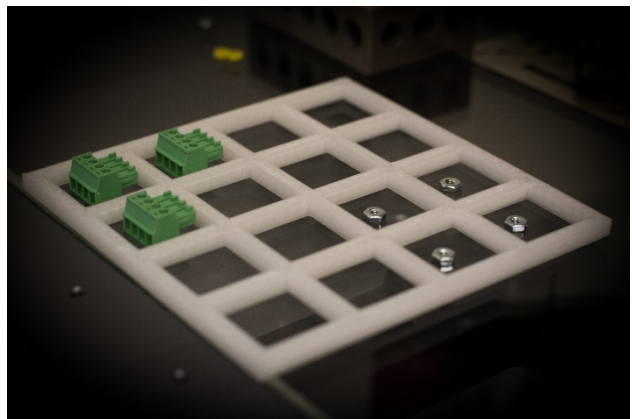
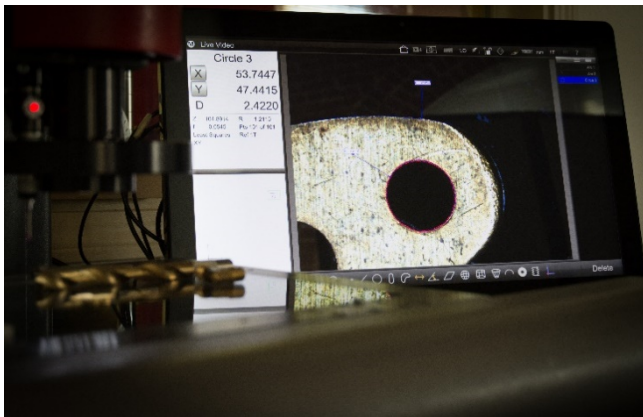


# MetLogix

# M<sup>3</sup>



## M3 Version 3

# *User's Guide Appendix*

October, 2018 PN# 15020-00 Revision 1

**M3 Version 3**  
***User's Guide***  
**Appendix**

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# M3 Version 3 User Guide Appendix

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## M3 Version 3 Features

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## Advanced Edge Teach

-The Advanced Edge Teach(AET) mode introduces new fine tune controls to the video measurement process, improving edge collection results in complex imaging scenarios. The new Advanced Edge Teach dialog provides a more detailed look at candidate edges and provides “live” feedback of the candidate edges currently detected.

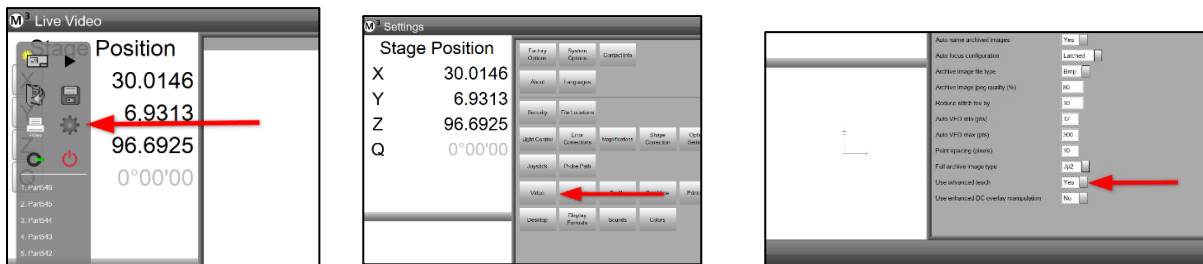
-Detection of low contrast, narrow, and difficult to image edges is improved with graph-based control of contrast, material direction, and edge width.

Advanced Edge Teach mode can be used in conjunction with any of the existing M3 VED probes.

### Setup:

**IMPORTANT:** The new Advanced Edge Teach functionality is OFF by default.

To enable the advanced edge teach functionality navigate to the Video Setup Screen and set the Advanced Edge Teach flag to “Yes”.

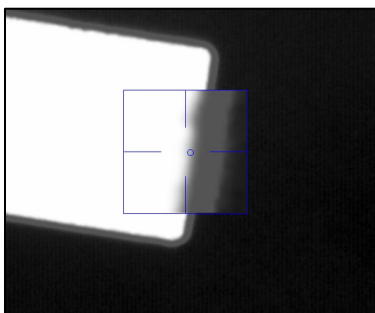


### Operation:

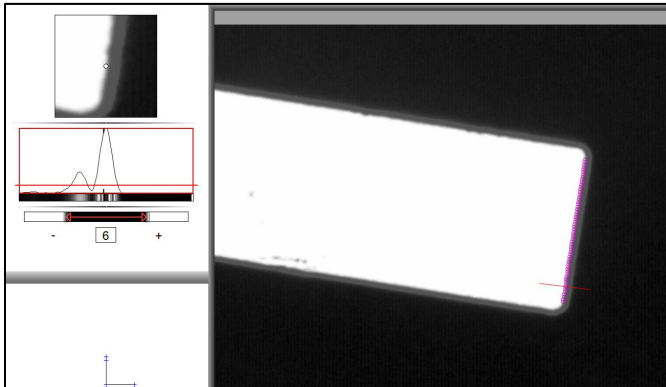
**IMPORTANT:** For brevity, the Advanced Edge Teach functionality will be referred to as “AET”.

The AET function is initiated by long pressing on an edge in the Live Video window with any of the Video probes selected(Active Crosshair, MeasureLogic, or EyeMeasure).

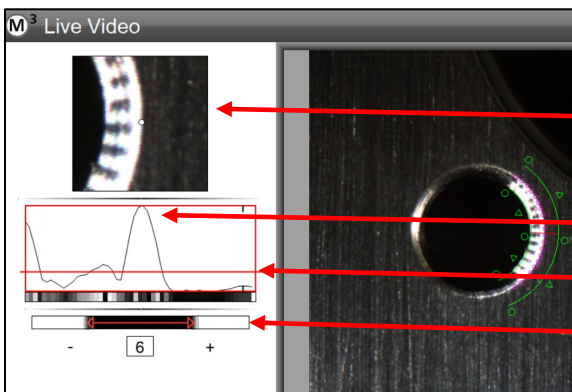
While continuing to hold down the mouse button or your finger, drag the small magnification popup window until the edge of interest is targeted by the small blue ringlet.



Release the mouse button or your finger to set the edge sample position, identified by a red stitch line drawn across the edge of interest. The AET dialog will also be displayed on the left side of the M3 desktop.

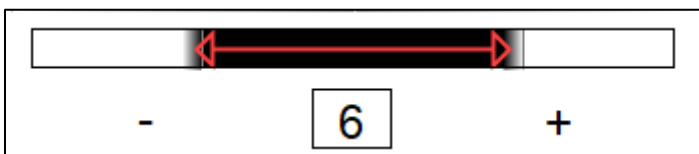


Adjust the red contrast threshold bar in the contrast graph to set the current threshold for edge detection. The points in the live video window will update in “real-time” to indicate current state of edge detection, based on the AET settings.

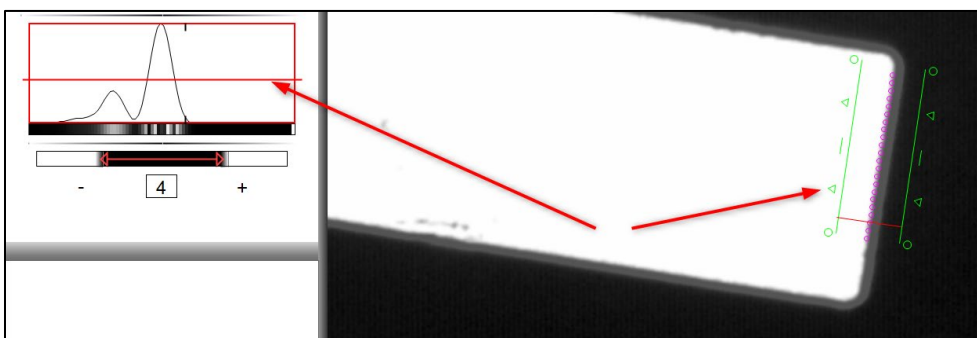


- “Zoomed In” view of current AET stitch.
- Edge contrast of current AET stitch.
- Contrast Threshold control.
- Edge Thickness Filter control.

Adjust the Edge Thickness Filter value by pressing the (+) or (-) buttons. This filter sets the minimum number of continuous pixels of sufficient contrast required to be considered a valid edge. The unit is in pixels.

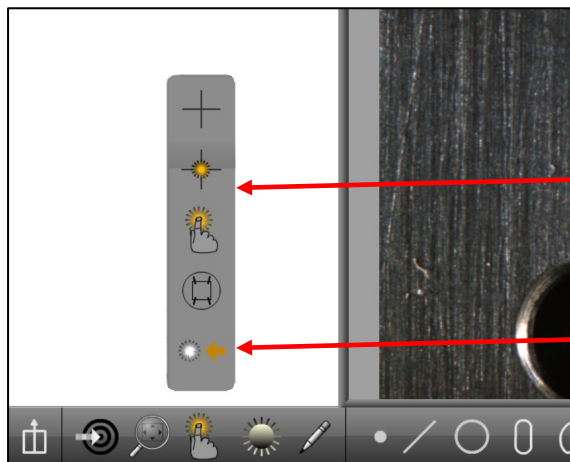


Using AET with the EyeMeasure Probe enables color sense and direction to be used along with the contrast threshold control to target specific transitions by contrast level.



## Sample Procedure Steps for using Advanced Edge Teach:

1. Select, or generate the desired Video Probe.
2. Long Press on the live video window with the left mouse button, targeting the edge transition that you would like to modify edge parameters for. You will see the magnification popup window appear providing a zoom region to assist with targeting.
3. Release the left mouse button once the target is achieved.
4. Make adjustments to the AET dialog. The candidate edge points will be updated “real-time” in the live video window as adjustments are made.
5. Adjust the red Contrast Threshold Bar to set the min contrast detection level for the current edge of interest. Adjust the Minimum Edge Thickness filter(in pixels) by incrementing the value with the “+” or “-” buttons.
6. Press the “Done” button to save the current AET settings.
7. Once modified edge parameters have been saved the video probes will be displayed in the toolbar with an orange colored tint, indicating that the system is currently using modified edge parameter.



-Probes displayed with an “orange tint” indicate that custom edge parameters are currently in use.

-Press the orange “left arrow” button to discard the current AET and return to default “Auto” edge parameters.

## Direct Data Transfer to Excel

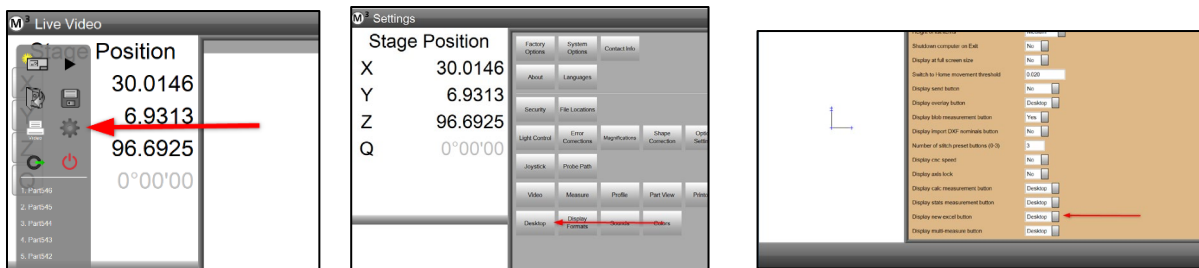
-Export measurement data directly to new or existing Excel spreadsheets.

-Export M3 specific report formats or populate existing quality reports using the custom export options.

### Setup:

**IMPORTANT:** The new Custom Excel Transfer functionality is OFF by default.

To enable Custom Excel Transfer navigate to the Desktop Settings Screen and set the Display New Excel button flag to “Desktop”. This will add the .XLXS option to your Data View export menu.



### Operation:

**IMPORTANT:** Direct data export to excel requires that a “licensed and activated” copy of the Microsoft Excel application be installed and closed at the time the Excel Data Transfer occurs. The M3 will not update open excel sheets. Use the “Close after export” flag(described on the following page) to ensure that sheets being updated programmatically are closed automatically, and ready for the next set of incoming data.

#### Direct to New Sheet Export:

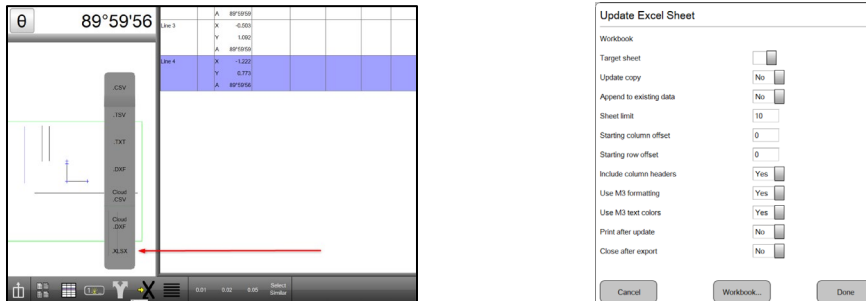
When viewing measuring results in the M3 Data View the Export to Excel button(found in the bottom toolbar) can be used to export the current data view directly to an Excel spreadsheet. When executed the system will open a new instance of the Excel Application, open a new Workbook, and then populate a blank sheet with the M3 data.





**Export to Existing/Custom Excel Sheet:**

When viewing measuring results in the M3 Data View the Export Custom Excel button can be used (from the Export Menu) to send data to an existing Workbook and Worksheet. Custom export parameters can also be set using the flags in the Export Dialog, and described below.



**Cancel Button** – Cancels the current Export and return the operator to the Data view.

**Done Button** – Accepts the current Export Settings and executes the data export.

**Workbook Button** – Press to select an existing Excel Workbook file. Data will be sent to this file.

**Target Sheet** – Once a Workbook has been selected from the Workbook button, select the target worksheet from the worksheet dropdown. This list will be populated with sheets detected within the selected workbook.

**Update Copy** – When set to Yes the target worksheet will be duplicated in the workbook and the new data will be sent to it.

**Append to Existing Data** – Set to Yes to append current data view contents to the end of the data within the current worksheet. Set to No to overwrite existing sheet contents.

**Sheet Limit** – Sets the maximum number of new worksheets that can be created within a workbook.

**Starting Column Offset** – Sets a cell column offset for the data entry starting point within the worksheet. The offset is specified from cell 1,1 within the target sheet, or from cell 1,1 relative to existing data, in the event the data is being appended.

**Starting Row Offset** – Sets a cell row offset for the data entry starting point within the worksheet. The offset is specified from cell 1,1 within the target sheet, or from cell 1,1 relative to existing data, in the event the data is being appended.

**Include Column Headers** – Set to Yes to include the data column header labels from the M3 template in the output excel sheet. Set to No to omit the header labels.

**Use M3 Formatting** – Set to Yes to enable M3 template emulation for the target worksheet. When set to yes the M3 will attempt to duplicate the template characteristics from the M3, in the target worksheet.

**Use M3 text colors** – Set to Yes to set text colors in the target sheet the same as M3. This option is typically used so that failed tolerance results, in Red Text color, will be transmitted to the target worksheet.

**Print after update** – Set to Yes to execute a Printout immediately following the export. The printer settings will be used from the M3 main system setup.

**Close after export** – Set to Yes to close the target workbook and Excel application, following the export step.

**Sample Procedure Steps for “Direct to New Excel Sheet” export:**

1. Prepare measurement results either by measurement or by opening an existing program containing run results data.
2. Press the Data View button to access the M3 report data view.
3. If desired, use exiting template editing techniques and data filters to prepare the data for export to excel.
4. Press the Direct to New Sheet export button from the bottom toolbar.



5. An instance of Excel will open and the data will be transferred to a new worksheet within the workbook.

**Sample Procedure Steps for “Export Custom Excel Sheet” export:**

1. Prepare measurement results either by measurement or by opening an existing program containing run results data.
2. Press the Data View button to access the M3 report data view.
3. If desired, use exiting template editing techniques and data filters to prepare the data for export to excel.
4. Press the Export Menu button from the bottom toolbar.
5. Select the item “.XLXS” from the export menu. The custom Excel Export dialog will be displayed.
6. Press the Workbook button from the bottom of the dialog and browse for an existing Excel Workbook file.
7. Select the desired target worksheet from the Target worksheets dropdown menu.
8. Set the desired formatting parameters in the Custom Export dialog.
9. Press Done to complete the Excel Data transfer operation.

## User Defined Report Templates

-Customize and save multiple report template styles for use in various part programs.

-Report templates can now be created and assigned to meet the formatting requirements of specific part inspection routines.

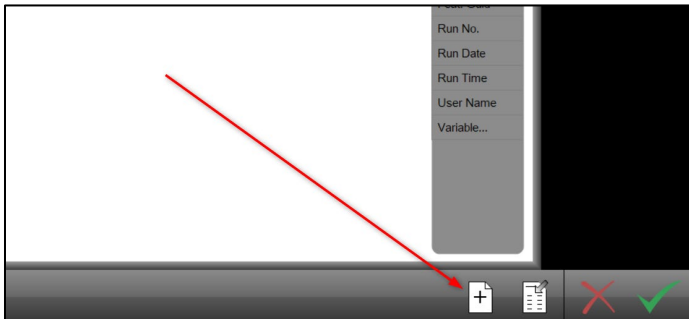
### Setup:

No additional setup is required to utilize the new User Templates functionality.

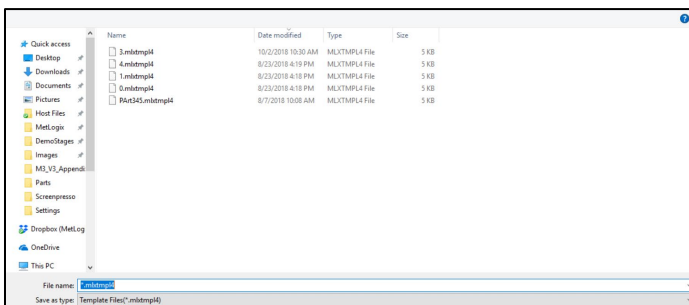
### Operation:

**IMPORTANT:** Template selection, editing, and usage for the purpose of data export and report printing remains unchanged from the previous versions of the M3 software. The following enhancement to the template edit and save system simply allows users to save and recall as many variations of the (4) main default templates as they would like.

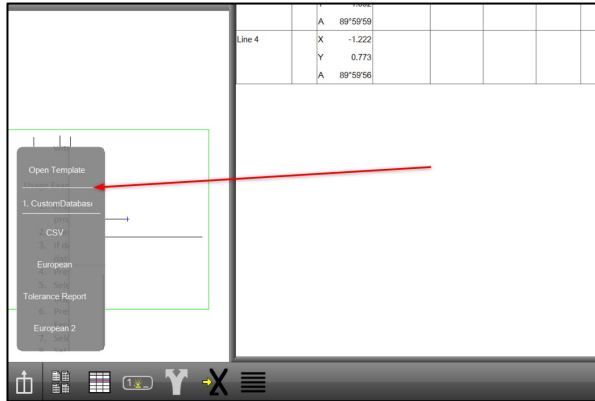
- ➔ A new button has been added to the bottom toolbar of the template edit mode. This button allows users to save the current template state to a new template filename.



- ➔ Once the Save New Template button is pressed the user will be presented with a windows dialog to allow the user to name the new template, as seen below.



- ➔ As new User Defined templates are added to the system they will begin to populate the template selection menu, along with the standard default templates. Select any desired template from this menu to set it as current, or use the Open Template button to choose a template from the Windows file dialog.



Sample Procedure Steps for “Save Custom Report Template” function:

1. In interactive mode(no program loaded) access the M3 data view screen.
2. Select the default template that you would like to make modifications to.
3. Press the small “+” button located to the right of the template headers to enter template edit mode.
4. Configure the template using the various template customization options.
5. Once the desired template is achieved, press the Save New Template button found in the bottom right toolbar.



6. Enter a name for the new template and press save. The newly saved template will be set as the current template and will be added to the template selection menu.

## Statistic Results Feature

-Added new “Stat” type feature construction for quick analysis of statistical results inside a part program.

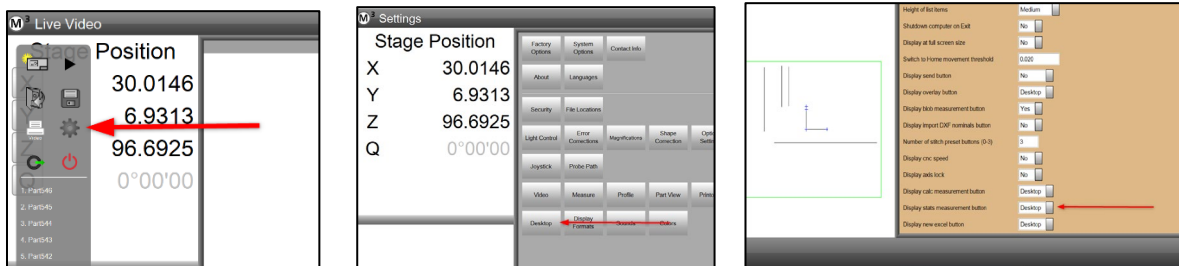
-Report the Min, Max, Range, Average, Standard Deviation, or Six Sigma result for a given population of feature measurements.

-Support for program playback of the “Stat” feature to enhance GR&R analysis and demonstration.

### Setup:

**IMPORTANT:** The new Statistics Result functionality is OFF by default.

To enable the Stats feature navigate to the Desktop Settings Screen and set the Display Stats Measurement button flag to “Desktop” or to “Extra” depending on whether you would like the new button added to the desktop toolbar or to the Extra menu.



### Operation:

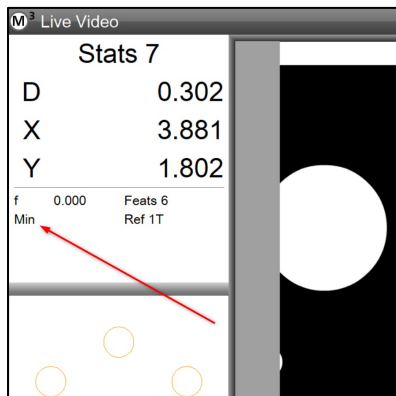
The Stats feature is a simple way of comparing measurement results from a number of like features. As an example, if you measure six bore features in a bolt hole pattern, you can measure them and then construct a Stats feature from these parent circles and quickly determine the largest, smallest and average of the six diameters. This applies to all feature types and can be used on all coefficients. The results of the Stats feature can be tolerated and can be also included in a report or part program.

- ➔ When enabled, a new button will be added to the bottom toolbar(or Extra Menu) of the main M3 desktop. This button will be used to initiate a Stat Feature construction.

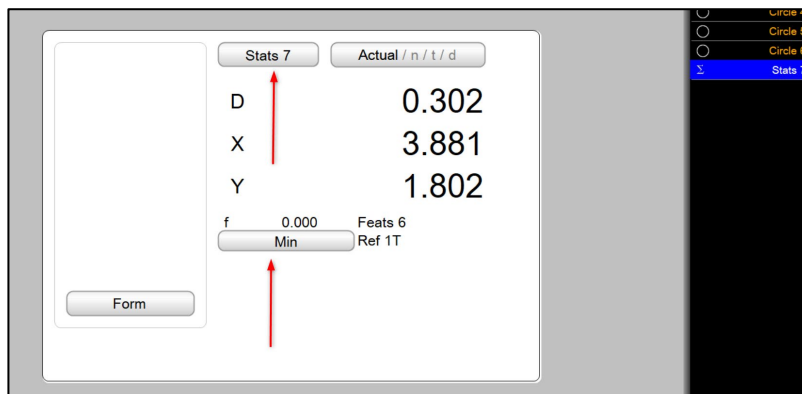


Sample Procedure Steps for the “Stat Feature” functionality:

1. Measure 4 circles of approximately the same size
2. Select the Stats Feature button from the Toolbar or Extra menu.
3. Select the 4 circles from the feature list and press the Done button.
4. The feature detail window(top left) will now display the results of the Stats feature construction, as seen below. The initial result will show “MIN”, meaning the minimum size and position value of the entire selected feature population for the Stat construction.



5. Navigating to the full Stat feature detail by pressing in the small feature detail viewport. This screen, as seen below, will provide access to additional settings for the Stat feature result.



-Change the name of the Stat feature by clicking on the box containing the label “Stats X”. Once selected, type the name of the desired label for this Stat feature result.

-Under the feature data, you will see a box showing the label “Min”. You can cycle through the various Stat calculation types by pressing this button.

- i. MIN = Minimum coefficient characteristic of the Stat population.
- ii. MAX = Maximum coefficient characteristic of the Stat population.
- iii. RANGE = Range of the coefficient characteristic of the Stat population.
- iv. AVE = the average of the coefficient characteristic of the Stat population.
- v. STD DEV = Standard Deviation of the coefficient characteristic of the Stat population.
- vi. 6 Sigma = Six times the Standard Deviation of the coefficient characteristic of the Stat population.

6. The results of a Stats Feature can also be tolerance and reported.

-Toggle the Stat feature result type to the desired Stat type.(Min/Max/Ave, etc)

-Toggle the “ACTUAL/n/t/r” button until it reads NOMINAL.

-Enter the Nominal Value for X, Y, and D in the corresponding fields.

Stats 7    Nominal / t / d / a

D

X

Y

Form

-Tolerance symbol buttons will also be displayed in the bottom toolbar. Click to add the X, Y, and D tolerance limit fields.

Use 0.05    Stats 7    Tolerance / d / a / n

- Tol    + Tol

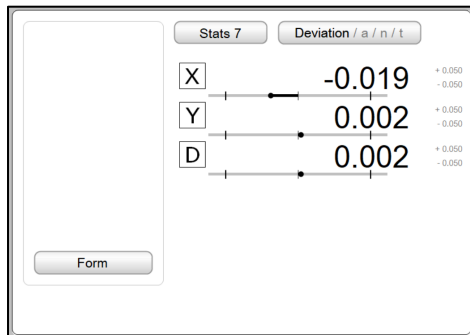
X

Y

D

-Enter the +/- tolerance limit values into the corresponding fields.

-Toggle the view again using the view type toggle button until the Deviation view is displayed. You will see the results of your tolerance Stat feature.



-The Stat feature, including its tolerance will be displayed in the report view along with other standard feature measurements and constructions.



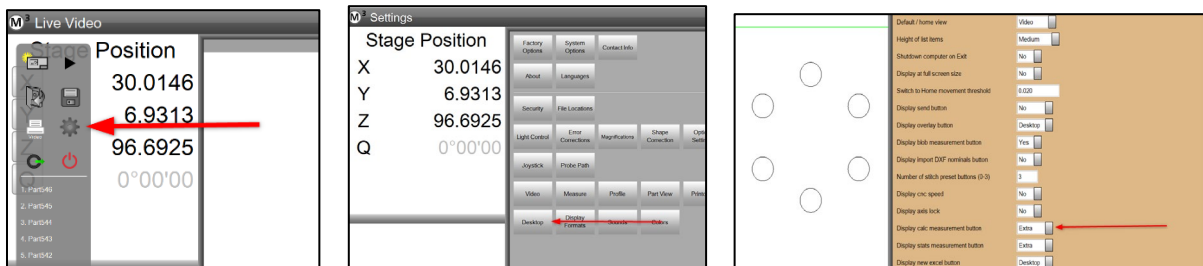
## Formula Results via Calc Feature

- Added new “Calc” feature type to support formula-based calculations inside the M3 software.
- Generate custom formula calculations utilizing measurement result data and standard mathematical operators and trigonometric functions.
- Perform simple and complex measurement calculations directly in the M3 software.

### Setup:

**IMPORTANT:** The new Formula Calc functionality is OFF by default.

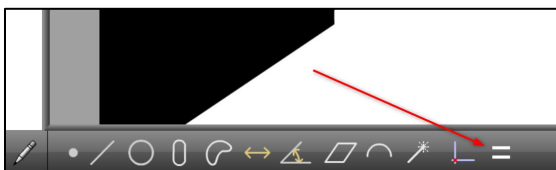
To enable the Formula Calc functionality navigate to the Desktop Settings Screen and set the Display Calc Measurement button flag to “Desktop” or to “Extra” depending on whether you would like the new button added to the desktop toolbar or to the Extra menu.



### Operation:

The Calc feature is used to solve complex measurement tasks which may require combining coefficients from several different features or by extracting a feature coefficient from a feature and then applying the power of an arithmetic/geometry calculator.

- ➔ When enabled, a new button will be added to the bottom toolbar(or Extra Menu) of the main M3 desktop. This button will be used to access the Formula Calc Feature.



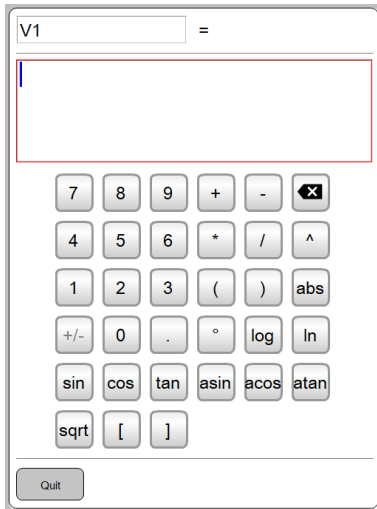
### Sample Procedure Steps for the “Formula Calc” functionality:

(The formula for calculating the circumference of a circle is  $\text{Pi} * \text{Diameter}$ )

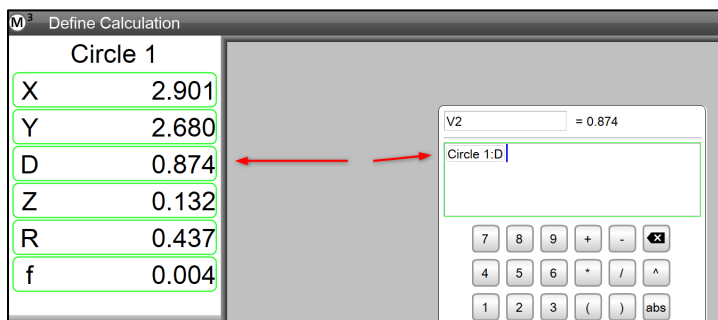
1. Measure a circle feature.
2. Select the Calc button from the bottom toolbar.



3. The Calc feature formula entry screen will be displayed.



4. Select the Circle feature in the feature list. A list of selectable coefficients will appear in the upper left viewport.
5. Select Diameter coefficient from the upper left viewport.

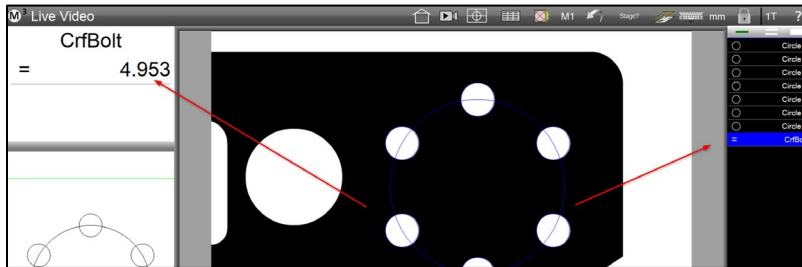


6. Press the Multiplication operator and then the Pi button from the Calc keyboard.
7. Press the Done button in the lower right toolbar to complete the formula calculation.
8. The Calculation result will be added as a calc feature to the feature list.
9. The Calc feature result can also be renamed, tolerated, and reported. See Example Procedure step #6 of the previous section for instruction on doing so.

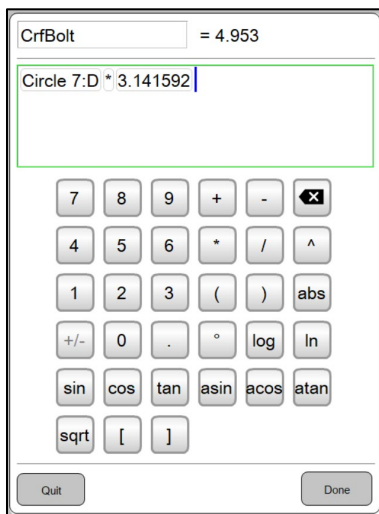
Editing the formula for a Calc Feature Results:

→The formula used to generate a Calc feature result can always be edited in either interactive or program edit mode.

1. To edit a Calc result formula, select the calc feature in the feature list and then long press, using the left mouse button, on the calc result view port, located in the upper-left detail viewport.



2. The Calc result formula entry screen will be displayed. Modify the formula as desired and press done to finish editing the Calc feature formula.



## Palletizing and Support for Stitched Images

-Applications with pallet based fixturing requirements can now make use of stitched images.

-Part position and orientation can be quickly identified by using pattern recognition within the super-image source of the pallet program.

-Using this method greater inspection throughput can be realized by overall reductions in pallet loading times and improved playback reliability.

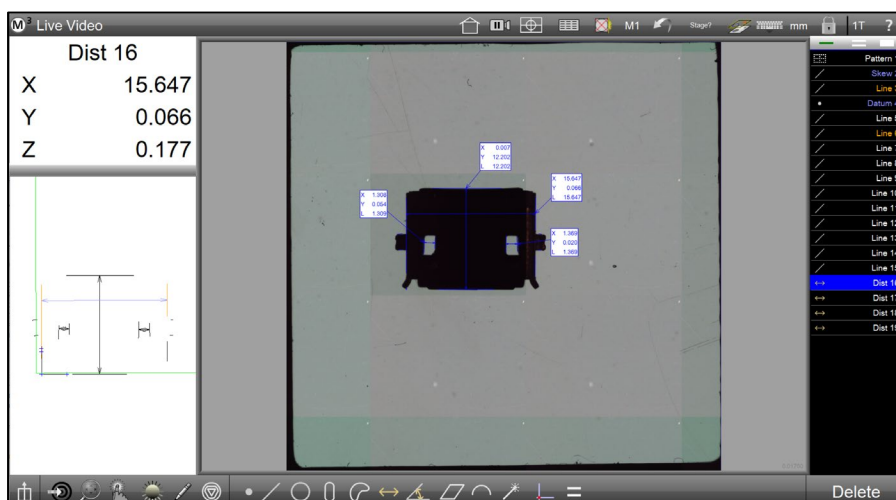
### Setup:

**IMPORTANT:** There are no additional software setup requirements to make use of stitched images within pallet programming. However, the measuring system must support image stitching, and pallet programming/permanent fixture modes.

**IMPORTANT:** The following sample procedure will palletize an existing M3 program that was authored using a stitched image of a “pocket” in a target fixture, and pattern recognition to identify the location of parts within the fixture. This sequence can also be used with M3 part programs using more traditional datuming and registration techniques.

### Sample Procedure Steps for “Palletizing a Program”:

1. Author the sample part program using image stitching to create a super-image of the pallet pocket containing a part sample. Use pattern recognition to establish part program registration as would be typical in a Field of View(FOV) system application.
2. Complete the remainder of the program authoring process, including the application of tolerances, reporting requirements(export and print), etc.



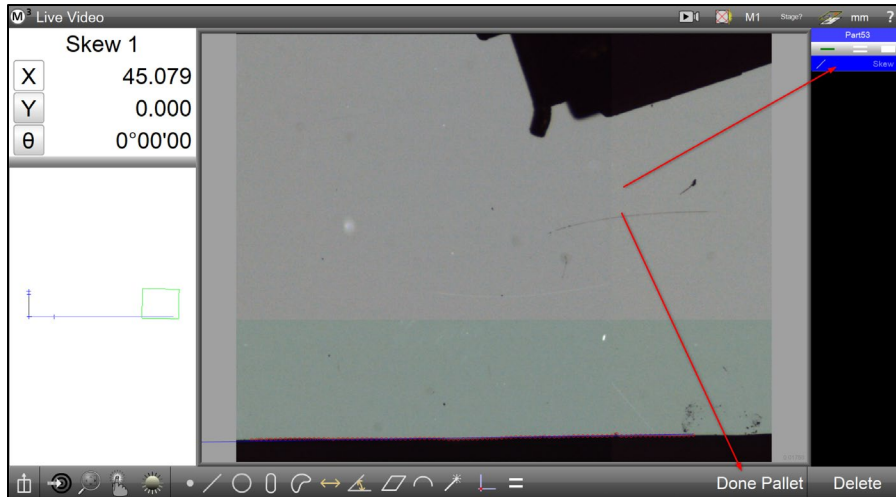
3. Press the Play button in the M3 menu to convert your measurement routine to a part program. Play the program back once to test playback functionality.
4. Go into Edit mode and press the Program Properties Step to access the Program Properties dialog, as seen below. You should notice that the Pallet Status box in the lower left corner is empty, indicating the program is not currently palletized.

5. Press the Palletize button in the lower left corner to access the Pallet Setup dialog.
6. Enter the number of Rows and Columns for your pallet, as well as the spacing between each row and column into the 4 numeric entry fields, as seen below.

7. **IMPORTANT:** The Skew Fixture and Locate 1<sup>st</sup> buttons will be used to configure the skew orientation of the pallet fixture and identify the origin pocket for pallet program playback. Both of these steps are required to successfully palletize a program and must be performed in order, Skew Fixture first followed by Locate 1<sup>st</sup>. The small status boxes to the right of the buttons indicate when the Skew or Origin have been successfully set. The box will fill green when successfully established.

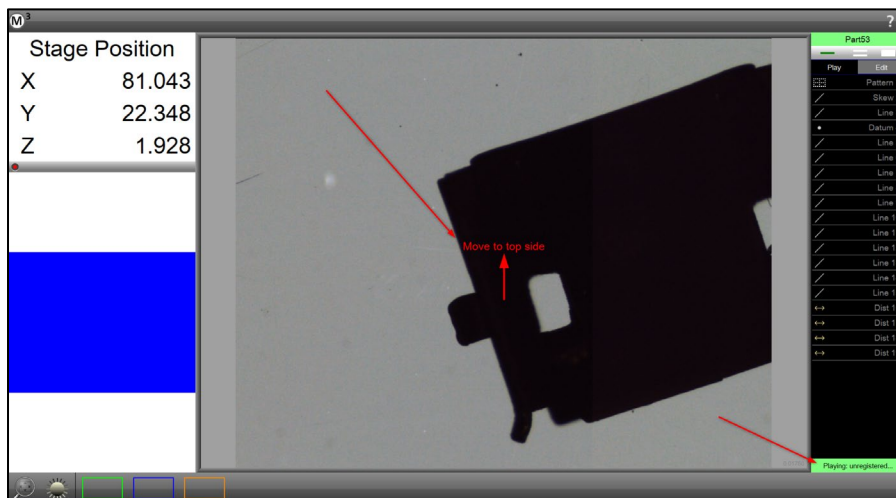
It should also be noted that any changes to the row and column count, or spacing, will result in a de-registration of the above pallet parameters, indicated by the status boxes no longer being “green filled”. Simply re-execute the Skew Pallet and Locate first to re-palletize the program using the new pallet row/column count or spacing.

- Press the Skew Fixture button. The M3 will return to video measuring mode. Skew the fixture by performing a skew measurement or construction on the fixture. Once a valid skew is detected by the M3 the Done Pallet button will appear in the bottom toolbar. Press the Done Pallet button to complete the process. Upon completion of the Skew Fixture routine the system will return to the Pallet Setup dialog.

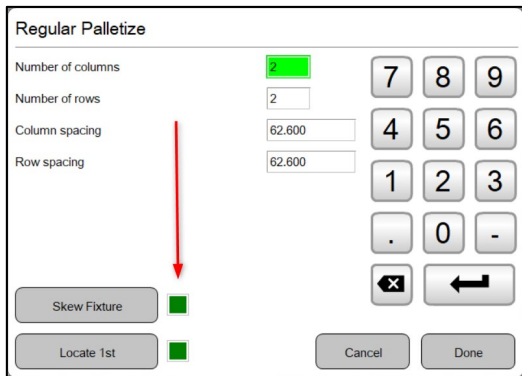


- Press the Locate First button. The system will switch to program playback mode for the part program you are palletizing. Execute the Registration program steps required for the part program.

**IMPORTANT:** For programs that begin with an image stitch step, as is the case for our example, the program registration comes from the stitched image position and orientation itself. As such the Locate First operation described above will comprise of setting the rectangular bounds (top, right, bottom, and left) for the origin pallet pocket. This is accomplished using the same method as any other rectangular stitch operation, following the on-screen instruction text and arrow.



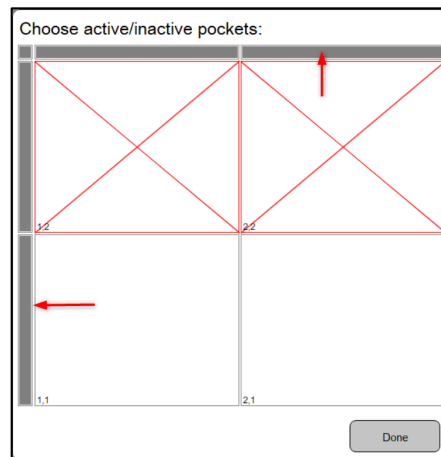
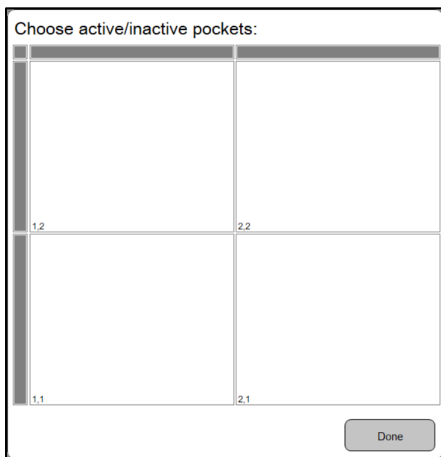
- Upon registration complete the system will return to the Pallet Setup Dialog. You should see both status boxes filled green indicating successful pallet setup, as seen below.



- Press the Done button to close the Pallet Setup dialog and the Done again to close the Program Properties dialog. The program should now be successfully palletized.

Sample Procedure Steps for playing back a “Palletized Program”:

- Open a pallet part program and press play from the M3 menu, or if continuing from the procedure above, just press play. Playing back a palletized part program will always display a dialog similar to the one seen below.



- The dialog will display a square pocket “button” for each pocket established in your pallet setup. Click any button to put a large red “X” in the button, as seen in the image to the right above. Use the grey row and column Select All buttons, located along the top and side of the pocket grid to enable/disable entire rows or columns of pockets. Pockets with a red “X” will be skipped in program playback. Press Done to proceed with pallet program playback.

## Enhanced Data Cloud Display

-Data clouds from measured features can now be displayed directly on the feature graphic in the main part view, and as an overlay on the live video image.

-Data cloud inspection tools such as point display scaling, and “best/worst” point finder tool can help quickly analyze VED measurement results.

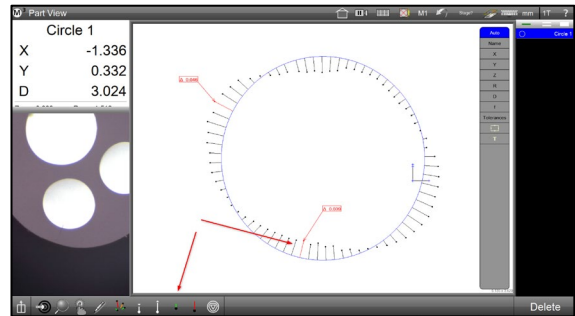
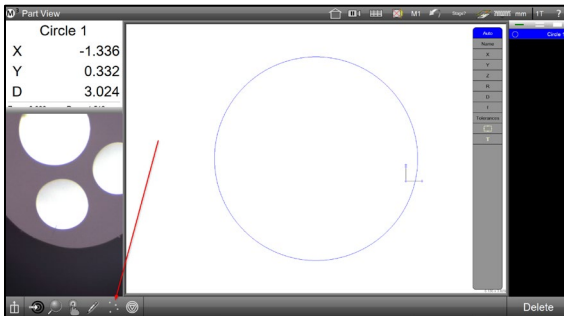
-Enhance feature printouts and reports utilizing this new graphical detail.

### Setup:

**NOTE:** There are no additional software setup steps required to use the new Enhanced Data Cloud display.

### Operation:

The new Enhanced Data Cloud tools are accessed via the new “Show Data Points” button, available in the Annotation menu. First, press the Annotation button (pencil icon) to expand the annotation toolbar, then press the “Show Data Points” button to add the data points for the selected feature to the part view. Adding data points to a feature also exposes the additional data cloud tool bar buttons, seen in the second screenshot below.





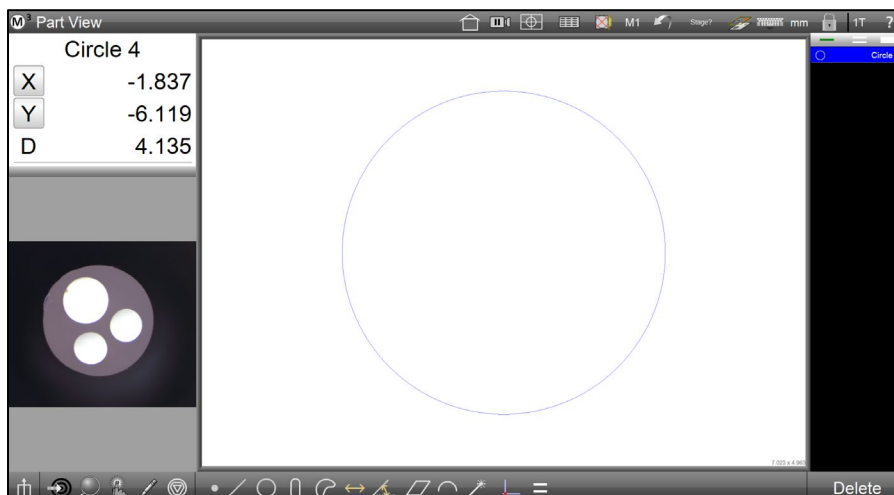
The following identifies and describes the functionality of the data cloud tool bar buttons.



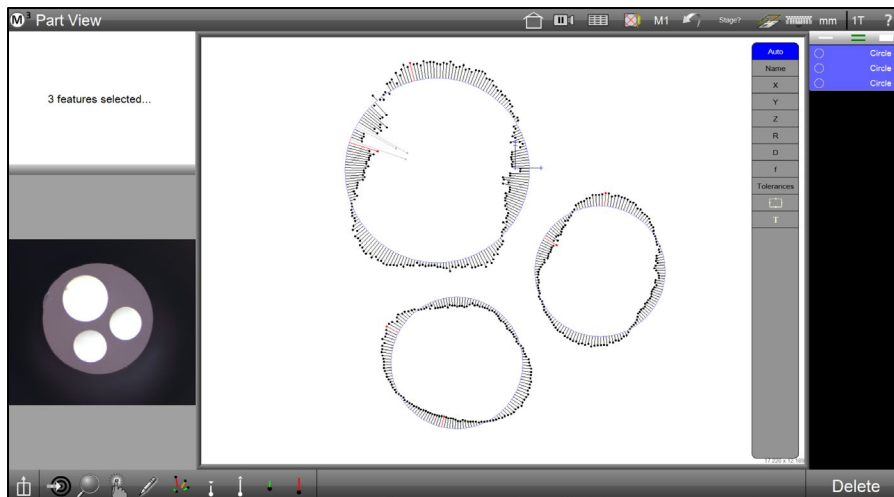
- (1) Annotation Menu Button – Opens and closes the Annotation Menu
- (2) Show/Hide Data Points Button – Toggles the selected feature(s) datapoints between shown and hidden.
- (3) Decrease Whisker Mag Button – Decreases the magnification(scaling) of all datapoints in the selected feature. Long-press the button to display a numeric entry dialog. Enter the numeric magnification you would like to use. Press Done to set the specified magnification.
- (4) Increase Whisker Mag Button – Increases the magnification(scaling) of all datapoints in the selected feature. Long-press the button to display a numeric entry dialog. Enter the numeric magnification you would like to use. Press Done to set the specified magnification.
- (5) Better/Best Whisker Button – Steps through the selected features data cloud, point by point, in the direction of smaller/less form error. Long-press the button to automatically select the data point with the least form error.
- (6) Worse/Worst Whisker Button – Steps through the selected features data cloud, point by point, in the direction of greater/more form error. Long-press the button to automatically select the data point with the greatest form error.

Sample Procedure Steps for adding “data cloud markup” to the part view:

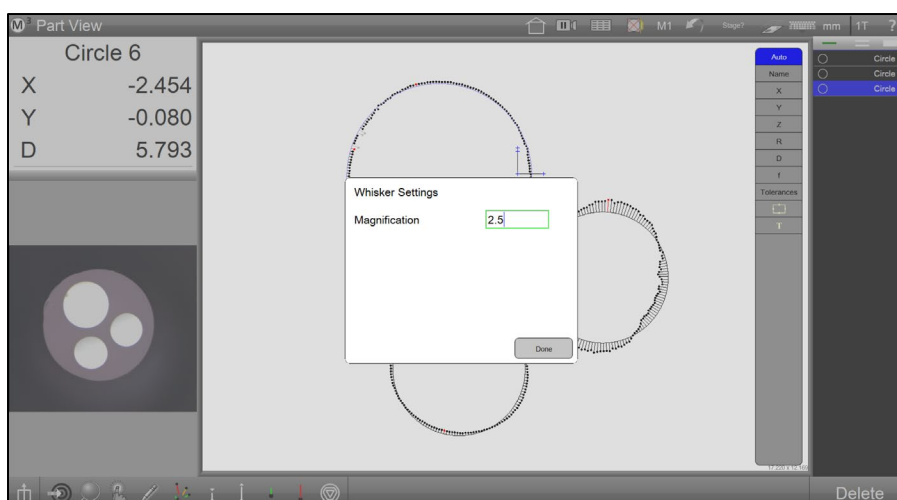
1. Measure a feature, preferably with a moderate to high point density, to use for demonstration in the following procedure.
2. Press in the small part view to bring it to the large center viewport.



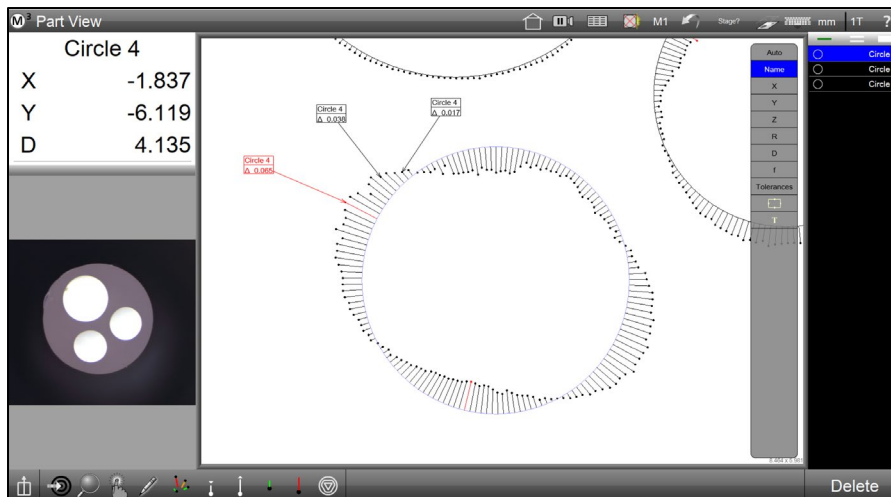
3. Press the Annotation Menu button to open the annotation toolbar.
4. Select the features from the feature list that you would like to enable data point display for.
5. Press the Show/Hide Data Points button to display data points and whiskers for the selected features.



6. Press the Increase and Decrease Whisker Mag buttons to set the desired scaling for the display of data point whiskers. Features with very low total form error may benefit from increased magnification in order to more easily observe variation in form error graphically. The inverse is true for features of very large total form error.
7. Long-press on either the Increase or Decrease Whisker Mag button to display the numeric entry dialog for manually setting whisker magnification. Magnification can be set to individual features, or to a selected group of features.

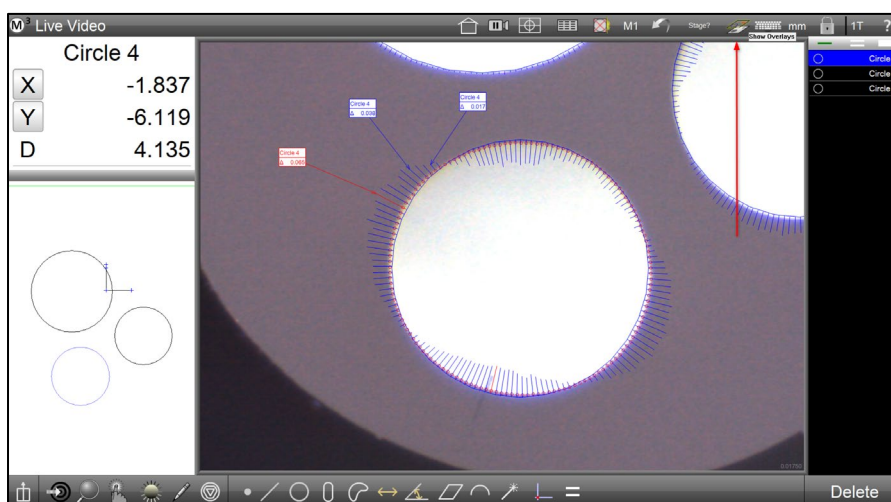


8. Select a single feature in the feature list, then a single data point in its data cloud. An annotation label displaying the datapoints “delta from fit” will be added for that data point. Press delete to remove the annotation label or select additional data points to add more labels. Press annotation items from the list at the right to add and remove data from the label.



*NOTE: The data point with the greatest delta from fit, per side, will be displayed in red. Added annotation labels will also be displayed in red.*

9. Long press the form error buttons to automatically select the whisker with the least or most form error.
10. Press in the live video viewport to bring the live video into the large center viewport.
11. Press the Part View Overlay button in the top right toolbar to display the data point markup on top of the live video image.



12. Data cloud markup can be printed along with the part view or live video by pressing the print button from the M3 menu.

# Polar Mode Step and Repeat

-Simplify creation of part programs containing large quantities of features by duplicating program step(s) automatically.

-Feature step and repeat functionality has been enhanced to support polar coordinate positions and offsets.

## Setup:

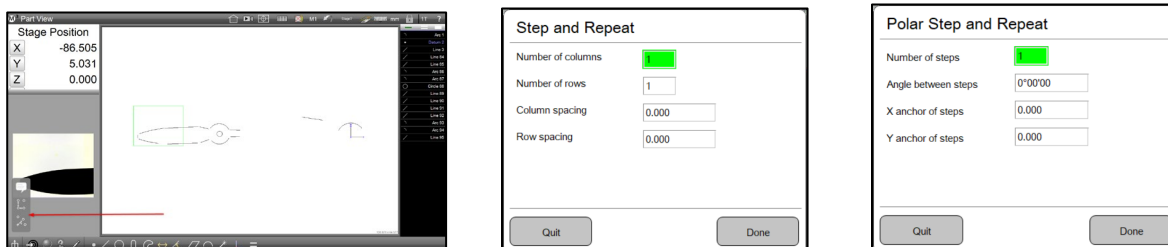
**IMPORTANT:** Cartesian and Polar step and repeat can now be used in both program creation mode(interactively) and in program edit mode. To enable the use of step and repeat mode while creating a part program navigate to the Program Settings screen and set the “Always allow step and repeat” flag to Extra. The Cartesian and Polar step and repeat buttons will be added to the Extra menu in the main M3 toolbar.



## Operation:

The Step and Repeat function is used to duplicate measurements and constructions in your M3 part program, increasing programming speed for inspection tasks with large numbers of features.

The operator would first execute the source measurement(s) to be duplicated, select them from the feature list, and then press one of the step and repeat buttons to open the Step and Repeat Dialog. Descriptions of the dialog fields can be found on the next page.



*Cartesian Step and Repeat:*

**Number of Columns** – Designates the number of columns to be created in the step and repeat grid.

**Number of Rows** - Designates the number of rows to be created in the step and repeat grid.

**Column Spacing** – Designates the distance to be used between columns in the step and repeat grid.

**Row Spacing** - Designates the distance to be used between rows in the step and repeat grid.

*Polar Step and Repeat:*

**Number of Steps** – Designates the number of instances of the selected features to be created in the polar array.

**Angle Between Steps** – Designates the angle to be created between instances of the selected features in the polar array.

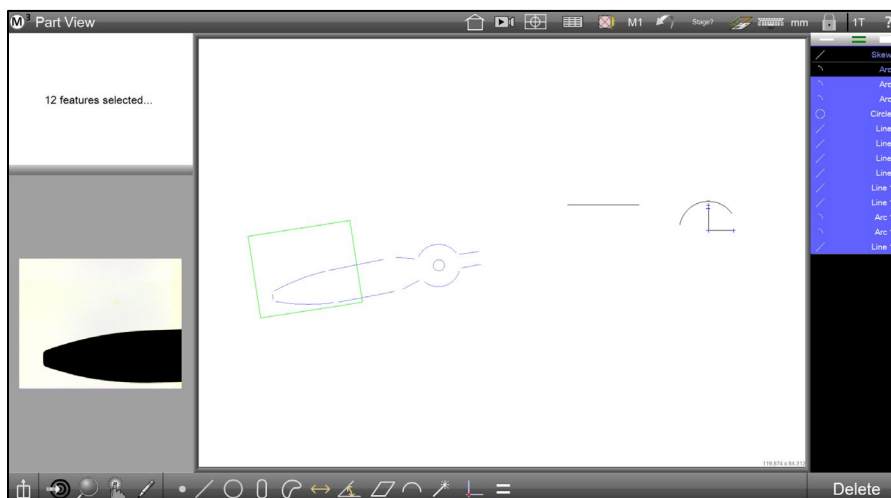
**X Anchor of Steps** – Designates the X position to be used for the origin of the polar array.

**Y Anchor of Steps** - Designates the Y position to be used for the origin of the polar array.

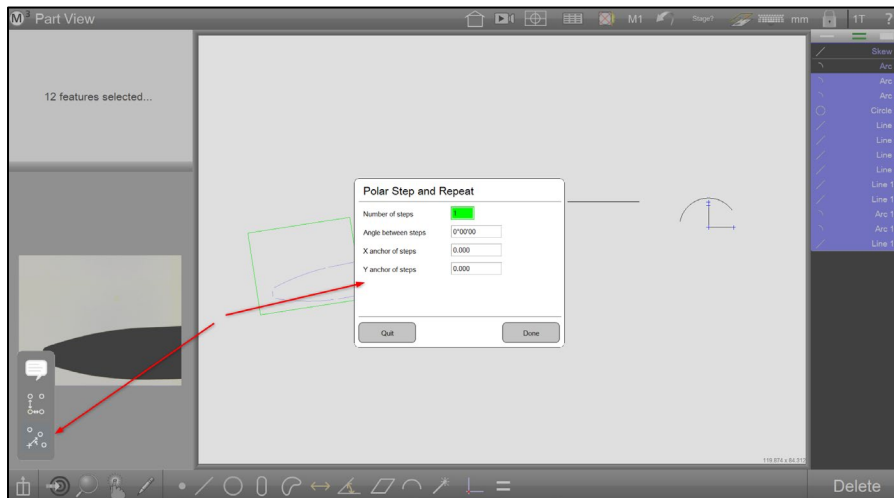
## Sample Procedure Steps for using the “Polar Step and Repeat” functionality:

1. Author an M3 part program up to the point where the features to be used with Step and Repeat have just been measured.
2. Select the features from the feature list that you would like to duplicate for your polar array.

**IMPORTANT:** When using Step and Repeat in interactive mode, you can only choose steps that lead up to, and include, the most recently measured(or constructed) feature in the feature list. If you attempt to use a feature measured prior to the most recent an error message will be displayed.

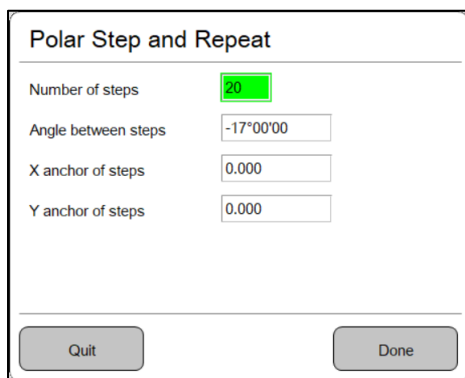


- Press the Polar Step and Repeat button, located in the Extra menu in the bottom toolbar. The Polar Step and Repeat Dialog will be displayed.

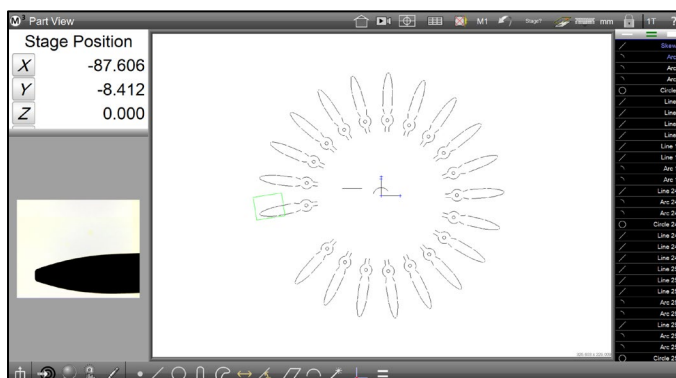


- Enter the desired parameters into the (4) Polar Step and Repeat fields. For our example we will create a polar array with 20 instances of feature duplication, centered around the X/Y zero position, and at 17 degree increments.

**Note:** Set the Angle Between Steps to a negative(-) number to step clockwise and a positive number(+) to step counter-clockwise.



- Press the Done button to complete the Polar Step and Repeat. See resulting image below.



## Enhanced DXF Overlay Manipulation

-DXF manipulation now supports simultaneous translation and rotation of the video overlay using either a mouse or touch screen controls.

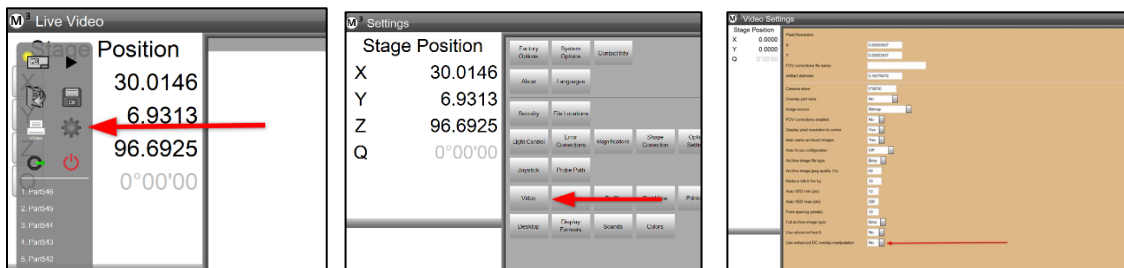
-Interact with digital comparator overlay files in a manner more closely resembling the physical manipulation of mylar sheets in a traditional optical comparator application.

-Quickly position the origin point for rotation using the new right mouse button/scroll wheel combination.

### Setup:

**IMPORTANT:** The new Enhanced Overlay Manipulation mode is only available on systems equipped with either the Digital Comparator or Profiling option. When one or both of these options is enabled a new option will be displayed in the Video Setup screen called “Use enhanced DXF overlay manipulation”. This new mode is set to NO by default, leaving the standard overlay controls in place. Set the flag to YES to enable the new mode.

**IMPORTANT:** When Enhanced DXF Manipulation mode is enabled, the Live Video pan functionality also requires that the Shift Key be pressed, simultaneously. This is because the right mouse drag function alone is used in this new DXF manipulation mode.



### Operation:

The Enhanced DXF Manipulation mode can be used with either a mouse or with 3 fingers on the touch screen.

#### *Translate/Rotate by Mouse input:*

To translate and rotate the DXF overlay simultaneously with a mouse, press and hold the right mouse button over some portion of the overlay. The overlay will translate on mouse movement and will rotate with mouse wheel rotations.

The pointer position used to right mouse down will also define the rotation point used when indexing the mouse scroll wheel.

*Translate/Rotate by Touch Screen input:*

To translate and rotate the DXF overlay simultaneously with a touch screen, press and hold three fingers over some portion of the overlay. The overlay will translate when all three fingers are “swiped” across the screen. The overlay can be simultaneously rotated by rotating the position of the three fingers, relative to one another. This is most easily accomplished using two fingers on one hand, and one finger on the other.

Sample Procedure Steps for using the “Enhanced DXF Overlay Manipulation” mode:

1. Open a DXF overlay file using the Load Overlay button.
2. Execute translation and rotation gestures using either a mouse or the touch screen, as described in the previous section.





## Feature Decomp using the Multi-Measure tool

-Quickly measure groups of features of the same or varying type using the new Multi-Measure decomp tool.

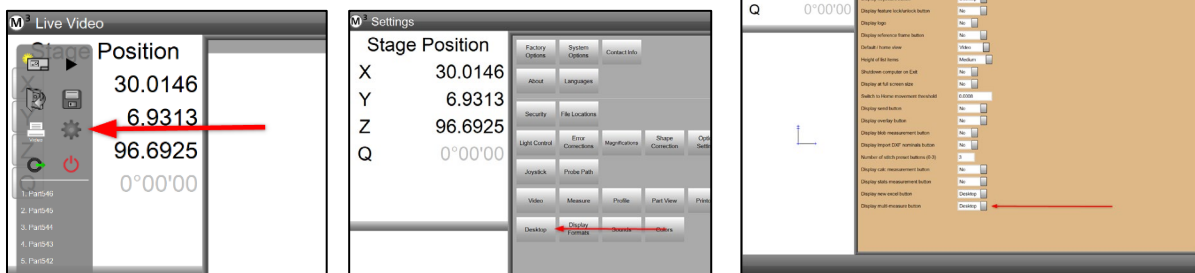
-Identify and measure features along a continuous edge contour with a single click on an edge or marquee drag a region of interest where “enclosed” features can be identified and measured.

-A feature filter can be used to quickly specify which feature types should be measured, and which should be ignored.

### Setup:

**IMPORTANT:** The new Multi-Measure tool is OFF by default.

To enable the Multi-Measure tool navigate to the Desktop Settings Screen and set the “Display multi-measure button” flag to “Desktop”. This will add the new Multi-Measure tool to the main measurement tool bar.

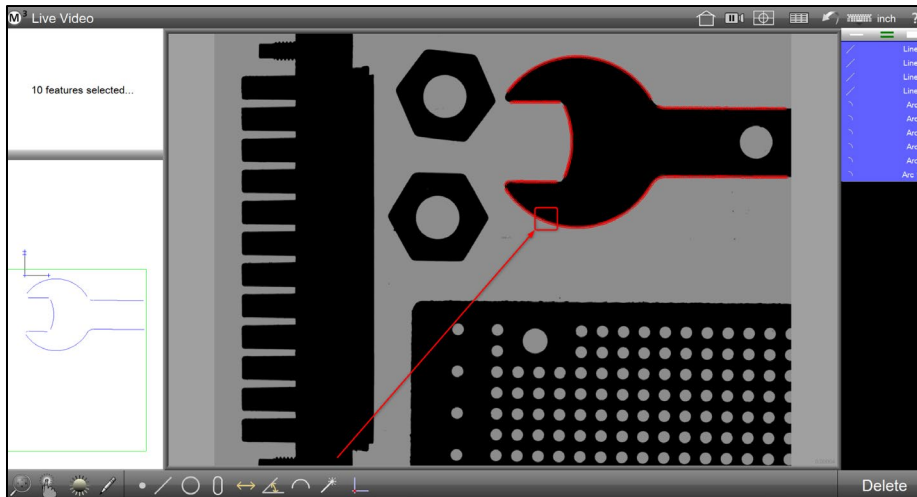


### Operation:

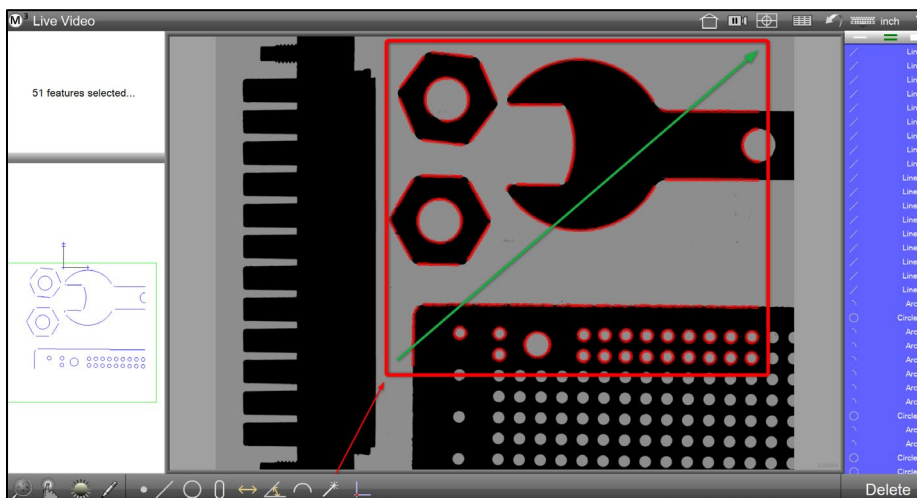
The Multi-Measure tool is a new measuring function that analyzes edges within a video image and “decomposes” edge contours into a group of standard fit feature results. The Multi-Measure tool is capable of identifying and measuring line, circle, arc, and blob features within a field of view or stitched image. Specialized algorithms within the probes firing code determine resulting feature types as well as the start and end position of feature data clouds, as one feature transitions into the next.

There are (3) different modes in which the Multi-Measure tool can be “fired”:

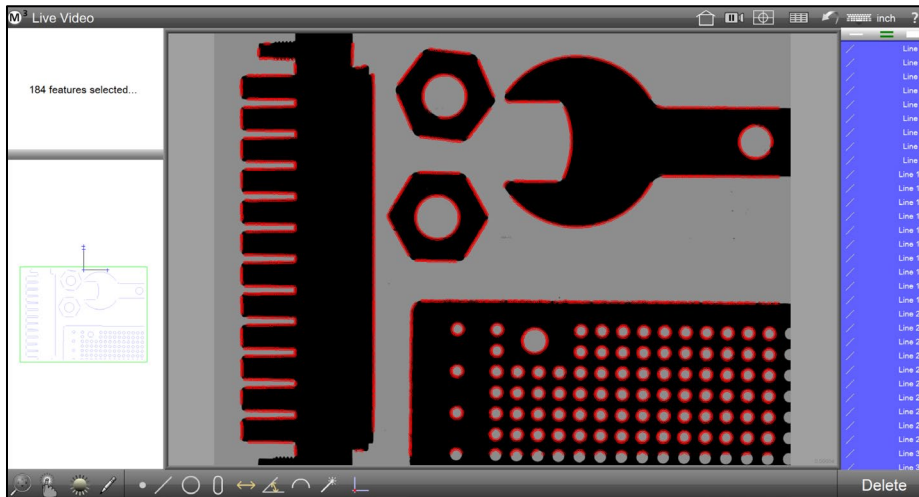
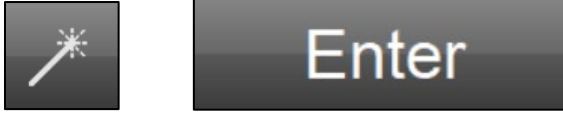
**Single Edge Mode** – Perform a single edge decomp by selecting the Multi-Measure tool from the bottom toolbar and then pressing on any edge in the Field of View. The tool will scan along the contour of the edge that was clicked on and return all detected features to the feature list.



**Marquee Mode** – Perform a marquee decomp by selecting the Multi-Measure tool from the bottom toolbar and then clicking and dragging a marquee box around a region of edges within the field of view. The tool will analyze all edges within the rectangular marquee region and return all detected features to the feature list.



**Full Screen Mode** – Perform a full screen decomp by selecting the Multi-Measure probe from the bottom toolbar and then pressing the Enter button, located in the bottom toolbar. The tool will analyze all edges within the current Field of View and return all detected features to the feature list.



### *Multi-Measure Tool Filters*

In some cases when using the Multi-Measure tool it may be necessary to collect only specific feature types for a single execution of the tool. For this case the Multi-Measure tool filters can be used to specify which feature types will be measured, and which will be filtered. Filtered features are not added to the feature list.

### *Setting a Filter*

Press the Multi-Measure tool button to expand the tools sub-menu, seen below. This menu contains “two state” toggle buttons for each feature to enable or disable filtering. When a feature button is pressed a “red slash” will appear indicating that features filter is enabled.



**NOTE:** The standard feature types(Circle, Arc, and Line) cannot be combined with Blob features when using Multi-Measure. As such the filter modes are mutually exclusive. When the Blob is un-filtered, the other feature types will automatically be filtered, and vice-versa.

Sample Procedure Steps for using the “Multi-Measure Tool” to measure multiple circles on a group of parts:

1. Press the Multi-Measure button located in the measure tool bar.
2. Press on the Filter Arc and Filter Line buttons in the Multi-Measure submenu to configure Multi-Measure to acquire circle features only.



3. Press the Enter button in the lower right toolbar to collect all of the circle features in the current image.

