. If the data you have selected is DVC data then a scrollbar will appear in the left of the GUI. By default the graph will initially display the data along the PosX and PosY axes with the scrollbar controlling the height along the z-direction. The value underneath the scrollbar displays the z value of the data currently being displayed.
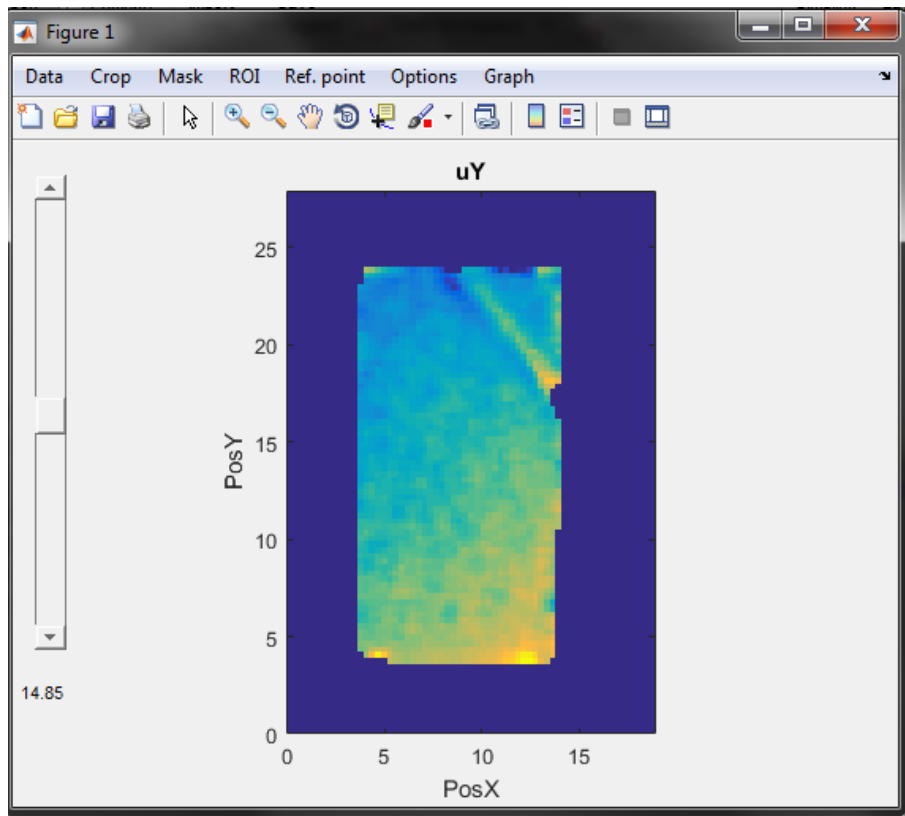
Additionally for DVC data the orientation of the data can be changed by selecting Graph->Axes and selecting what coordinates you would like on which axes. This will change which plane of the data is viewed and the scrollbar will change to the accordingly.

An alternative way of changing the height for DVC data is to select Graph->3D position->"the corresponding height you want to change". This will bring up a GUI that allows you to enter the height according to columns and rows that you want to view.
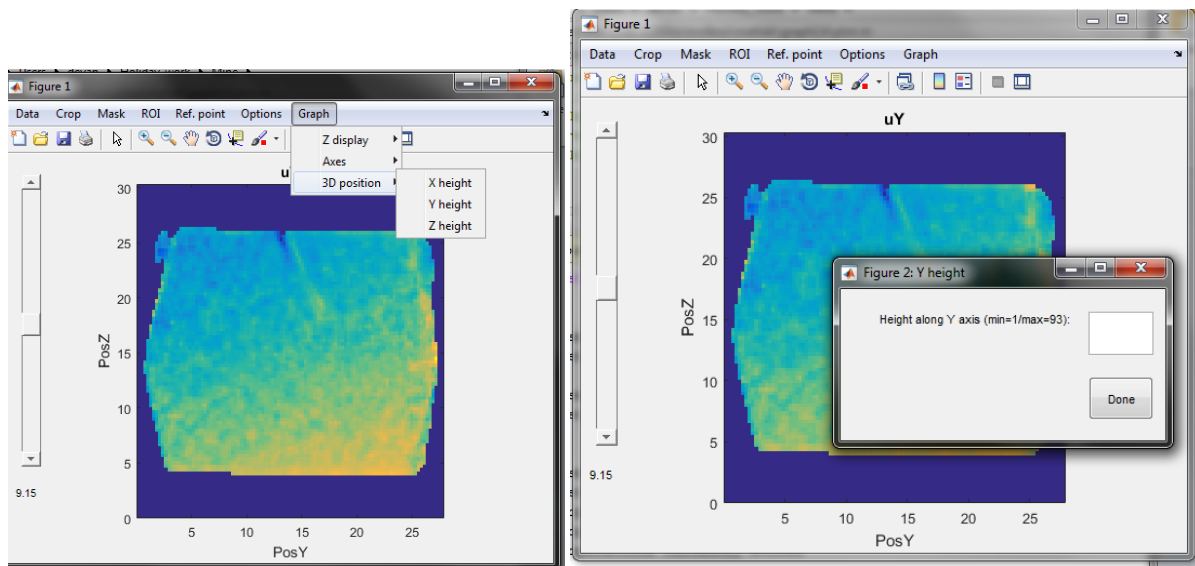

The displacement data viewed can be changed by selecting Graph->Z display->intended displacement data. Note that using any of the functions in the Graph drop down or using the scrollbar in the case of DVC will place all masks and reference points permanently where they are. So first use the Graph menu to get the data into the way you wish to view it to create a mask and then apply masks and reference points.

From this point you can create the following:

- Crops – these are rectangular and are intended to remove spurious displacement data that will not be needed for analysis. The execution of this function reduces the size of matrix the data is stored in.
- Masks- these can be applied in the shapes of rectangles, ellipses and polygons. A masks is intended to removed unwanted data that is not to be used for analysis.
- ROI- regions of interest are intended to be used to highlight data that is of specific interest amongst other data that is still valid and used elsewhere. These can be applied in the shapes of rectangles, ellipses and polygons.
- Reference point- This changes the location of the origin for the position data. If multiple reference points are applied then only the final one will take effect.

Once these masks and other operations have been set you can use Options->Set options to select which operations to apply. This will bring up a GUI that allows you to select with checkboxes which operations to apply to the data. You can select show to display what the data will look like after you have selected the specific operations to apply. You can additionally use checkboxes to remove rigid body motions over the data you have obtained using the masks and you can select where or not you wish to view the masks on this data.
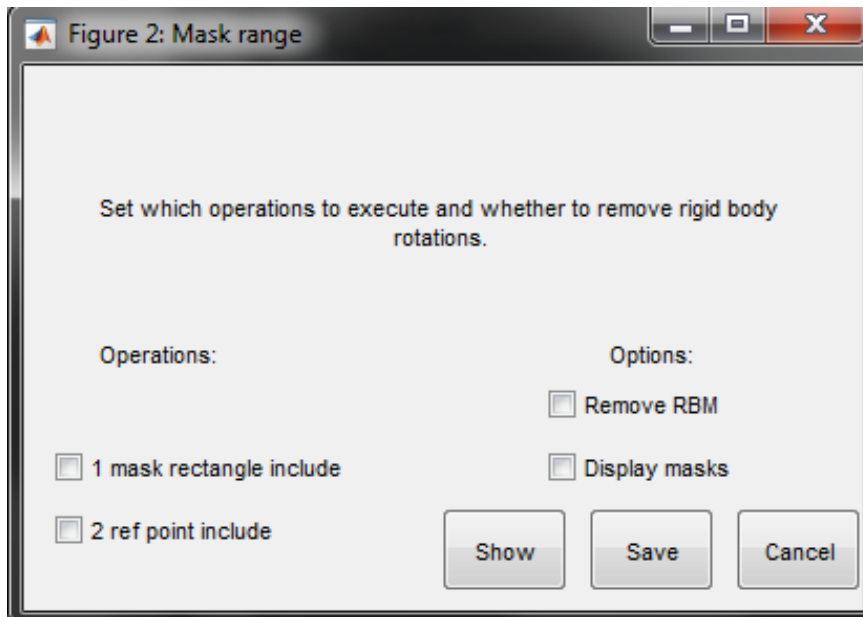
If you save the selected operations then these are the operations which field_format will apply when the data is put in by default. If set options is not used then the default is to apply all masks, crops, ROIs and reference points and RBM removal will not be applied.

Selecting Options->Show processed data is the same as selecting show in the above gui except masks will not be displayed on the data.

Additionally Options->Write to workspace writes the procdata, roi and roicount variables to the workspace of matlab.

In order to save the masking created go to Data->Save and close. This will open up a file browser to allow you to name the output file. The output file must be in the form of a .mat file so that the structure variable can be saved to it.

Field_format:

In order to import data and apply the masks created in your program used to analyse the data use field_format.

To use the default operations set by 'set options' in the GUI run:

Field_out=field_format('output_file_of_GUI.mat')

Where Field_out is the data with the operations specified in the GUI applied, output_file_of_GUI.mat is the file you created when closing and saving in the GUI.

Field_out will contain the following fields:

- Field_out.POSX
- Field_out.POSY
- Field_out.POSZ
- Field_out.UX

- Field_out.UY
- Field_out.UZ
- Field_out.gridspacing

To specify which operations to perform you can use run

Field_out=field_format('output_file_of_GUI.mat','which operations',operation_list)

Where operation_list is a vector containing ones and zeros which enable or disable the corresponding operations contained in the output_file_of_GUI.mat file. For example specifying operations_list=[1 0 0 1] will run the first operation, skip the next two and run the fourth operation. Note the operations_list must have the same amount of entries as there are opertions in the output_file_of_GUI.mat file.

To specify a file to import data from run

Field_out=field_format('output_file_of_GUI.mat',filename',fname,'pathname',pname)

Where fname is the name of the file containing the data and pname is the path to the folder containing the file (it should end in a '\' for windows).

Lastly if you intend to remove RBM then you can run

Field_out=field_format('output_file_of_GUI.mat','RBM',1)

1 will enable RBM removal and 0 will disable.

**Display_operations:**

In order to view what operations an output file from the gui contains the function display_opertions can be used as

display_operations('GUi_output_file.mat')

or display_operations(procdata)

This will bring up a GUI displaying the data and which operations the file or procdata contains. You can then view the masks and processed data by selecting the operations from the list. In order to select multiple operations at a time use ctrl or shift keys when selecting.
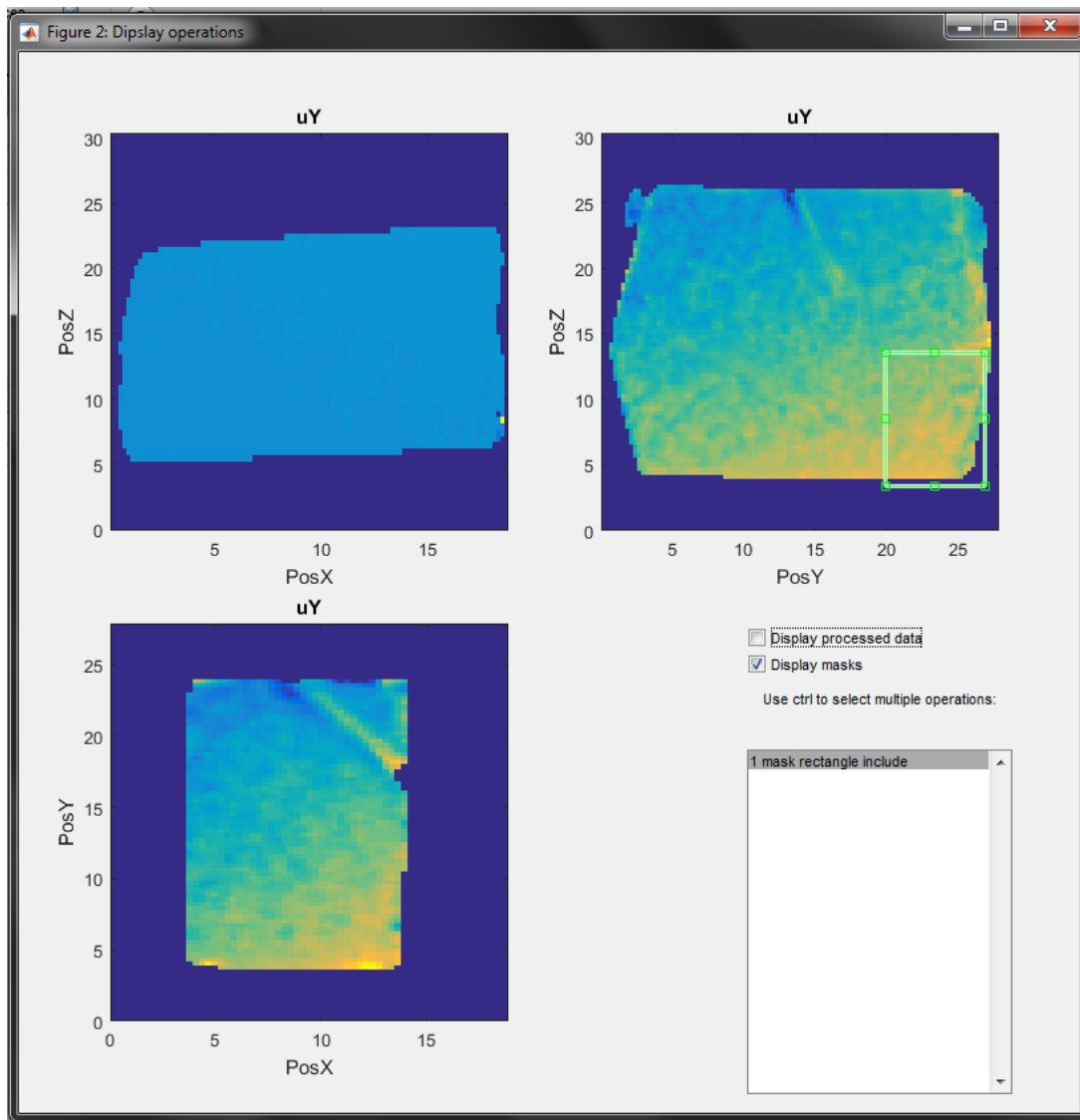
If you have questions, recommendations or issues you can contact me at 17732913@sun.ac.za.
Hope this program helps you out.