



VMS™ HEAT MAPS

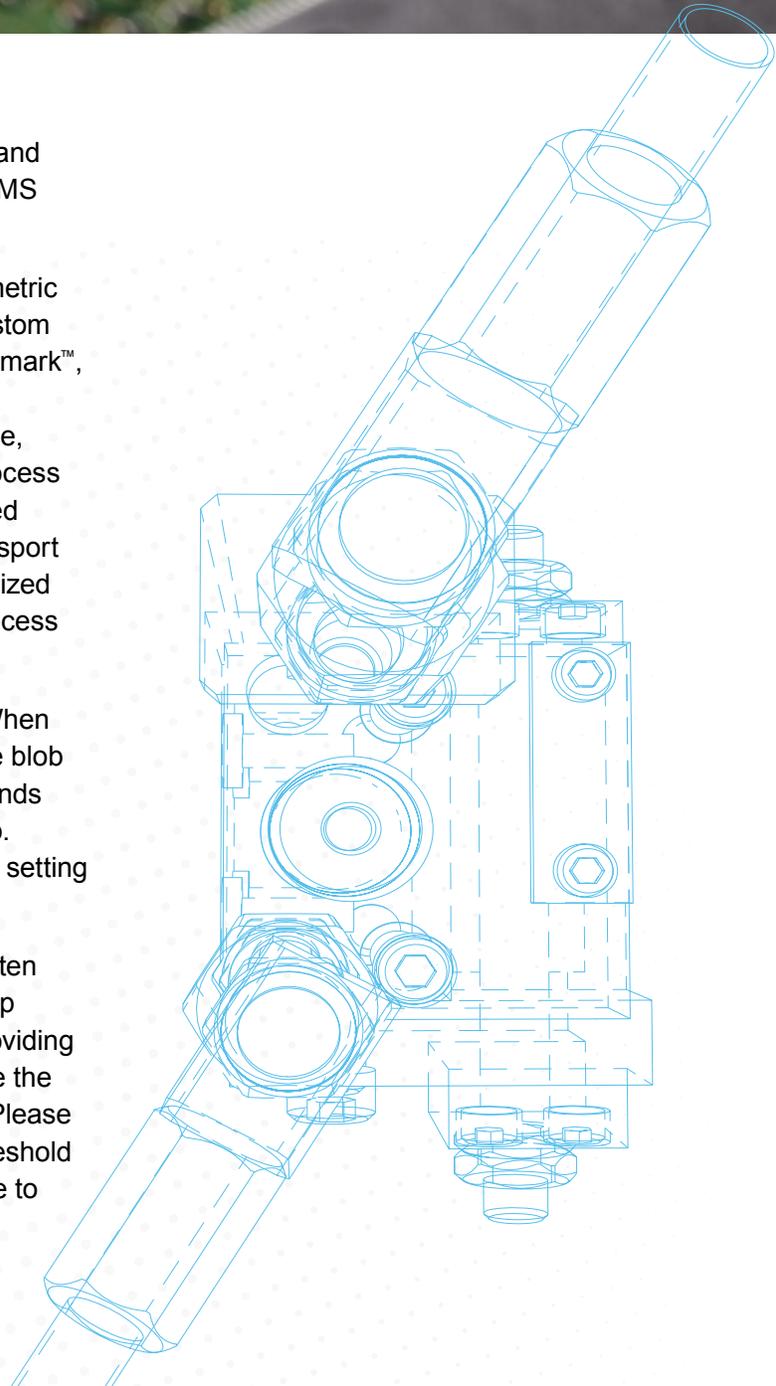
For Easier Blob Detection

The heat map feature in VMS software is a little-known and very useful tool in the blob and centroid finders. Many VMS users know it's there, but few know what it does.

VMS is a 2½ D metrology software, with powerful parametric programming and built-in scripting for the creation of custom routines and user interfaces. VMS is available on Benchmark™, Pinnacle™, and Summit™ systems, which are tailored for wafer, photomask, slider, MEMS, semiconductor package, HDD suspension, probe card, and micro-component process measurements. These systems, also known as Advanced Production Systems (APS), combine high-accuracy transport and optical technologies with VMS software and customized application support to satisfy the unique demands of process monitoring near the production line.

Heat maps are there to make life easier. Let's explain. When you want to automatically detect or identify a feature, the blob finder works to do this by evaluating pixel intensities. It finds groups of like pixels and lumps them together into a blob. When necessary, the user can control the blob finder by setting manual thresholds for the pixel intensity.

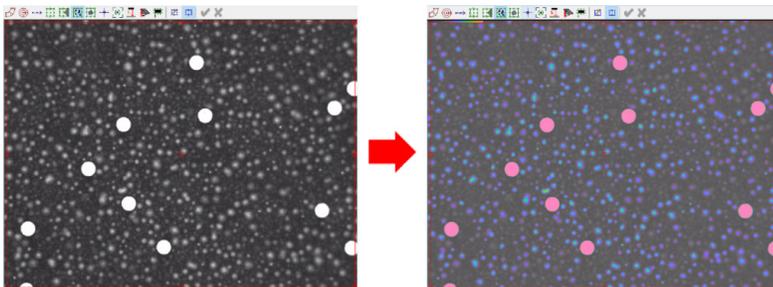
Unfortunately, finding the right manual thresholds can often be somewhat challenging. To help with this, the heat map makes adjusting manual thresholds much simpler by providing visual feedback on what the finder will detect. To engage the heat map simply activate it by clicking on its checkbox. Please note that heat maps are not available with automatic threshold modes or stored images. Heat maps require a live image to work.



In the blob finder, there are two different threshold modes: automatic and manual. In automatic mode the blob finder will seek “light on dark” or “dark on light” blobs that fit within the area thresholds. This can be good enough when the part is very simple and has clearly defined blobs with little noise in the image. In these cases, the heat map functionality is not really needed.

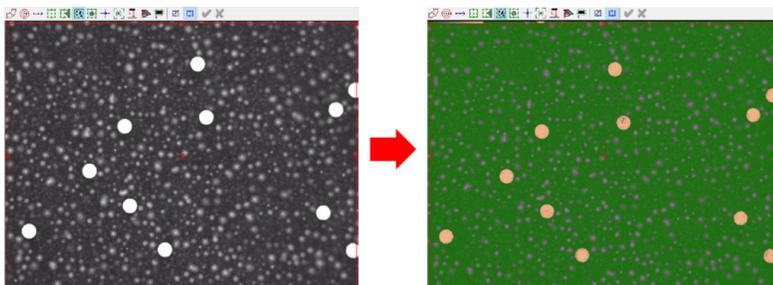
However, in cases where there is more noise in the video image, as shown below, the automatic mode has a chance of not detecting the desired blobs. It is essential then to select manual mode and narrow down manual threshold values so that the upper and lower thresholds fit into a window of acceptable values. The heat map helps with this by giving a visual representation of what blobs will be detected by shifting the live video image to a pseudo-color image that illustrates the manually chosen threshold values. When the heat map is active, the video window will illuminate the pixels that fall within the range selected in the manual threshold parameters.

When inclusive polarity is selected, pixels within the minimum and maximum thresholds will be illuminated. The pixels will light up according to pixel intensity on a color gradient moving from violet to red, as shown below.



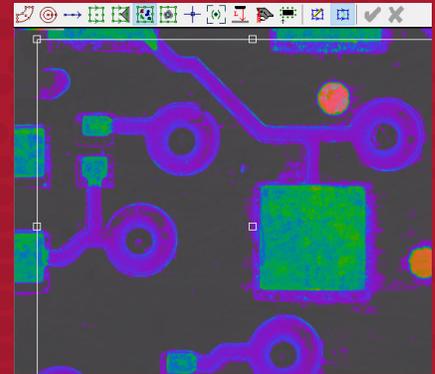
Heat map displayed with inclusive polarity selected.

When exclusive polarity is selected, pixels outside the minimum and maximum will be illuminated. Any pixels with intensity below the minimum will be green, and anything above the maximum will be a peach color as shown to the right.

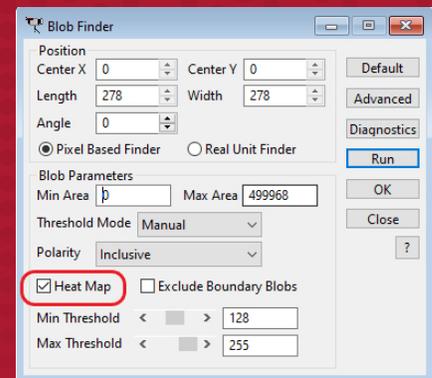


Heat map displayed with exclusive polarity selected.

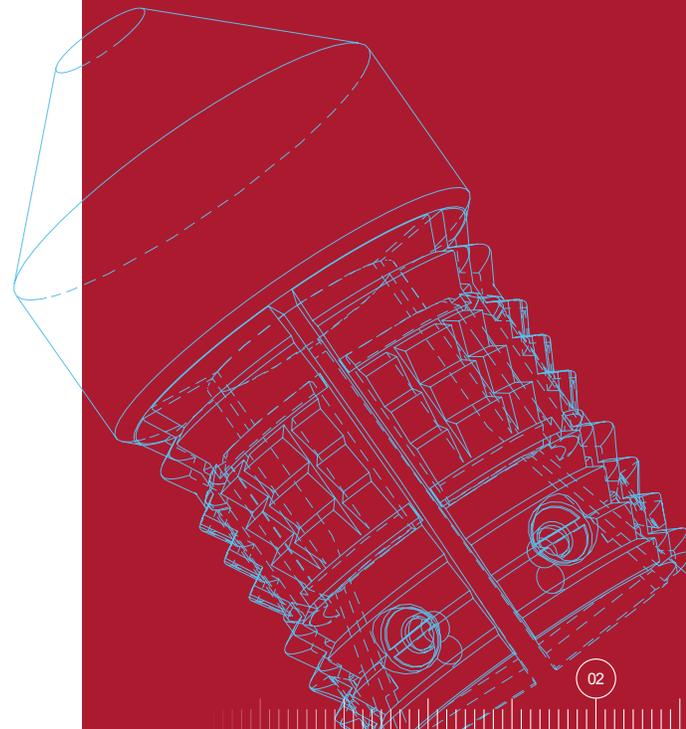
Heat map displayed with inclusive polarity selected.



Heat map used to find common features on a PCB.

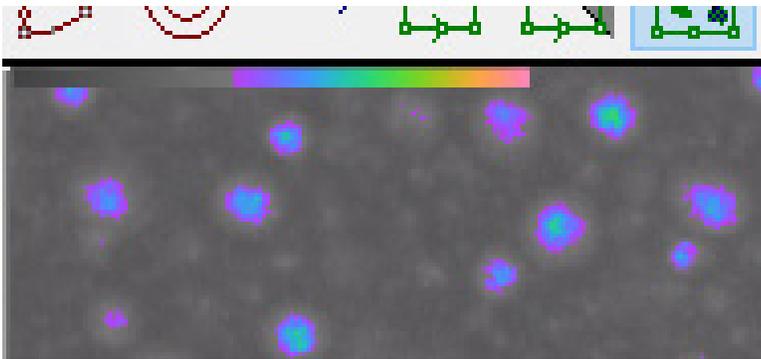


Heat map checkbox in the basic blob finder.

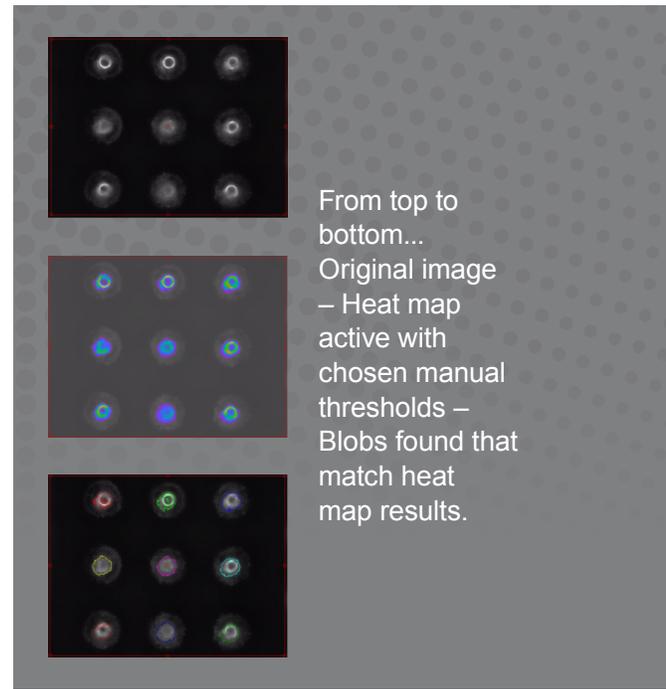


You may notice, when the heat map is enabled, a small bar appears in the upper left quadrant of the video window. This bar represents the intensity scale from 0-255 and will display an overview of which pixels in the image will be assigned what colors. The scale will show as gray where the pixel intensity falls outside the valid range given by the chosen threshold values.

The heat map works in a similar fashion to the centroid finder. By using the heat map the user will develop expert-level ability in finding the right blob or centroid manual threshold parameters to fit the needs of the application. This will decrease the time spent programming and will likely improve the robustness of routines. See upper right for an example case where the heat map is used to identify desired blobs.



Heat map bar showing pixel intensity scale for the image.



From top to bottom...
Original image
– Heat map active with chosen manual thresholds –
Blobs found that match heat map results.



Learn more about OGP Measurement Systems at ogpnet.com

OGP (Optical Gaging Products) is a division of Quality Vision International Inc (QVI®), a world leading manufacturer of precision multisensor metrology systems for industrial Quality Control. Our metrology systems focus on measurement technologies that help manufacturers monitor dimensional compliance to design specifications. First introduced in 1992, the famous OGP SmartScope® product family has become one of the world's most popular and versatile dimensional measurement systems. SmartScope systems are designed and produced at QVI corporate headquarters in Rochester, NY, USA. Flash branded systems are sold in North America while Flash CNC and CNC systems are found outside North America.



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