



For SAGUARO v1.4.x

## Welcome to SAGUARO

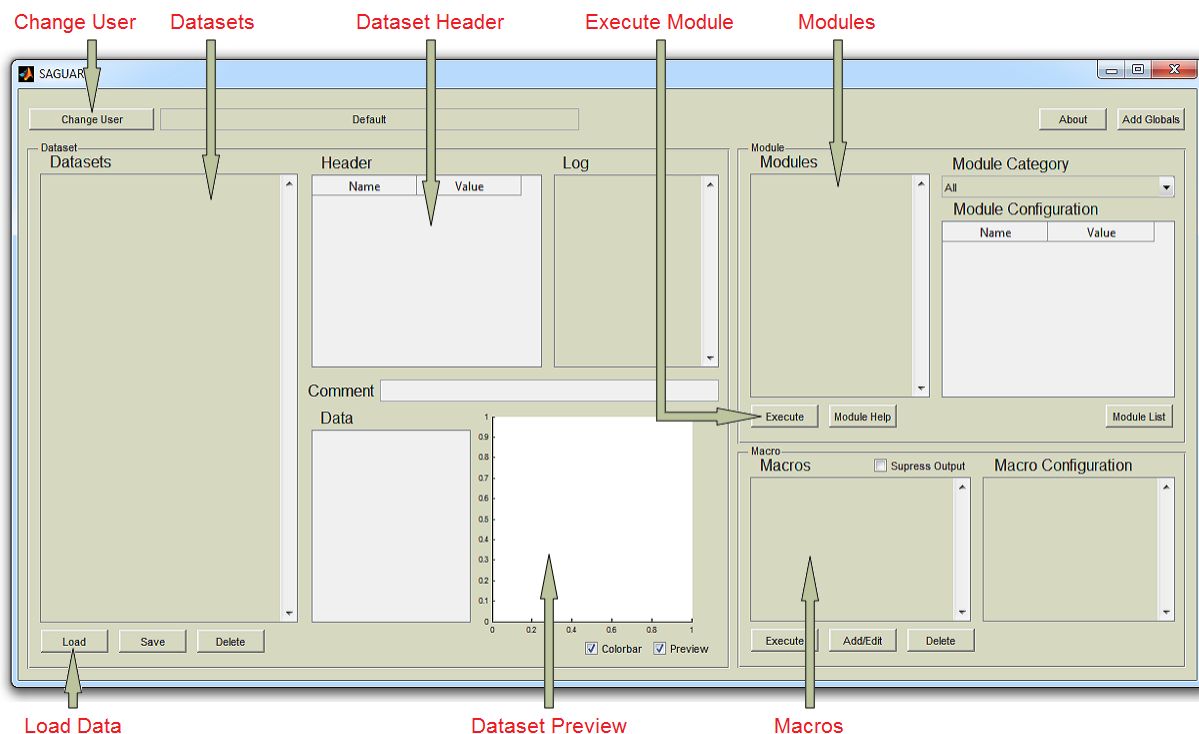
SAGUARO is a platform for the analysis of data generated during optical design, analysis, and fabrication. SAGUARO is designed to be extensible and user customizable, while offering stability and rigor.

## Installing and Launching SAGUARO

Download SAGUARO from <http://www.loft.optics.arizona.edu/saguaro/>.

To install SAGUARO, simply place the files you have downloaded in a convenient location. If you have a previous version of SAGUARO, copy the files in the 'UserData' directory to the new installation location.

To run SAGUARO, start a MATLAB session. (MATLAB 2009b or newer is required along with the 'Image Processing' toolbox.) Set your MATLAB working directory to the folder where you placed the SAGUARO files, then right-click on the **SAGUARO.m** file and select **Run** or double-click on the **SAGUARO.cmd** file. After a few seconds, the SAGUARO splash screen should appear followed by the SAGUARO main GUI:



## Getting to Know SAGUARO

There are a few key features of SAGUARO that need introduction. The most important SAGUARO concept is that of **datasets**. Each dataset is like a MATLAB variable, but it conforms to certain standards, defined in the SAGUARO User Manual. Data can be loaded into SAGUARO using the **Load** button, and all datasets currently in SAGUARO are visible in the **Datasets** panel.

To modify or analyze the data in SAGUARO, **modules** can be run on it. These modules are displayed in the **Modules** panel, and can be run using the **Execute** button.

SAGUARO allows modules to save information that the user enters for the next time they are run. To do this, SAGUARO creates **user profiles**. The user profile can be selected using the **Change User** button.

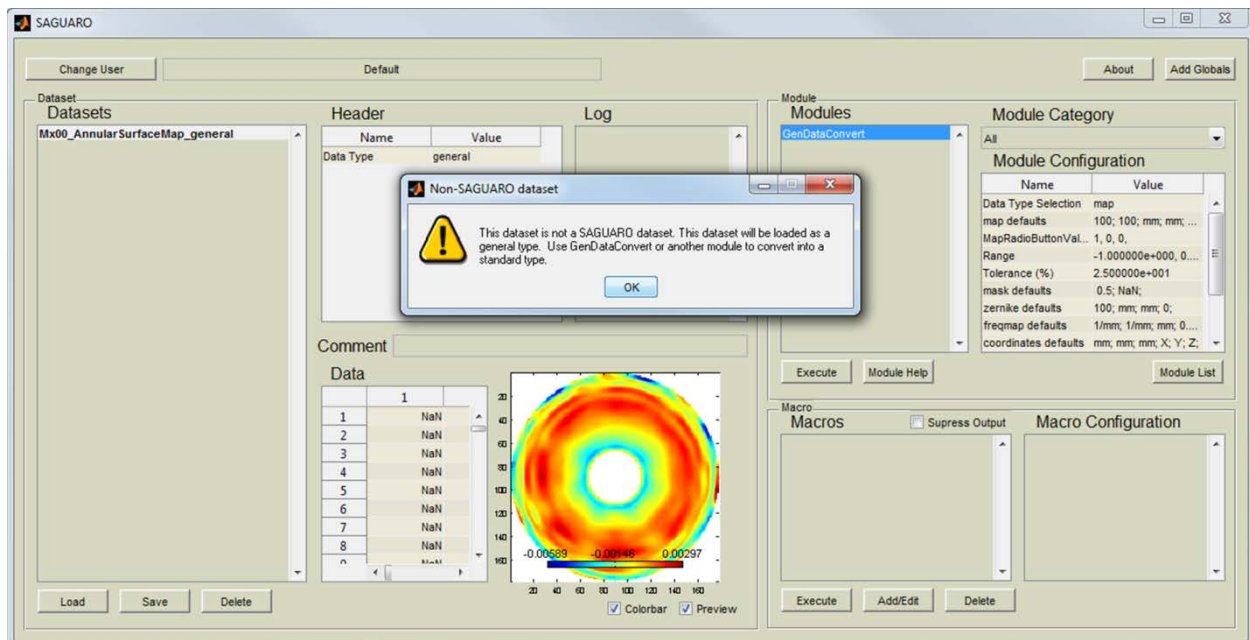
Groups of modules can also be combined together into **macros**, accessible from the **Macros** panel. More information about macros is available in the SAGUARO User Manual.

The next section presents a short example that explains the use of modules and other important features of the GUI.

## Example: Analyzing Mirror Quality

One common application of SAGUARO that is used frequently by the members of LOFT is the analysis of mirror quality from an interferogram. Included with SAGUARO, in the **TestDatasets** folder, is the file **AnnularSurfaceMap.txt**. This text file contains values from an interferogram.

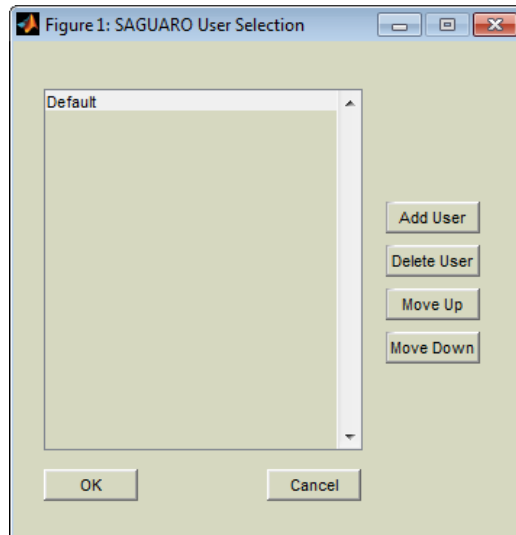
The first step to analyzing this data is to load it into SAGUARO using the **Load** button. After this is done, SAGUARO should look like this:



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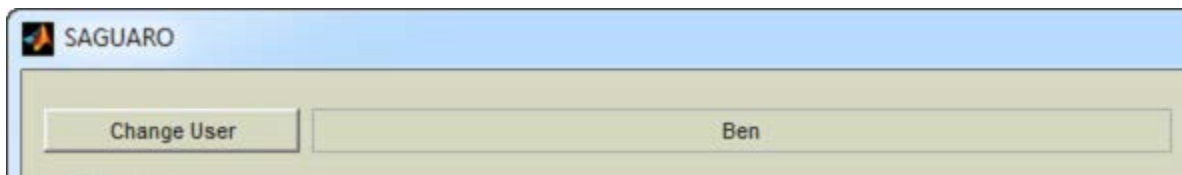
The warning dialog you will receive is alerting you that the data you have loaded is not in a SAGUARO format. This is fine: one of the goals of SAGUARO is to allow many different types of data to be loaded. Click **OK**. The next step in processing will be to convert the data.

Before we convert our data, however, it will be convenient to create a user profile. This will allow SAGUARO to keep track of any information we enter, so the next time we perform this task, we won't have to re-enter it. To do this, click **Change User** at the top of the GUI. This will bring up the **User Selection** dialog:



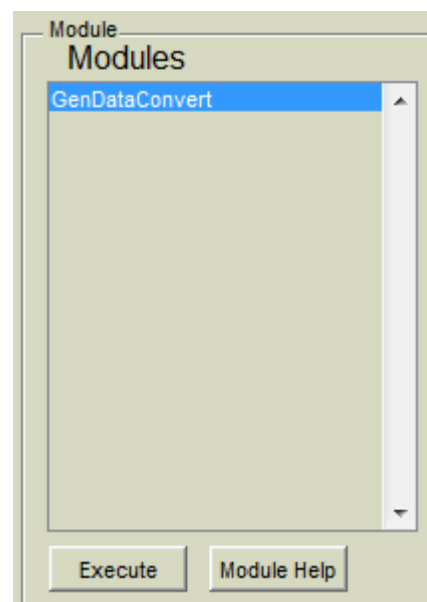
To add a new user, click **Add User**. Enter a user name, and click **OK**. Then click **OK** on the **User Selection** dialog to close it.

The top of the GUI should now have the user name you selected, as shown below.



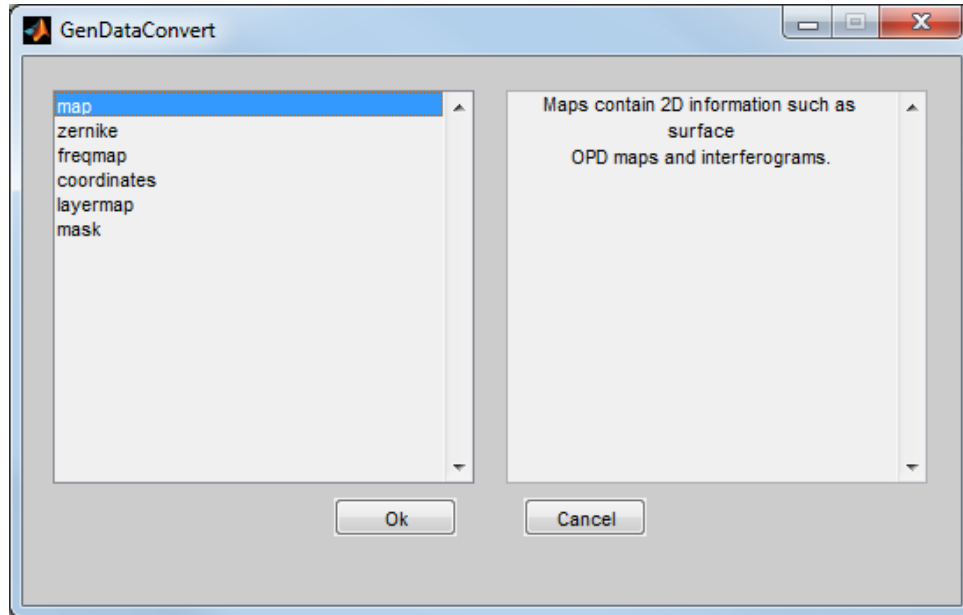
We are now ready to convert our data.

From the **Modules** list on the right side of the GUI select the **GenDataConvert** module, then click **Execute**:

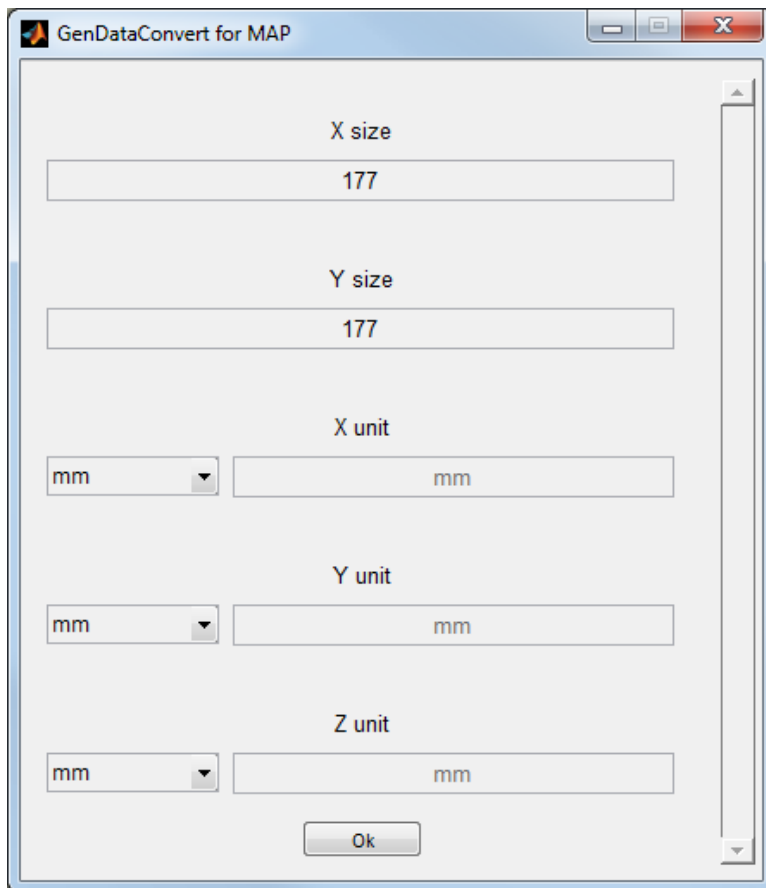


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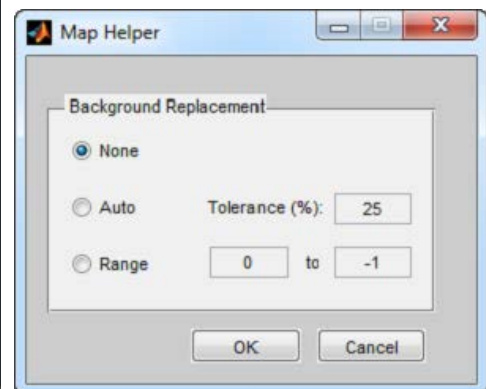
The following dialog should appear:



Select **Map**, which is the dataset type we will be using, then click **OK**. A new dialog will pop up:

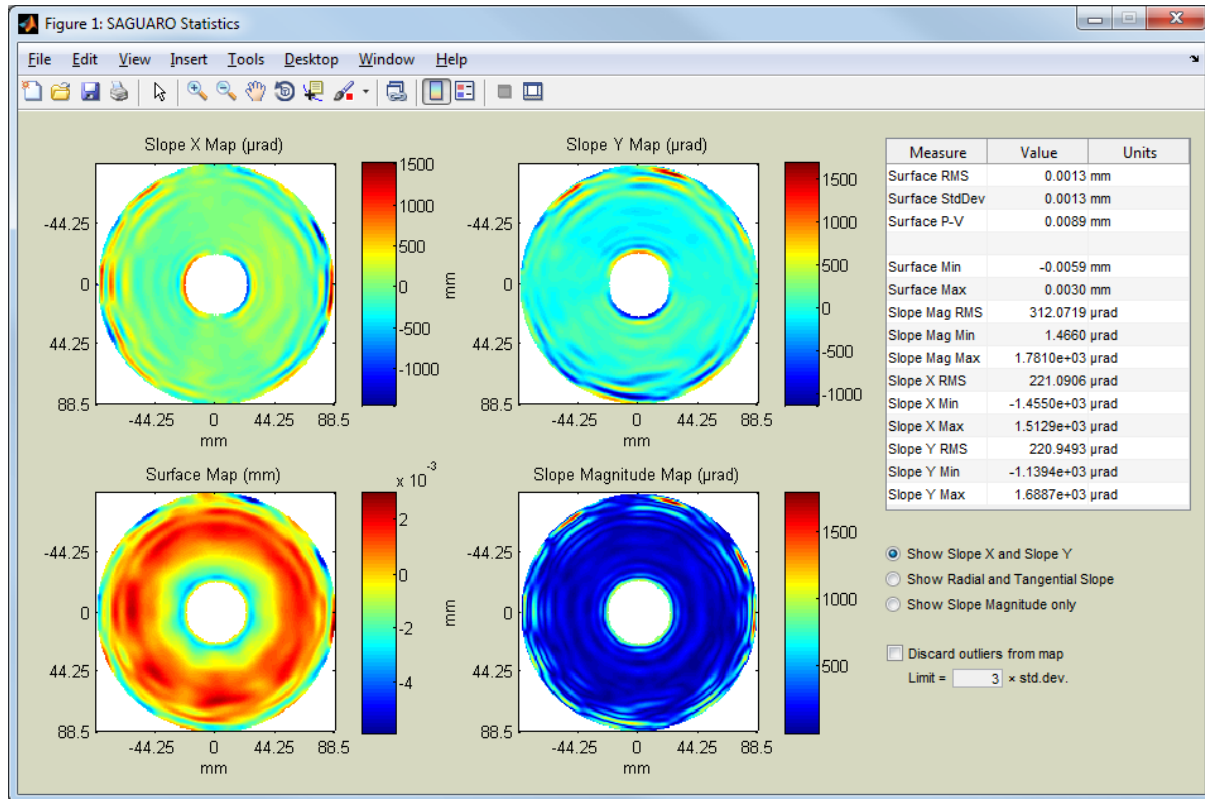


This dialog asks the user the size of their data, and the units to use. The default values are fine for this example, so click **OK**. The next dialog that will pop up asks the user what background, or masking values, the dataset uses. Our data already has NaN values for the background, so we do not need any background replacement. Select **None**, then click **OK**:



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With that done, you should see a new dataset in SAGUARO with a name beginning with **Mx01**. This is the new dataset SAGUARO created, after modifying our data. There will now be a large number of modules available in the **Modules** list on the right side of the GUI. Select **MapStatistics**, then click **Execute**. The following window will appear:



The **MapStatistics** module gives useful information about the interferogram, including **Surface RMS**, a standard metric of surface quality.

If you have other questions about SAGUARO, please consult the SAGUARO User Manual.

If you encounter any problems with SAGUARO and you are running MATLAB 2009b or later with the 'Image Processing' toolbox, please submit a bug report form which is included in the SAGUARO folder or contact us at [saguaro@optics.arizona.edu](mailto:saguaro@optics.arizona.edu).

### Learn More

- Website: <http://www.loft.optics.arizona.edu/saguaro/>
  - Downloadable copy of the latest SAGUARO release
  - SAGUARO User Manual
  - User forum (SAGUARO Garden) for questions and discussion about SAGUARO

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