Studio Software Update 8.2 – Release Notes

Previous Studio Release: 8.1
Supported Equipment PC: Z97, Z170
Offline Studio Operating System: Windows XP (Service Pack 3) or higher; extensive testing specifically performed on Win 7 32/64 bit and Win 10 64 bit

Summary:

All included Studio applications have been validated for compatibility with previously created Akrometrix Studio file formats. Files created prior to Studio 8.0 will not be readily usable with the Automated Report Generator feature. Important bug fixes and added features are listed below. This list does not include all resolved bugs and added features. Known issues are presented with workarounds where applicable.

Update Procedure:

Install Studio 8.2

Download and Unzip the Studio Installer zip file. Install all applications for Studio 8.2 by launching the provided file "Akrometrix Studio 8.2 Installer x86[or x64].exe". Uninstalling older Studio applications is not required prior to launching this file, as this will be done automatically. A computer restart **must** be performed after the install. Take note to only install the x86 version for 32 bit systems and x64 for 64 bit systems.

Key Feature Changes or Additions:

Studio 8.2 is releasing with fully updated User Manuals for this version. Historically Studio User Manuals could trail behind the actual release. Users are encouraged to read through the new User Manuals.

Unwrapping Parameters and Die Tilt – Surface Analysis (Optional Feature)

A new feature in Studio 8.2, Unwrapping Parameters, unlocks new capabilities for the shadow moiré technique. Unwrapping Parameter operations are performed exclusively on phase images either in one-off or batch processing. The most basic function of changing Unwrapping Parameters is to change the starting point for unwrapping of a phase image. Historically when phase images are converted to displacement this process starts in the center of the image. This could cause issues with images with minimal data in the center. Users can now change this starting point to any location.

Historically, shadow moiré measurements had no ability to connect separated islands of data. Measuring discontinuous surfaces has always been a limitation for shadow moiré. While this limitation has not been completely overcome, as with measuring the heights of solder balls, Unwrapping Parameters via a specific function called a "Phase Bridge" allows the testing of many discontinuous surfaces with shadow moiré measurement. The Phase Bridge function is used below to connect 4 separate areas of phase data that are similar in height in the example below. Note that phase data is still used to calculate exact height between areas.
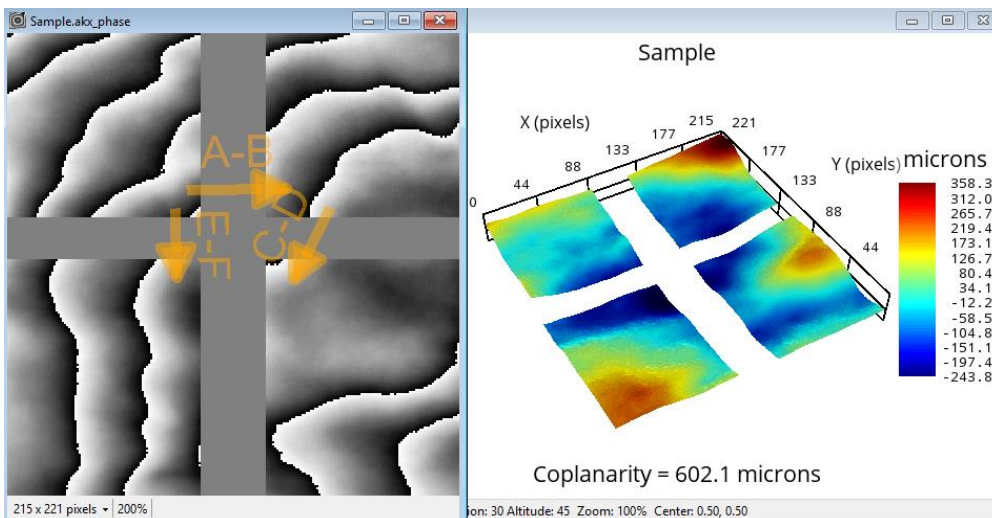
In the example shown the Phase Bridging uses the assumption that the two surfaces are approximately the same height. However, the function can also be used on separate planes that are different heights. A flip chip with exposed die is a good example. The user can create a bridge between substrate and die, along with an approximation of the height between the two surfaces. This approximate height needs to be known within half of the image Fringe Value, or around 127 microns for a 100LPI grating. Height estimates incorrect by up to a range of 1.5 Fringe Values (380 microns with 100LPI) will generate an error from the software stating an incorrect height estimate. Height approximations incorrect beyond this threshold would lead to incorrect data. An example with a flip chip is shown below.
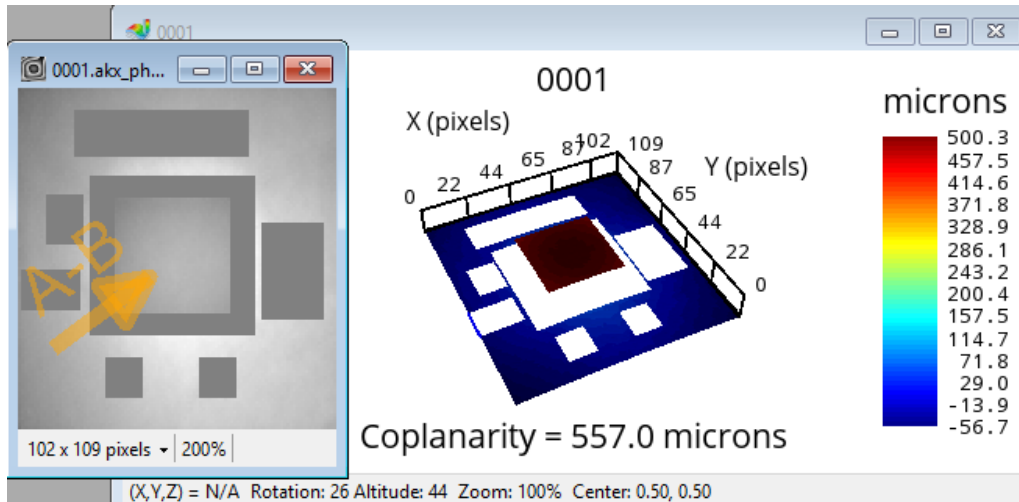

Finally, the new capabilities can be used to calculate the tilt of one surface based on the reference plane of another surface. This led to the application of "Die Tilt" as in the flip chip case above: the surrounding substrate is the reference plane used to find the tilt of the die surface. The result can either include the warpage of the die itself or exclude it by fitting the die surface to a 1st order plane. As a result a new gauge is available called DTA (Die Tilt Angle).
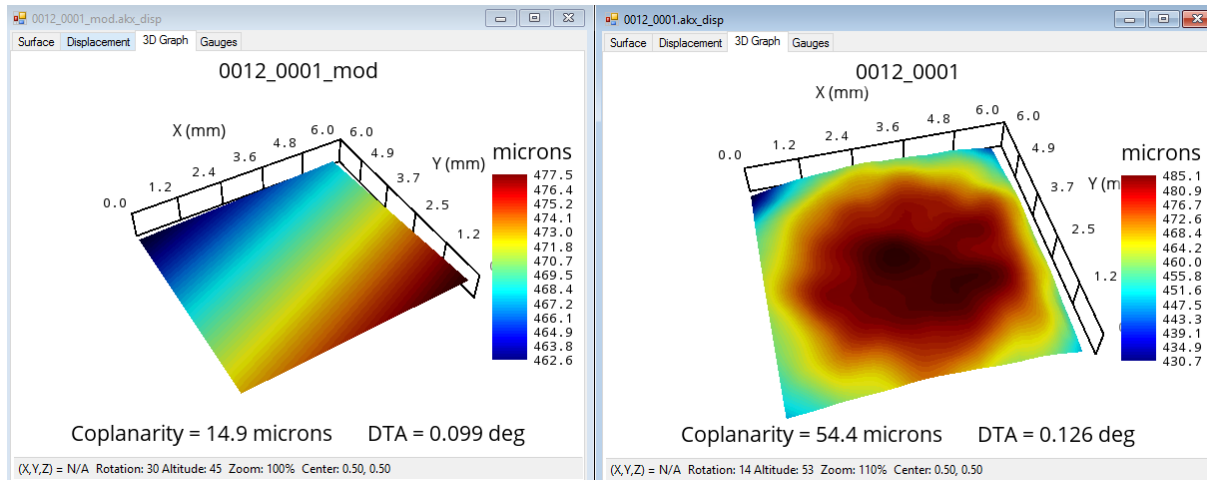

Feature Detection - Surface Analysis (Included Feature)

Feature Detection is most often used with Digital Fringe Projection (DFP) Module data as shadow moiré is unlikely to recognize many of the feature types found with this tool. Feature Detection is used to find patterned features with distinct height change, commonly solder balls or other surface mount features. Once found these features can be excluded from the data set or the feature center points or peaks can be extracted. Different options are in place to expand the represented size of peak points or size of feature mask. Found regions on a BGA are shown below followed by masking the features and leaving the substrate and leaving just the ball peaks with the peak made larger for visibility.
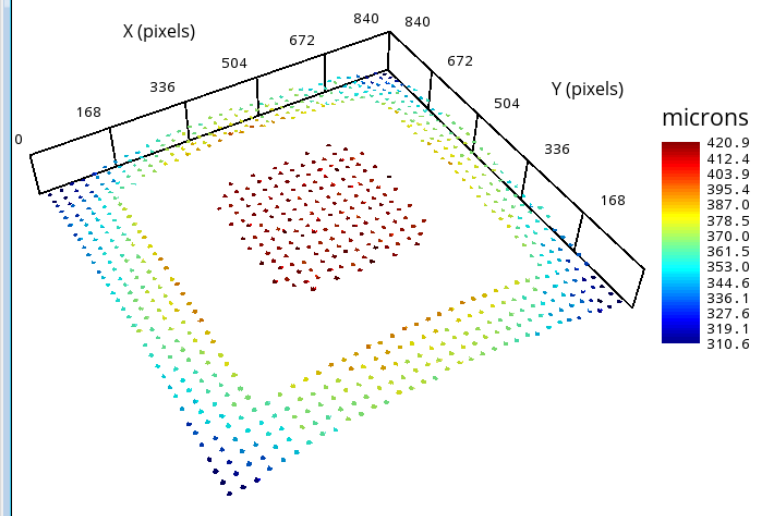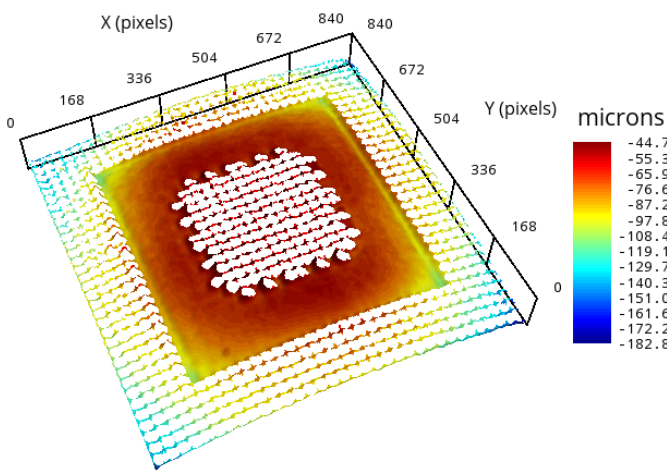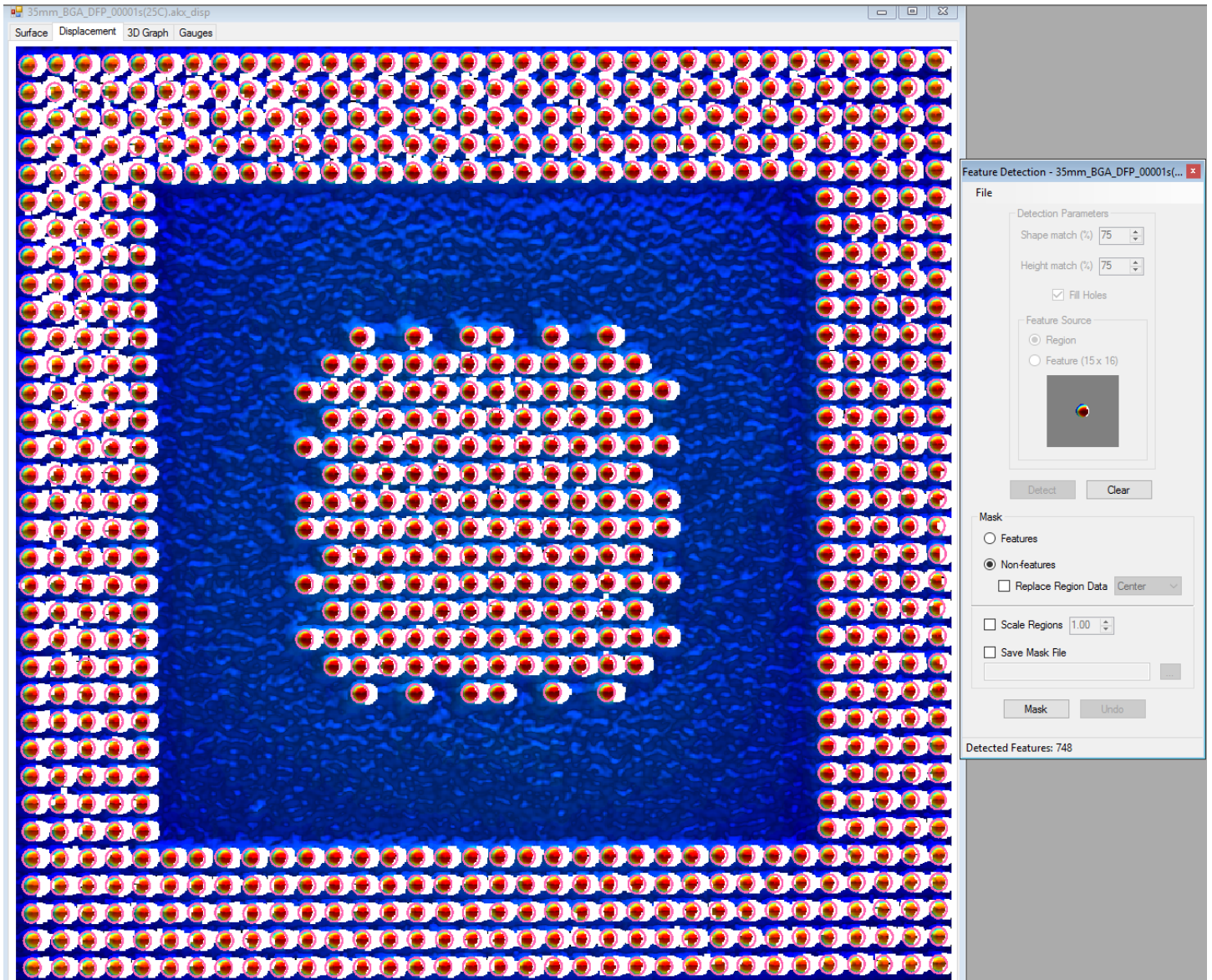
Z-Range Mask - Surface Analysis (Included Feature)

Z-Range Mask servers as a high pass and low pass filter for displacement data. Numerous options are made available to establish a range of displacement heights, which can be masked from the displacement data. Users can define the data to exclude via absolute numerical values or by region of the data set itself. Below are examples of a single data with two different Z-range masks applied.
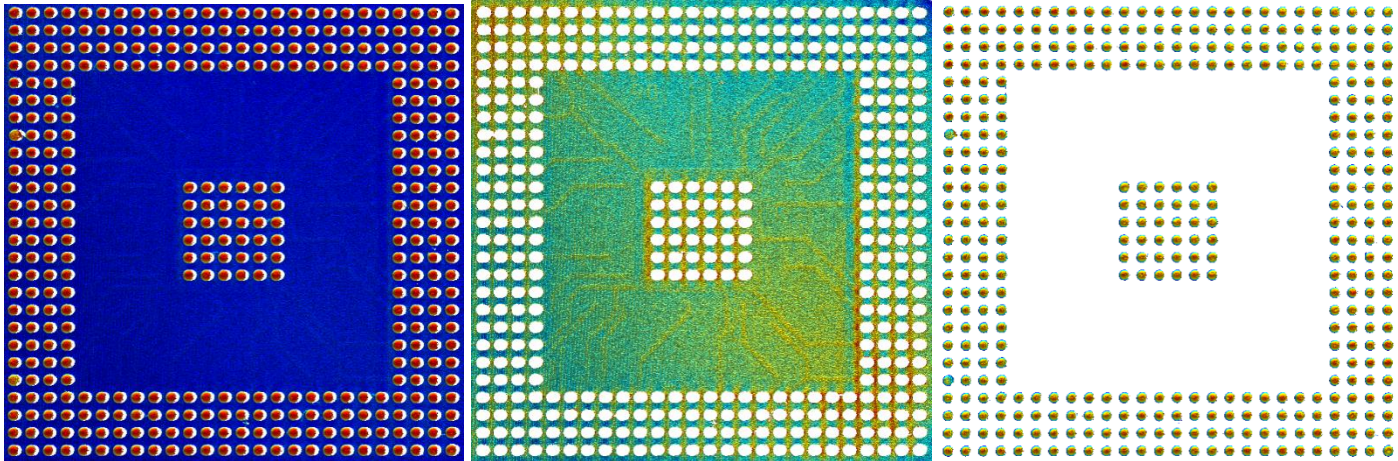
Studio 8.2 Features:

- New gauge, 3S Warpage: Uses coplanarity as the absolute value, but combines JFFS Warpage and Signal Strength (SS) gauges to define direction of warpage. Instead of only positive and negative a third category T (for Transition) is uses when SS is ≤25%. If SS>25% the result of + or – is used from the JFFS Warpage equation.

- New single point gauges: Shows displacement value for corners, center point, or "corner gap" which is defined as: max of 4 corners – min of 4 corners

- New gauge, SOFC (Second Order Fit Coefficients): The coefficients of a 2nd order polynomial are provided to the user for further calculations related to the surface. The 2nd order equation for the surface is as follows:

$$Z = a + bx + cy + dxy + ex^2 + fy^2$$

- *Profile Generator:*
  - o All Acquisition Nominal Temperatures may be set equal to their current set-point via the Edit menu.

- *Surface Measurement:*
  - o Added support for all Akrometrix modules on the AXP 2.0 equipment
  - o Added support for the DFP on the PS600S/AKM600P equipment
  - o The supported range of light intensities has been increased via the Camera Control "Exposure Time" option
  - o Lower While Heating function is now disabled when in convective mode to prevent potential damage to the system
  - o Surface Units have been slightly retooled to avoid confusion and now are only set via the Edit Recipe window under the Edit file menu
  - o "Rename Recipe" and "Set default Product ID" have been removed from the Edit file menu of the Edit Recipe window to reduce complexity
  - o Metadata settings now have their own floating window that can be called from multiple locations in the interface including Thermal Profiler. The metadata window also has the option to require the data on acquisition removing "Prompt for Acq Settings" from the Tools menu
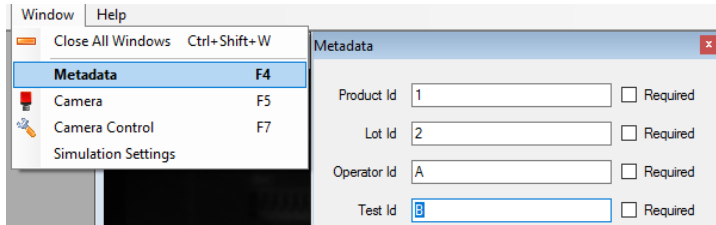
- o Preloaded Metadata tags are now available via context menu on the Filename Template and Output Path Template in Autosave Settings and Thermal Profile start menu

- **Thermal Profiler:**
  - o Users may optionally have a warning message appear when starting a profile without the Exhaust manually enabled, as is common for use in the AXP 2.0. Further steps are needed if intending to use this functionality and can be provided by local Akrometrix representation

- **Surface Analysis**
  - o Custom chord sets have been added to batch processing and Automated Report Generator functionality
  - o Functionality of Filename Filtering has been significantly increased. The software provided examples of syntax within the software to explain how the filter can be used
  - o Smooth Displacement has been removed from Tools->Options to avoid confusion as to current graph state
  - o Added more tooltips to show full gauge names on abbreviated gauges
  - o Source file and Destination file Min/Max are shown when Batch Masking akx_disp files
  - o Batch processing windows can now be duplicated
  - o Batch processing Generate Output no longer creates a new top-most window. Instead output is placed as a tab next to analyzed data. This output can optionally be locked and synced with other batch processing windows for easy comparison of outputs with different analysis options
  - o BatchResults.txt files created from Batch Analyze now include an additional column with filename immediately after the full filename path

- **Surface Analysis (Related to Automated Report Generator – ARG)**
  - o Custom title pages can be added to the report output to precede the report output. Contact Akrometrix to pursue this customization
  - o Groups Tab
    - ▪ Updated syntax added to the "Edit Metadata" function to allow further customization of Roi name. This function is explained in the User Manual
    - ▪ Edit Metadata can now be accessed by double-clicking on a Group
    - ▪ Improved interface for "Add File to Profile" via found Groups context menu
  - o ROI Selector Tab
    - ▪ Open file and Open Contain Folder functionality have been added via context menu to each thumbnail image
  - o Layout Settings Tab
    - ▪ Report output now has the option to output a Video file, with chosen size and delay per image, and/or individual image files
    - ▪ A "Gauge Preview" option is now available to show only gauge graphs and tables before creating a full report

- Page formatting has been retooled for more flexibility and options in report layouts (shown to the right)
- Legends are now shown on each individual image in the report output if common Z scale is set to none
- Z scaling can now be User-Defined

Key Bug Fixes:

- *Studio Manager*
  - Report Generator shortcut is now mapped to the correct x86 path when running a 64-bit OS
- *Profile Generator*
  - Akx_profile files are now associated with Profile Generator and support drag and drop functionality
  - Fixed issue with adding profile rows from the table when the last step included an acquisition
  - Fixed issue where custom Nominal Temperature values were not being retained in some cases
- *Surface Measurement*
  - Saturated dark pixels are no longer incorrectly shown outside the ROI
  - A check for missing required Metadata is now performed before on-demand acquisitions
  - A message box is now correctly shown if DAQ Fringe Height calibration does not complete
  - Removing a profile from a recipe no longer causes an unintended error
- *Thermal Profiler*
  - The Power Output Limit option is now correctly seen on all equipment from the profile Start menu
  - Output file format is now correctly honored and retained run to run
  - Manual Profiling control panel is now only shown when in Manual Profile mode
- *Surface Analysis:*
  - <TemperatureReading> tags now always display temperature correctly
  - Improved ARG functionality to better handle files missing TemperatureNominal metadata
  - Chord data now correctly saves with appropriate suffix added to file names
  - Chord data files are now saved with appropriate precision contained in the data file
  - Relative batch analysis can no longer be incorrectly triggered when results table is empty
  - Chord graphs now have the correct default footer when in batch analyze
  - Page subtitles in ARG now consistently show the correct ROI name
  - Configuration files are no longer ignored in ARG output

Known Issues:

- In Batch Analyze performing Action->Group prior to Action->Analyze can lead to some unintended errors and is generally not recommended to be performed in this order at this time

- 3D and 2D Configuration files have conflicts with new functions in some areas and should be used with caution. Configuration file appearance issues will be revisited in future versions.

- Automated Report Generator (ARG) use is generally built around reporting samples over varying temperature. Using ARG when measuring large quantities of samples at room temperature currently has limited usefulness.

Versions (listed for reference):

Studio Manager	7.6.11492
SurfaceMeasurement	8.2.11492
SurfaceAnalysis	8.2.11492
ProfileGenerator	7.7.11492
Report Generator	7.4.8202
FileConverter	7.5.11492
LicenseUtility	7.5.11492
User Manuals Studio	Studio 8.2