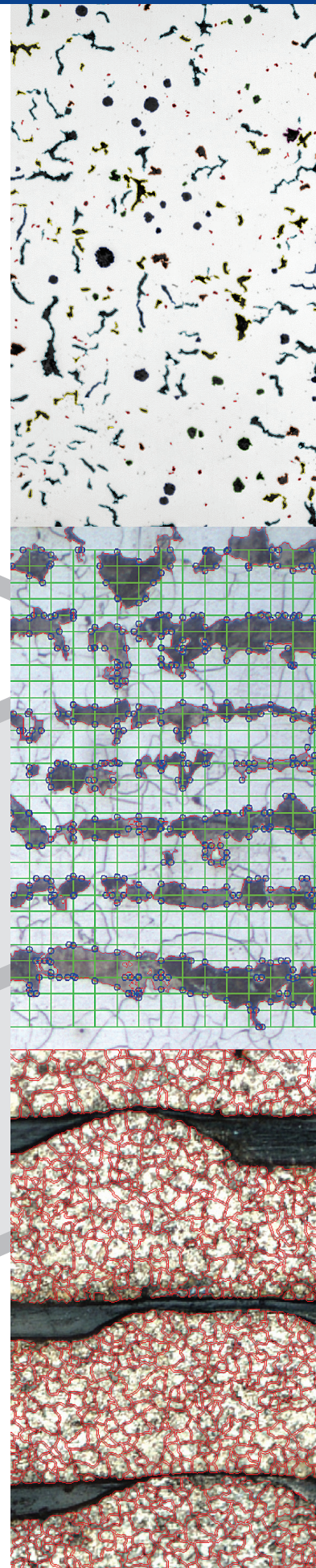


iSolution DT-M / DT / DT-L
i-Solution™
iSolution FL / Auto
iSolution Lite
iSolution Capture

Measuring and Analyzing with Ease

Imaging solutions for
Metallurgical and Material
Science Applications



iSolution DT-M / DT / DT-L

iSolution

iSolution FL / Auto

iSolution Lite

iSolution Capture

Technology that will rewrite the history of Image Analysis.

The iSolution family of software helps you keep pace with today's rapidly changing digital technology. This exceptional software technology and leading image analysis tool will streamline image capture, measurement and enhancement, while improving the accuracy of your results.

All versions combine revolutionary measurement and analysis technology with an exceptional, user-friendly interface. Become an expert in image analysis and optimize your work environment with this imaging software suite.

iSolution DT-M is the motorized stage control application version having all features of iSolution DT. It has many new developed functions also

iSolution DT is IMT's premium software program includes all of the functions for various science and inspection applications.

iSolutionDT-L is the program focused on core material science applications

i-Solution is a high-end image analysis application that offers easy integration into any workspace, an intuitive interface and ground-breaking image analysis technology

iSolution FL / Auto has advanced fluorescence image merge function with all features of iSolutionLite. It is a perfect solution for fluorescence microscope applications.

iSolution Lite is a streamlined image analysis application that offers a wide range of unique image reading, measurement and enhancement tools

iSolution Capture is a streamlined version of the iSolution Lite for image acquisition and manual measurement.

Image Acquisition

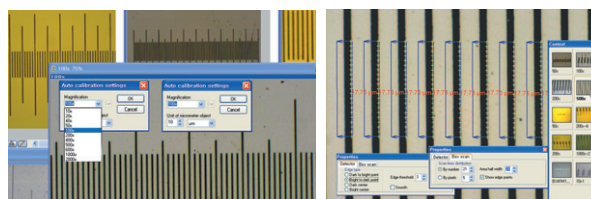
- i-Solution family of software is designed to receive images directly from various hardware sources. Keeping in tune with today's rapidly changing digital camera technology, you can directly control digital cameras. IMT software also supports TWAIN and WDM Drivers along with a wide variety of frame grabbers and i-LINK from Sony. The Time Lapse Capture tool offers accurate time interval analysis for video production for both analog and digital cameras. Movie recordings can be saved in AVI, MPG, MPEG, and MOV file formats. The time is also captured during recording.

Live Measurement and Overlay

- Measuring and analyzing high volumes of images can take a long time. With live measurement you don't need to capture images in order to perform measurements. This will allow you to measure, analyze, sort and manage image statistics all from a Live Preview window. In addition, you can import measured data, images, statistical tables and diagrams into MS Excel in real time. You can perform these high-speed live measurements using both CCD and high resolution digital cameras. Crosshair generation and grid mask on the live preview window according to the calibrated scale are also available.

Calibration (Auto, Manual)

- All measurements start with an accurate calibration. Auto, Semi-Auto calibration functions allow the software to calculate the pixels-per-unit value automatically. Only setting the unit for the calibration scale and the minimum distance between the scale marks is needed. This feature greatly improves the accuracy and repetition of measurements. Manual calibrations are easily added and saved for recall from a drop down menu. All calibrations can be saved as files, which let the calibration be retrieved by simply opening the saved files later. Calibration can be protected by password option. Two password options, one in calibration menu itself and the other in camera resolution option, protect calibration by unexpected change. A scale bar can be permanently added to each image. Scale bar properties for color, size and text are simple to optimize for any image background.

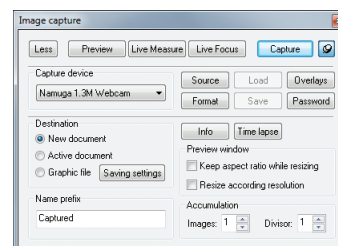


Automatic Calibration Adjustment

- By Adjust Resolution option in calibration menu, all camera capture resolution may be used regardless of the image resolution which was used for calibration. Even different cameras can be used on the basis of the same calibration. All calibration is adjusted automatically even with different camera models and captured image resolution.

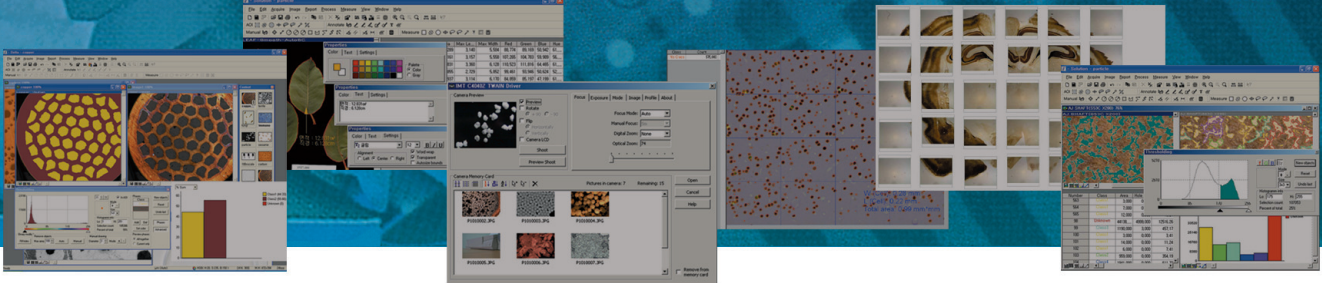
On the same menu window for easily handling

- Image capture, live measurement, live focus enhancement, and overlay settings are on the same menu window. User can easily handle all functions on the same menu window.



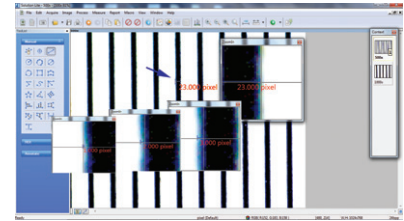
Shading Correction

- The edge parts of captured image by low magnification have background shading frequently, which can be removed by the shading correction function. The color of the original image remains the same though. A standard image is acquired from a blank space on the slide glass, or from an out of focus image in a metallurgical specimen. Such a standard image is used to correct the background shading of all other captured images.



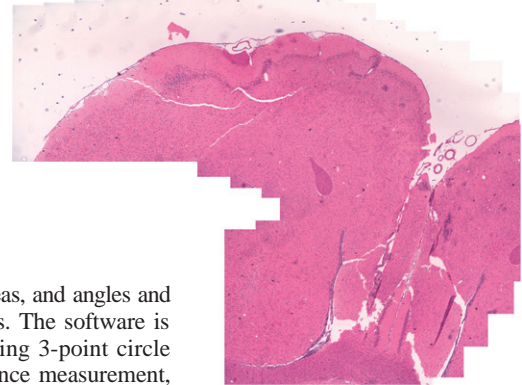
One pixel control measurement for the best accuracy.

- Measurement accuracy is enhanced remarkably. One pixel accuracy is guaranteed. Pointing the exact position is not easy by mouse click. By mouse drag, controlling one pixel accuracy is not possible in fact. Using keyboard arrow key, user can move the mouse point one pixel by one pixel. Zoom in window function in the View menu can be used together seeing one pixel movement. Enter key also is used for starting and completing line measurement.



Live image stitching

- Without motorized control stage, you can have the same performance. Simply moving X/Y manual stage by hand, you can have the same performance result. There is no need capturing images at all. All are done on Live and Manual. We think you may not believe your eyes.
- Live focus enhancement: There is no need capturing images for the focus enhancement also. Clicking Live focus enhancement and then moving focus knob of a microscope is all needed. All are done on Live.

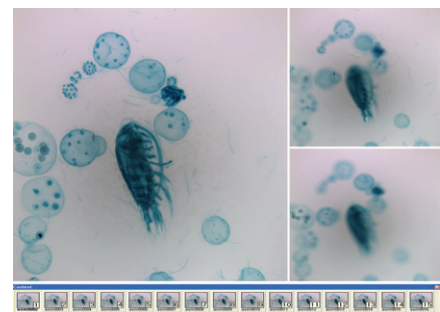


Measurement

- IMT software features versatile measurement tools for measuring lengths, areas, and angles and can auto detect an object's outline and then make specified measurements. The software is equipped with all the measurement functions you will ever need, including 3-point circle functionality, N-point circle measurement functionality, parallel line distance measurement, perpendicular distance measurement, object distance measurement, as well as auto object outline trace. In addition, a zoom-in window can be used to determine the accurate measuring point of an object. Once you've measured a specimen, you can easily export all of the images, measurement data and statistics to an Excel file.

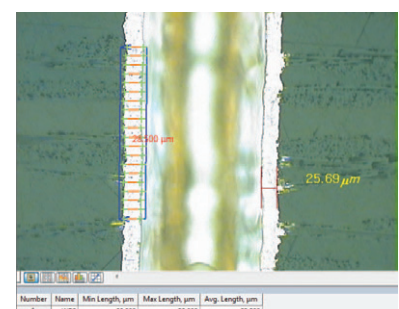
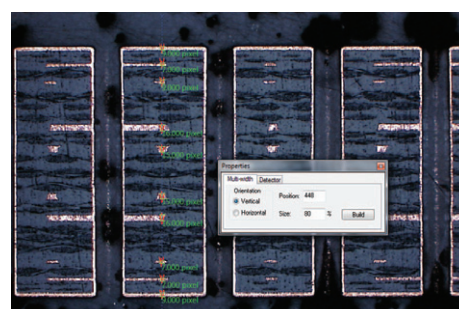
Microscope Focus Enhancement

- Samples with curves or of varying heights are difficult to bring into focus under highly magnified conditions. IMT software combines many images using different levels of focus to provide one seamless image. This function leaves no trace of the composites and can even create perfectly focused images from Stereo Microscopes. In the case of Stereo Microscopes, two lenses positioned at different degree angles are used for observation. To set the focus for the camera image, the microscope's Z-axis needs to be manipulated and partially focused images are then taken continuously. This results in slightly crossed images. IMT software compensates for this by auto-correcting its location, resulting in a perfectly focused image every time.
- In IMT software, there are four different focus enhancement (Extended depth of microscope focus) methods as in the below. They can be selected based on applications and specimen for the best performance.
- Live focus
 - There is no need capturing images for the focus enhancement at all. Clicking the button of Live focus enhancement and then moving focus knob of a microscope is all needed. All are on Live.
- Perfect focus
 - For the best performance and result it can be used. Very fine details of specimen remain with in focus. It takes a little longer time than Fast Focus. The fundamental theory being used for Perfect Focus is different from Fast focus
- Fast focus
 - The processing time is very fast.
- Stereo microscope focus
 - The slightly crossed images by stereo microscope are aligned automatically.



Auto Edge Detector and Multi Width Measurement

- Software automatically detects the edge of any object being measured, including lines, points, circles, boxes, and arcs. Auto-Detect feature simplifies the process of determining the beginning and end of the object being measured, further streamlining the task of image measurement and analysis. Each width on the vertical or horizontal line is measured automatically.



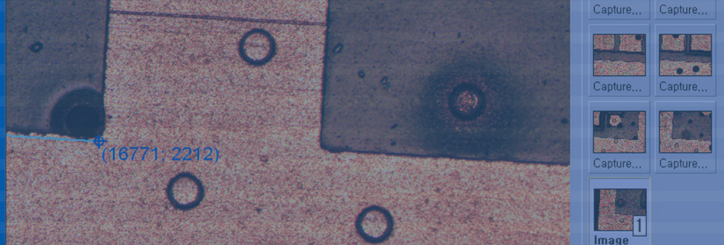
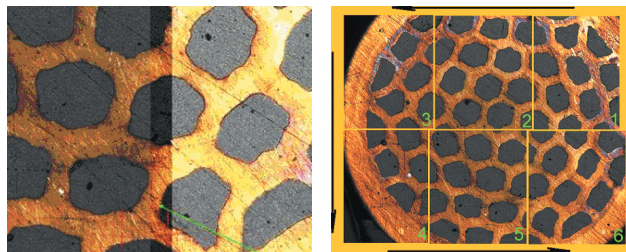


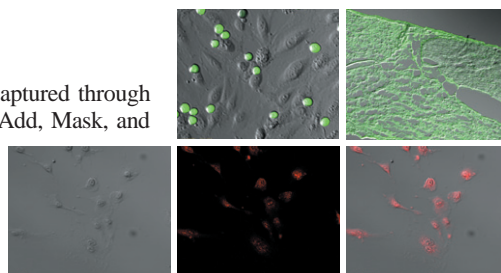
Image Stitching

- With IMT software you can create auto composites of continuously captured images in order to minimize the reduction in the FOV that typically comes with increased magnification. Combined images display no trace of former edges, and any irregularities in the brightness of the images are automatically corrected. Unlike other image analysis software packages, the i-Solution series automatically configures the various sizes of combined images in order to eliminate any discrepancies in the composite image size, and allows you to easily dissect magnified images without sacrificing resolution.



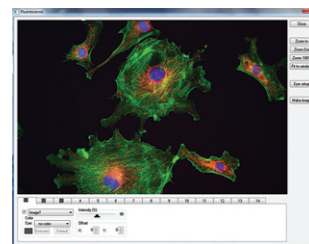
Fluorescent Image Composition

- IMT software can create a perfect composite image of fluorescent images captured through mono and color channel filters and features a variety of methods, including Add, Mask, and Mean. This allows composites of pseudo-colored images to create multi-channel image effects in addition to black and white images. With its exceptional quality, flexibility and speed, image composite technology for mono and color channel fluorescent filters is sure to impress even the most demanding users.



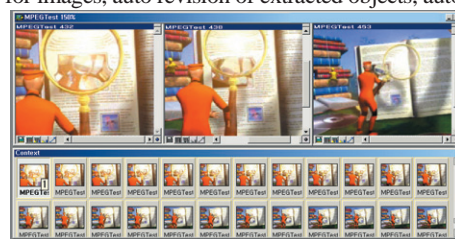
Advanced Fluorescent Image Composition

- There is rich list of 134 pre-defined dyes with the customized Adding Dye option together. The color also can be corrected with standard Windows color dialog box. Dye emission dialog box allows choosing desired emission wavelength in nanometers and correspondent color will be calculated automatically. Window size is adjusted by simple mouse drag. Intensity control allows specifying weight strength of the image in the final merged images. Offset controls are to correct disposition of one image relatively another.



Count and Size

- With IMT software you can auto-detect specific objects within an image in order to find the total number of objects in the image and extract the data. By dragging the mouse, you can detect objects and generate a wide variety of data. With IMT software the time-consuming Count function has been refined to a simple mouse click, with unparalleled speed and accuracy for data output. IMT software offers a variety of measurement tools that allow you to easily measure an object's area and perimeter. IMT software measurement tools include equal circle diameter, ribbon length, line length, Circle SF and Ellipse SF. In addition, IMT software feature automatic output of statistics, sorting of measured data objects, creation of data tables for images, auto revision of extracted objects, auto separation of composite objects, auto image and data import to Excel.

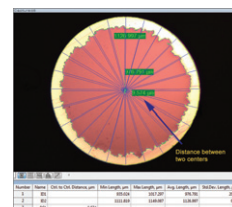


Movie File Production

- All versions feature a Time Lapse Capture function that supports CCD and digital cameras using TIF, BMP and JPG file formats. The Time Lapse Capture function also includes an Auto Save feature. You can save video movie recordings in AVI, MPG, MPEG, and MOV formats. When recording video, the elapsed time of the image is also captured so you can recheck the capture time when reproducing the video image.

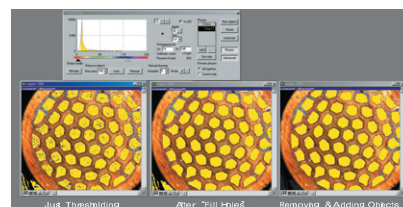
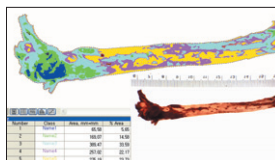
Irregular Diameter Measurement

- Irregular diameter by phases allows to automatically create Irregular diameter manual measurements object from the thresholded objects. Two irregular diameter measurement objects are created as the source of the two phases with Min, Max, Average, and Standard deviation of diameters. In addition, the distance between two objects centers is created in order to check out the inter-center displacement.



Phase Analysis & Advanced Thresholding

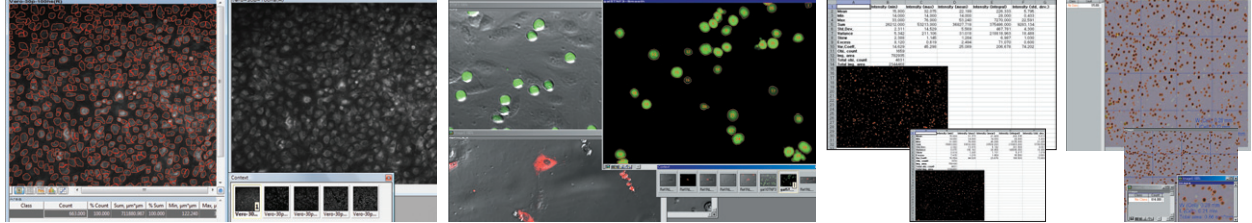
- With IMT software you can conduct phase analysis on an entire image or within a specified Region of Interest (ROI) and you can sort images using Gray Scale, RGB, HSB or YUV. In addition, you can automatically or manually manipulate images using Fill Holes and a Removing & Adding Objects tool during the thresholding stage of phase analysis. Because you can manipulate images during the thresholding stage rather than after it, your phase analysis will be more accurate. All results of phase analysis are displayed simultaneously as statistical data and in chart form. You can also export images, object data, statistical data, and charts directly to an Excel file.





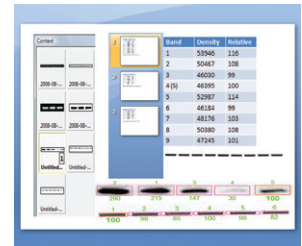
Cell Count and Intensity Analysis

- Stained and live cells having irregular form with congregation can be counted automatically. By a simple mouse click all cells are counted.



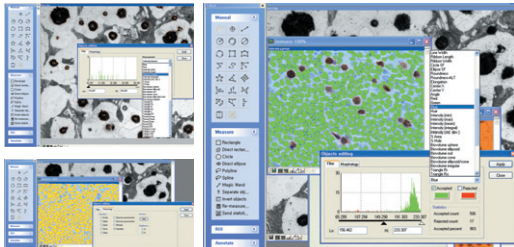
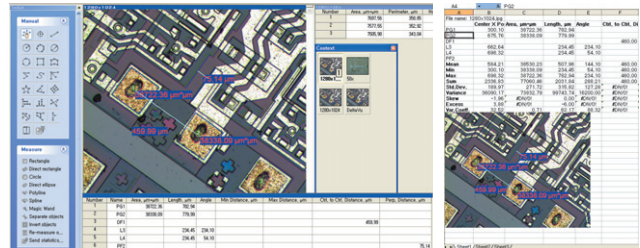
Densitometry

- Densitometry is the quantitative measurement of optical density. Three different options of Auto, Semi-Auto, and Manual are to identify the objects and record the integrals of optical intensity of each object. The result data and images can be sent to MS PowerPoint by a simple mouse click.



Unique Measurement Tools - Including Various Perpendicular Distance Measurements

- A unique measuring tool allows the measurement of straight and curved lines, diameters, radius, distances, area, perpendicular distance, and much more. From the measuring point, the distance is always calculated perpendicularly making the measurement very accurate.



Objects Editing

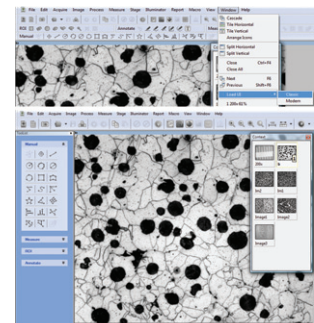
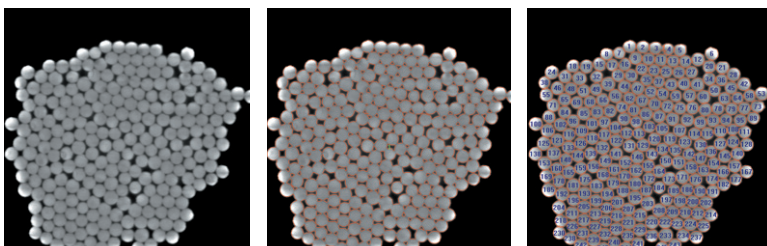
- iMT software features a very special tool set for improving the accuracy of object counting and measuring. Included is a full complement of morphological operations such as erode, dilate, open, close and more. In addition, a wide variety of filters can be applied that allow further editing, powerful tools such as separation and editing of the attached objects, limiting objects to be counted based on size, intensity and many other parameters. This makes identifying and classifying even the most difficult images easy. Once the correct set of filters and operations are selected, they can be added to any macro for repetitive work.

Dynamic User Interface

- The i-Solution series provides a user-centered environment. Discarding a developer-centered software user environment, we designed it to allow users to edit the UI directly according to their own user environment. In addition, we made it for anybody to use an easily recognizable graphic environment under any surroundings with ease.

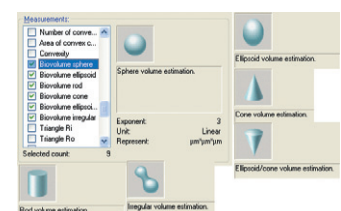
Auto Segmentation

- Objects are segmented automatically by a simple mouse click.



Stereometry for Biovolume

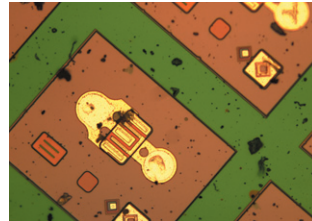
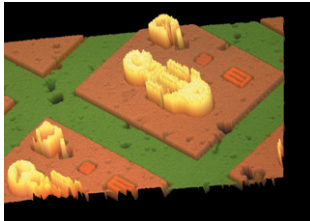
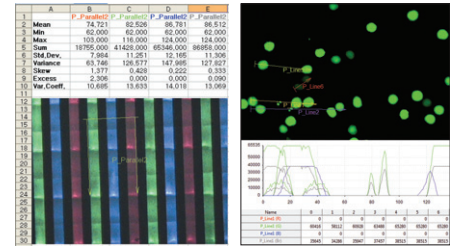
- 3D volume of an object is calculated by 2D measuring parameters. It helps to estimate 3D volume for any life form which hardly keeps a fixed shape.





Line and Box Profile

- This feature displays a graph of the intensity value of each pixel for any line drawn across the image. The X axis gives the location of each pixel. The Y axis shows the intensity value of the red, green, blue, and grayscale channels. Measurement data and statistics for all lines are exported to MS Excel.

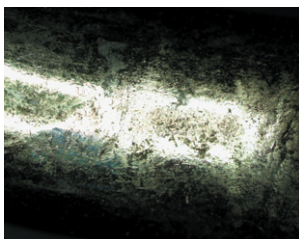


3D Visualization

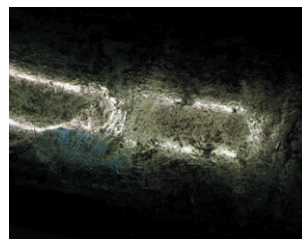
- Three-dimensional pictures are created based on the brightness of normal images. This creates a better visualization of the surface through the realization of 3D images and rotating observation of 360 degrees on the XYZ axis.

Removing the Reflected Light

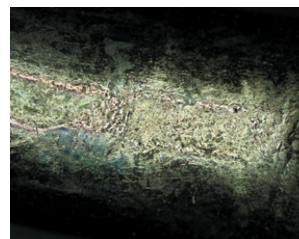
- A clear image in detail is created by removing the reflected light from a metal's surface.



Before



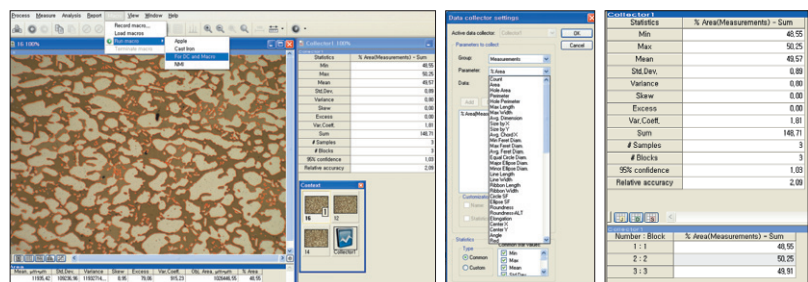
After Correction by Two Images



After Correction by Five Images

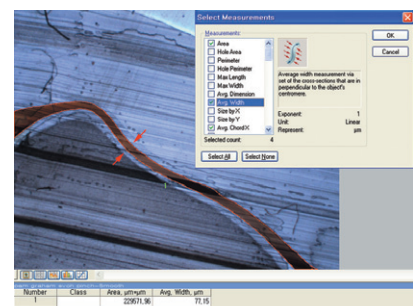
Data Collector and Macro

- IMT software provides the data collection function for acquiring, storing, accumulating and statically treating data from one or several image documents. Data on an image cannot be deemed the data for all the specimens being observed under a microscope. The data collector function solves these problems and it automatically provides data among images or after collecting the statistical data based on the requests of users. As its statistical data on the entire test pieces may add reliability to the study results.
- Macro is very useful to record and re-implement repeating works. The macro function enables users to execute the whole process at once with a single mouse click by recording the performance of repeating functions. Accordingly, the loss of time caused by the repeated measures and the occurrence rate of errors in the measurement may be minimized. The created macros can also be edited, saved, and deleted. Edit function allows step by step execution and modification.



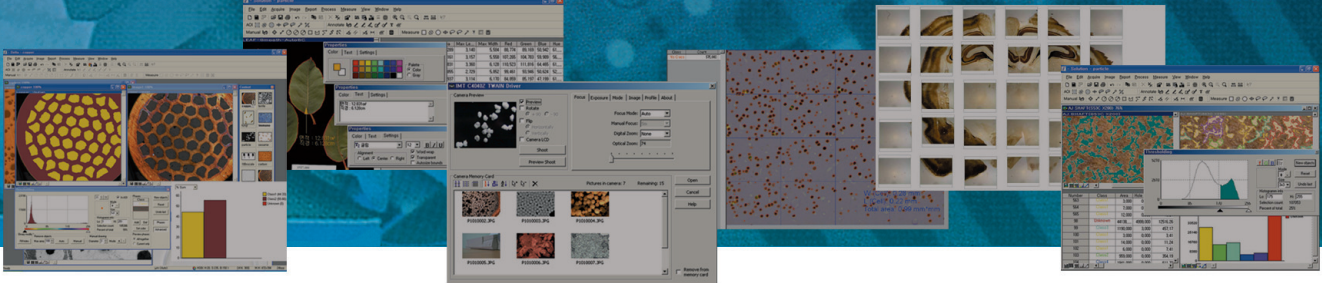
Average Width Measurement

- It gives the average width of any form of object. The cross-sections of every pixel that are in perpendicular to the object's center are measured.



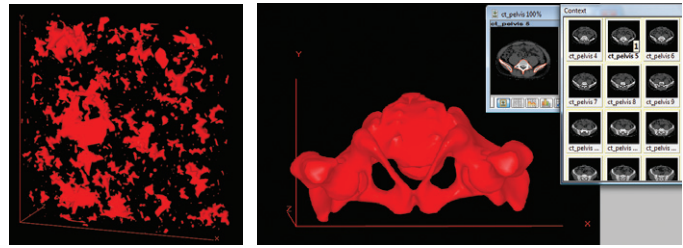
Software Enhancement and Development

- All images have their own unique attributes. It is not possible to satisfy all analysis objectives with limited options. iSolution DT can be customized to provide the most appropriate algorithm depending on the user request. A unique algorithm is created for each application.



3D Reconstruction

- Three-dimensional pictures are created based on the Z-stacked images. 3D images are observed by 360 degree rotation on the X/Y/Z axis.



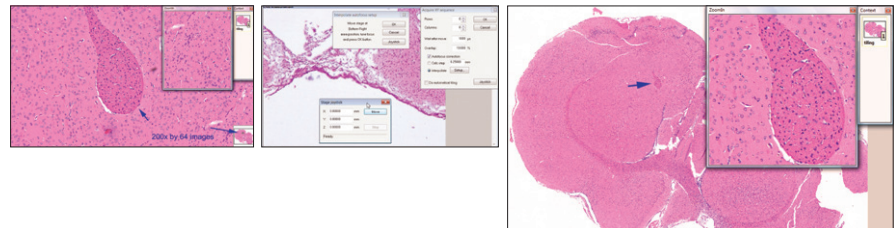
Large Size Object Measurement

- Until now, users could only measure images within the Field of View (FOV). To measure outside the FOV various measurement stages (including linear scale) were needed. The iSolution DT Image Analyzer overcomes this limitation and offers new, advanced tools for image measurement. The Image Analyzer software tracks an objects movements within the image at high-speeds, then uses the results to automatically extrapolate the distance between the two objects. Expensive, time-consuming measurement stages previously used to measure samples exceeding the full screen size are no longer required. IMT (Image & Microscope Technology) has patent in this technology.



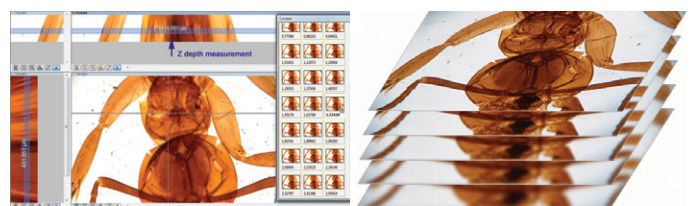
Virtual Microscope and Image Analysis

- Automatic image stitching can be done together with image analysis. Run macro for each frame option allows executing existing macro for each acquired image before moving to the next stage position for automatic image stitching. Autofocus correction feature allows choosing different ways to get the right focus for each frame before taking pictures. Several Z-stack images may be acquired for the combined feature of focus enhancement (extended depth of focus) and automatic image stitching. That feature is available even with the pictures taken by stereo microscope.



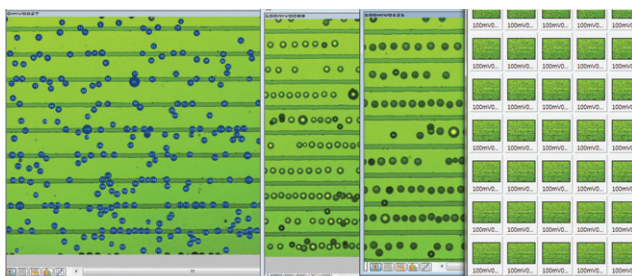
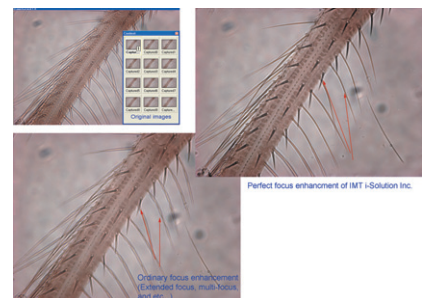
Z-Depth Measurement

- By Z-depth measurement function each image is captured with own Z-position. So set of images allows revealing the specimen depth representation. The command also allows exploring cross sections through whole set of images of the Z-stack.



Perfect Focus Enhancement

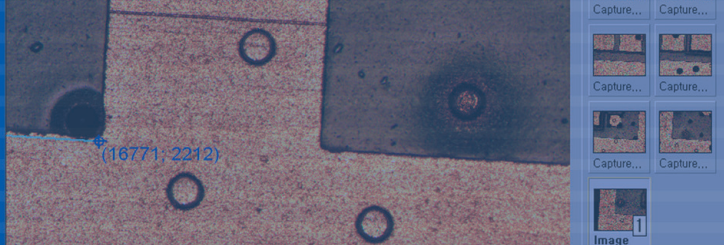
- IMT software provides perfect focus enhancement which uses different theory and algorithm from ordinary similar functions in other software. Better crisp details are seen by perfect focus enhancement.



Z-direction objects tracking

- The change of measurement value is tracked based on customized parameters. Z direction as well as X/Y is considered. Detecting moving objects automatically into X/Y and Z directions and tracks them over time.

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iSolution FL / Auto
iSolution Lite
iSolution Capture



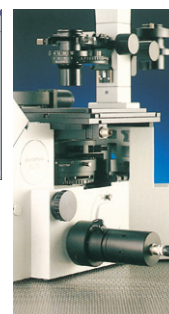
IMT iSolution Quick-Scan™

IMT Motorized Stage Control Applications

IMT iSolution **Quick-Scan™** is an intuitive motorized stage control system which automates many of the powerful applications tools available with I-Solutions software. IMT iSolution Quick-Scan is the trade mark of IMT iSolution Inc.

Key Features of IMT iSolution **Quick-Scan™**

- Extremely Fast Scanning: Scanning time while capturing pictures is quick and precise.
- Multiple Scanning Methods: Circular, rectangle, and square shape based on application needs.
- Theta Compensation for Camera and Stage: Images are automatically compensated for camera and/or stage mis-alignment.
- Automatic Shading Correction: During scanning, shading correction is applied automatically as the stage moves.
- Automatic Focus Adjustment: During scanning, Z focus is automatically adjusted as the stage moves in the X and Y direction.
- Stage Position Memory: X/Y/Z Stage positions are memorized for future recall.
- One Click Position Recall: A single mouse click on the mosaic image brings the stage to the exact location for further observation. The user can switch to a higher magnification objective lens for closer inspection and image capture.
- Automatic Image Overlap Compensation: Data is accumulated and adjusted live to compensate for image overlap. Duplicate data points are filtered out regardless of how much image overlap occurs.

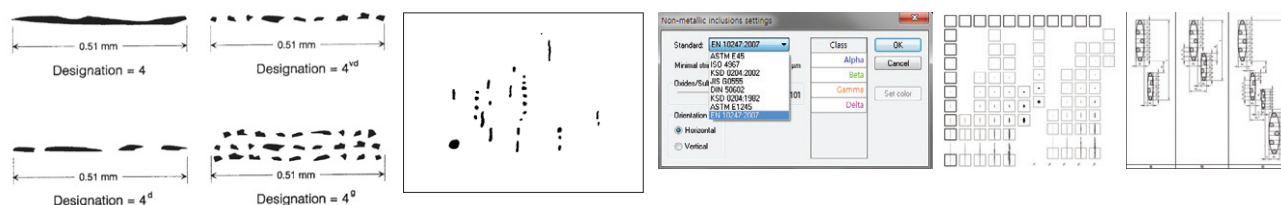


Non-metallic Inclusion Rating with IMT iSolution Quick-Scan™ :

- The iSolution DT software program constantly endeavors to provide the most complete set of tools for metal texture analysis. As a result, the analysis solution to non-metallic inclusion is unveiled. This function is intended to determine the inclusion content of steel according

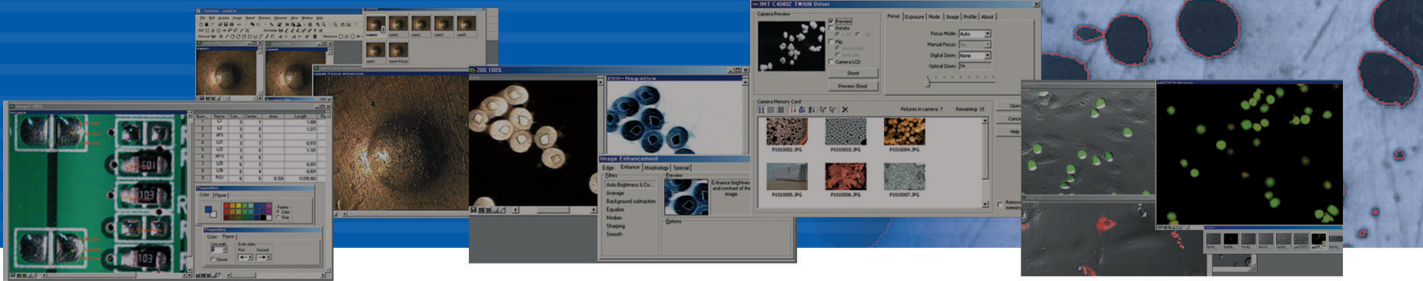
EN 10247 (2007), ASTM E45 (2002), E1245-03 (2008), DIN 50602 (1985), ISO 4967(1998), KSD 0204 (2002), KSD 0204(1982), JISG555 (2003). There are two analysis approaches implemented, Stereological measurements and JK inclusions ratings

The European and British Standard BS EN 10247 (2007) has been added. This is the micrographic examination of the non-metallic inclusion content of steels using standard reference pictures. This European Standard defines a method of microscopic non-metallic inclusion assessment using reference charts. The basic principle of this European Standard allows the determination of non-metallic inclusion content by image analysis techniques. According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



NMI1											
Severity index (Cell Max)	Severity A-Fine (Cell Sum)	Severity A-Thick (Cell Sum)	Severity B-Fine (Cell Sum)	Severity B-Thick (Cell Sum)	Severity C-Fine (Cell Sum)	Severity C-Thick (Cell Sum)	Severity D-Fine (Cell Sum)	Severity D-Thick (Cell Sum)	Severity DS (Cell Sum)	Cleanness (Cell Mean)	
0.50	4	5	0	0	0	2	18	14	10	94	
1.00	0	0	0	0	0	1	1	8	1	39	
1.50	0	0	0	0	0	0	0	0	3	21	
2.00	0	0	0	0	0	1	0	0	2	53	
2.50	0	0	0	0	0	0	0	0	1	35	
3.00	0	0	0	0	0	0	0	0	0	0	
Cleanness	7	8	0	0	0	24	35	53	113	242	

NMI4													
Standard (Majority)	Feild area (Sum)	Type of inclusion (Cell Min)	Rating 1 (Cell Sum)	Rating 2 (Cell Sum)	Rating 3 (Cell Sum)	Rating 4 (Cell Sum)	Rating 5 (Cell Sum)	Rating 6 (Cell Sum)	Rating 7 (Cell Sum)	Rating 8 (Cell Sum)	Sulfide (Total index K)	Oxide (Total index K)	Overall (Total index K)
DIN 50602	23600327.35	SS	0	0	0	0	0	0	0	0	0.00	1267.28	1267.28
		OA	21	8	10	3	0	1	0	0			
		OS	2	1	0	0	0	0	0	0			
		OG	34	13	2	0	0	0	0	0			



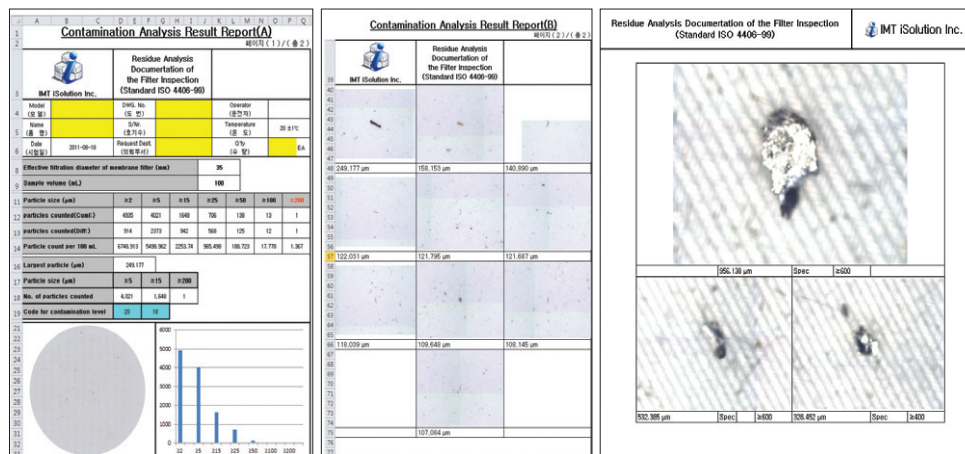
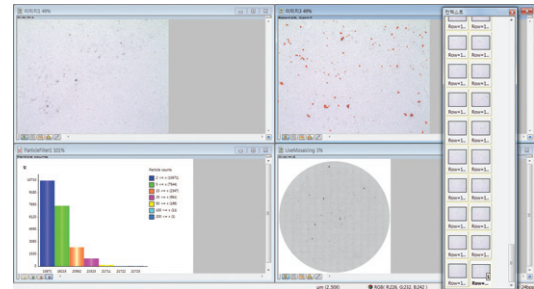
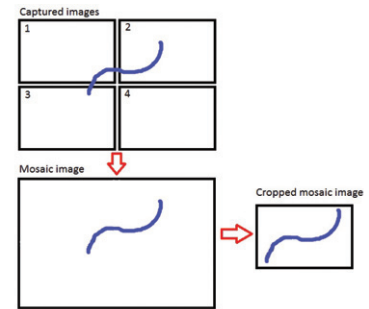
IMT Motorized Stage Control Applications

IMT iSolution **Quick-Scan™** is the trade mark of IMT i-Solution Inc.

Filter contamination analysis with IMT iSolution Quick-Scan™ Particle size and shape analysis with IMT iSolution Quick-Scan™

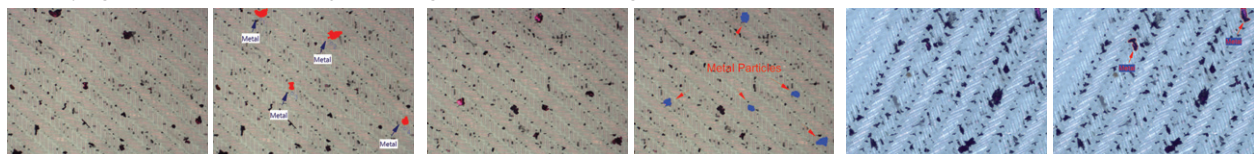
Filter contamination analysis based on ISO 4406 / ISO 4407 / ISO-DIS 16232-10 / SS 2687

- Fully automated analysis of residues on circular filters.
- Automatic Image Overlap Compensation: Data is accumulated and adjusted live to compensate for image overlap. Duplicate data points are filtered out regardless of how much image overlap occurs.
- Stage Position Memory: X/Y/Z Stage positions are memorized for future recall. A single mouse click on the mosaic image brings the stage to the exact location for further observation.
- The user can switch to a higher magnification objective lens for closer inspection and image capture.
- Theta Compensation for Camera and Stage: Images are automatically compensated for camera and/or stage mis-alignment.
- Automatic Shading Correction: During scanning, shading correction is applied automatically as the stage moves.
- Automatic Focus Adjustment: During scanning, Z focus is automatically adjusted as the stage moves in the X and Y direction.
- Export to Excel™: Result can also be exported to customized Excel reports.
- See Results Quickly: The image containing the biggest particles can be automatically highlighted for better observation. The number of images with the biggest particles to be highlighted can be chosen (e.g. 2)



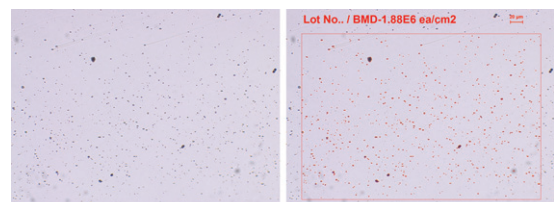
Automatic Detection of Metal Particles

Simple thresholding methods in ordinary image analysis routines are not enough to define organic and inorganic objects such as metal and non-metal objects. We incorporate special algorithms for finding visual textural differences and other parameters in defining and classifying metal and non-metal objects having similar color and brightness.



Customized Particle Analysis

- Analysis can applied one complete image or within a selected field of interest (FOI). Annotations such as text and scale bar can be added to the image for more detail.





Particle Shape and Size Analysis

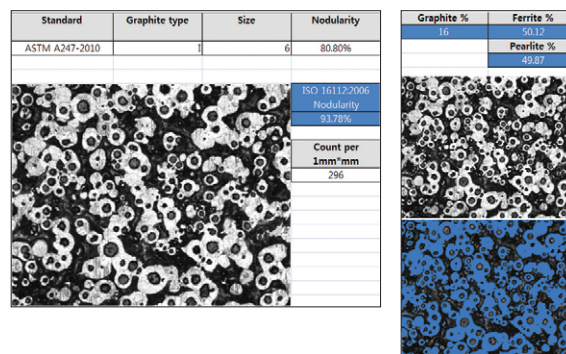
- Particles over several images are characterized on the basis of shape and size. Customized parameters for selecting and sorting the data are available, producing volume distribution and other statistics. The Particle Gallery showing each object shapes in each classification range is displayed in the data collector table. All resulting data as well as the Particle Gallery can be exported to MS Excel by a simple mouse click.

Statistics	Image Name	Object View	Equal Circle Diam	Min Ferret Diam	Max Ferret Diam	Avg Ferret Diam
Min	0.000	0.000	1.271	0.090	0.796	0.505
Max	0.000	0.000	114.691	102.757	166.021	136.665
Mean	0.000	0.000	7.796	6.122	9.582	8.040
Std Dev	0.000	0.000	10.550	9.365	14.914	12.436
Variance	0.000	0.000	111.262	87.712	223.413	154.662
Skew	0.000	0.000	4.697	4.668	5.099	4.932
Excess	0.000	0.000	32.845	32.189	37.843	35.092
Var.Coeff.	0.000	0.000	135.209	152.962	155.045	154.669
Sum	0.000	0.000	6481.649	5075.737	7943.763	6665.849
# Samples	10	829	829	829	829	829
# Blocks	10	10	10	10	10	10
95% confidence	0.000	0.000	0.602	0.535	0.852	0.710
Relative accuracy	0.000	0.000	7.730	8.739	8.692	8.836

Number	Block	Object View	Equal Circle Diam	Min Ferret Diam	Max Ferret Diam	Avg Ferret Diam
885	9	1	3.324	0.796	6.458	4.322
882	9	2	6.888	4.361	7.345	5.993
889	9	3	2.887	1.281	2.558	2.089
884	9	4	1.271	0.796	0.796	0.990
885	9	5	1.271	0.796	0.796	0.990
886	9	6	4.121	0.796	6.458	4.322
887	9	7	6.032	4.361	7.345	5.993
888	9	8	11.584	10.276	16.602	13.666
889	9	9	8.796	7.796	9.582	8.040
700	9	10	7.282	6.122	9.582	8.040
701	9	11	5.796	4.361	7.345	5.993
702	9	12	3.324	0.796	6.458	4.322
703	9	13	2.089	1.281	2.558	2.089
704	9	14	15.089	13.666	22.341	15.466
705	9	15	8.847	7.796	9.582	8.040
706	9	16	2.887	1.281	2.558	2.089
707	9	17	8.847	7.796	9.582	8.040
708	9	18	10.889	9.582	14.914	12.436
709	9	19	10.889	9.582	14.914	12.436
710	9	20	4.482	3.324	6.458	4.322

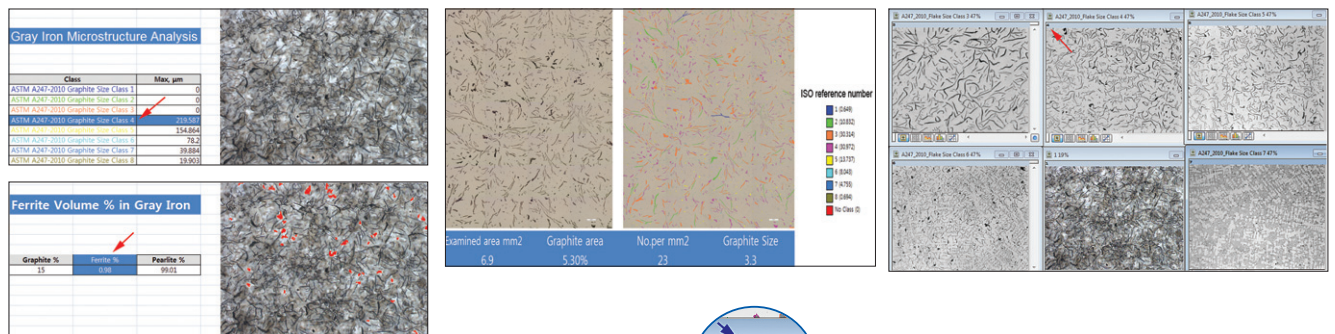
Microstructure of Cast Irons (by image analysis software) Microstructure of Cast Irons According to ISO/TR 945-2:2011

- ISO/TR 945-2: 2011 describes procedures using image analysis software for graphite classification. iSolution DT provides shape, size, graphite types, nodularity and distribution of graphite inclusions in cast iron according to international standards such as ASTM A247_2010, ASTM A247-67 (1998), ISO/TR 945-2: 2011, ISO16112: 2006, JIS G5502 (2001), KSD 4302 (2002). Cast iron analysis considers several consequent image-frames processed to achieve improved statistical results. The results are accumulated in the special data collector document. An Excel file may be created to report the results. ISO16112: 2006 defines a method of compacted (vermicular) graphite cast iron nodularity evaluation. In ISO 16112:2006, percent nodularity is calculated and weighted based on roundness-shape factor and graphite form. Reference images provided in Chart Navigator (see below) include Nodule Size Class, Flake Size Class, Graphite Form, and Distribution Examples.

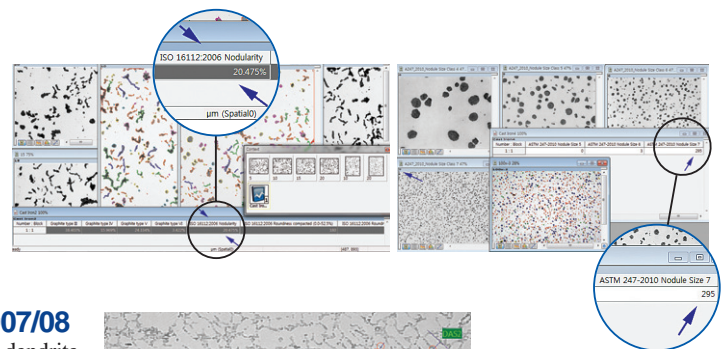


- Ductile Iron Microstructure Analysis

- Gray Iron Microstructure Analysis

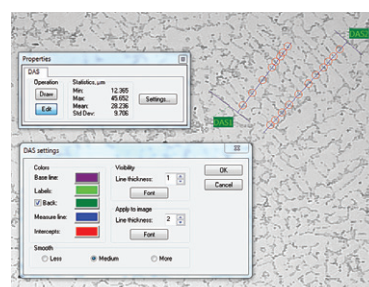


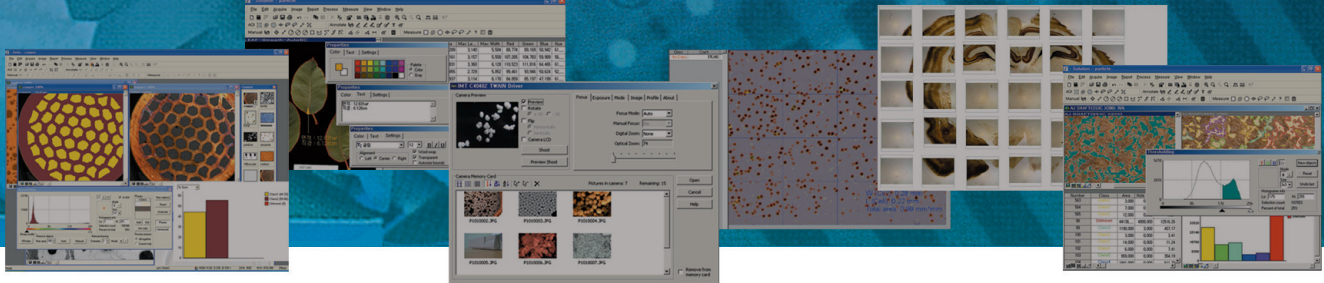
- CGI (Compacted Graphite Iron) Microstructure Analysis



DAS (Dendrite Arm Spacing), ARP1947-2007/08

- This procedure is for determining the acceptability of the dendrite arm spacing (DAS) of D357-T6 aluminum alloy castings that have a specified tensile strength. Dendrite arm spacing (DAS) refers to the spacing between the secondary arms of the dendrite structure. Based on the ARP1947-2007/8 standard, a straight line is drawn perpendicularly to the growth direction of the secondary arms. Each space is then measured automatically. Average, Min, Max, and Standard Deviation measurement values are generated automatically.





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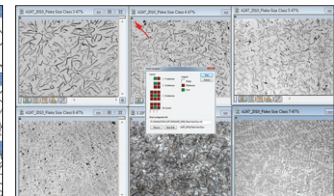
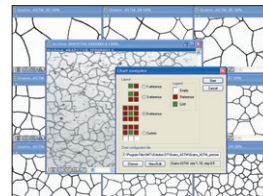
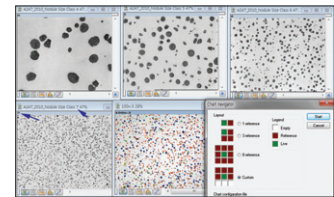
IMT Motorized Stage Control Applications

Chart Navigator

- The Chart Navigator permits direct comparison between either live or captured images with a series of reference images.

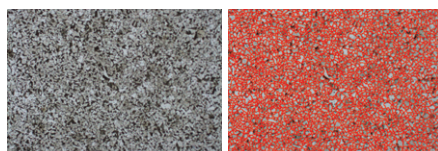
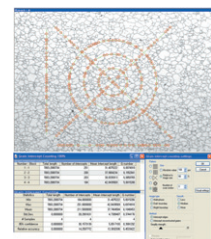
The user-friendly interface allows you to quickly select the appropriate reference image which most closely matches the live or captured image. Both the live image and the reference image can be exported to MS Excel by a simple mouse click. The Synchronize Zoom function maintains the magnification relationship between the reference image(s) and the live or captured image when using the image Zoom tool.

Included reference images are: ASTM A247_2010 Distribution, ASTM A247_2010 Flake Size Class, ASTM A247_2010 Graphite Form, ASTM A247_2010 Nodule Size Class, ASTM A-247, Grain ASTM, Twin Grain ASTM, ISO TR 945-2_2011 Graphite Form, Sinter Cast CGI (Compacted Graphite Iron).

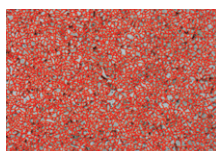


Grain Size Measurement

- iSolution DT provides the standard measurement environment for structural analysis of metal and materials. ASTM E112 (2000). ASTM E1382 (2010) describe the Grain Size measurement environment with both various Line Intercept methods as well as Planimetric counting methods. The ASTM E1382 (2010) standard defines methods for determining grain size when using image analysis software. Due to accurate Edge Detect algorithms, iSolution DT provides both automatic and manual measurement environments. Grain size statistics as well as images with grain sized data and images with grain overlays are generated. Grains touching image boundaries are automatically ignored based on the standard.



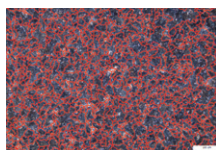
• Carbon Steel



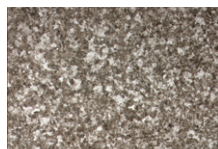
• Grain Overlayed Image



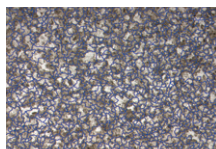
• Low-Carbon Steel



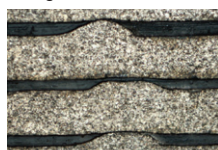
• Grain Overlayed Image



• High-Carbon Steel



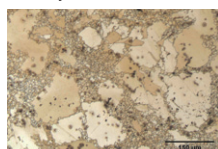
• Grain Overlayed Image



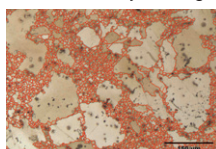
• Alloy



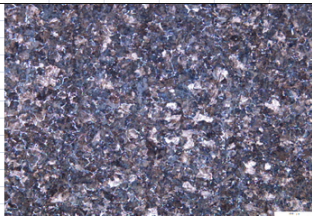
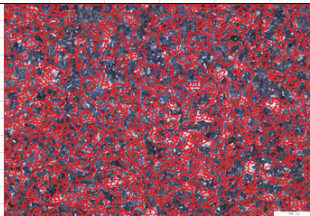
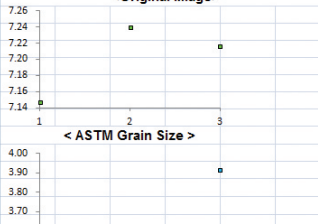
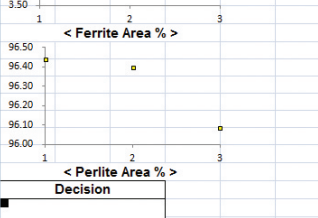

• Grain Overlayed Image



• Alloy



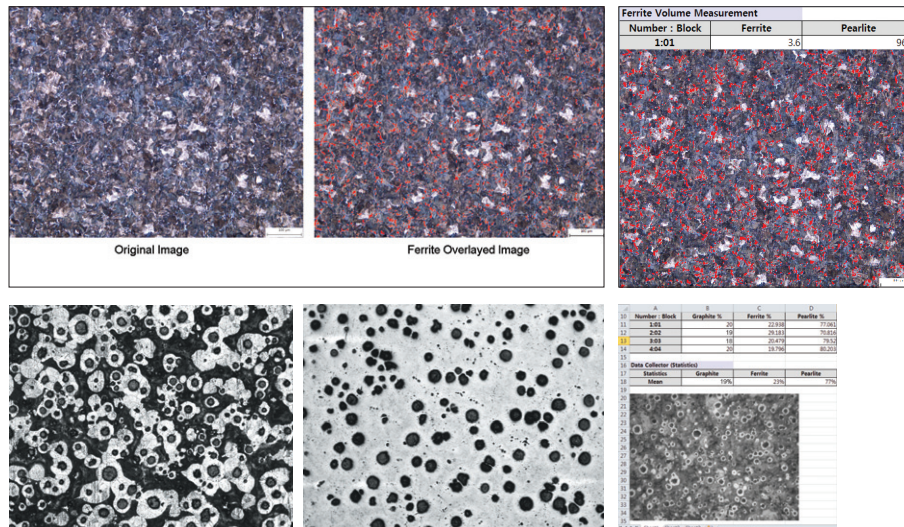
• Grain Overlayed Image

			Date: 2012-03-28																													
Product	Lot No.	Material	Grain Size(ASTM #5 & more)	HARDNESS(HRC15~25)																												
			7.20																													
																																
<Original Image>			<Analyzed Image>																													
			<table><tr><th>Field No.</th><th>Grain Size (ASTM #5 & more)</th><th>remark</th></tr><tr><td>1</td><td>7.15</td><td></td></tr><tr><td>2</td><td>7.24</td><td></td></tr><tr><td>3</td><td>7.22</td><td></td></tr><tr><td>Minimum</td><td>7.15</td><td></td></tr><tr><td>Maximum</td><td>7.24</td><td></td></tr><tr><td>Average</td><td>7.20</td><td></td></tr></table>		Field No.	Grain Size (ASTM #5 & more)	remark	1	7.15		2	7.24		3	7.22		Minimum	7.15		Maximum	7.24		Average	7.20								
Field No.	Grain Size (ASTM #5 & more)	remark																														
1	7.15																															
2	7.24																															
3	7.22																															
Minimum	7.15																															
Maximum	7.24																															
Average	7.20																															
			<table><tr><th>Field No.</th><th>Ferrite A%</th><th>Perlite A%</th><th>remark</th></tr><tr><td>1</td><td>3.56</td><td>96.44</td><td></td></tr><tr><td>2</td><td>3.60</td><td>96.40</td><td></td></tr><tr><td>3</td><td>3.92</td><td>96.08</td><td></td></tr><tr><td>Minimum</td><td>3.56</td><td>96.08</td><td></td></tr><tr><td>Maximum</td><td>3.92</td><td>96.44</td><td></td></tr><tr><td>Average</td><td>3.69</td><td>96.31</td><td></td></tr></table>		Field No.	Ferrite A%	Perlite A%	remark	1	3.56	96.44		2	3.60	96.40		3	3.92	96.08		Minimum	3.56	96.08		Maximum	3.92	96.44		Average	3.69	96.31	
Field No.	Ferrite A%	Perlite A%	remark																													
1	3.56	96.44																														
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			<table><tr><th>Field No.</th><th>HARDNESS(HRC15~25)</th><th>remark</th></tr><tr><td>1</td><td></td><td></td></tr><tr><td>2</td><td></td><td></td></tr><tr><td>3</td><td></td><td></td></tr><tr><td>4</td><td></td><td></td></tr><tr><td>5</td><td></td><td></td></tr><tr><td>Minimum</td><td></td><td></td></tr><tr><td>Maximum</td><td></td><td></td></tr><tr><td>Average</td><td></td><td></td></tr></table>		Field No.	HARDNESS(HRC15~25)	remark	1			2			3			4			5			Minimum			Maximum			Average			
Field No.	HARDNESS(HRC15~25)	remark																														
1																																
2																																
3																																
4																																
5																																
Minimum																																
Maximum																																
Average																																
Decision																																



Ferrite Volume Measurement

- Percentage of Ferrite area can be calculated excluding the graphite area automatically. As such, percentage of Ferrite, Pearlite, and Graphite areas can be acquired very easily. One simple mouse click of the Ferrite volume measurement produces the results (below).

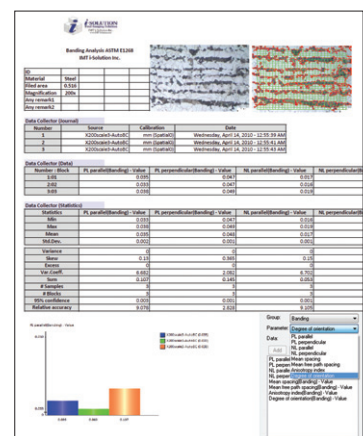
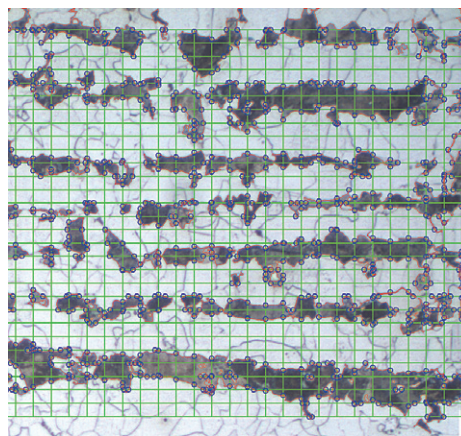


Assessing the Degree of Banding or Orientation of Microstructures by ASTM E 1268

- ASTM1268 Banding Analysis Assessing the Degree of Banding or Orientation of Microstructures by ASTM E 1268 Segregation

occurs during the dendritic solidification of metals and alloys and is aligned by subsequent deformation. Solid-state transformations may be influenced by the resulting microsegregation pattern leading to development of a layered or banded microstructure. The below parameters are used for the ASTM1268 Banding Analysis

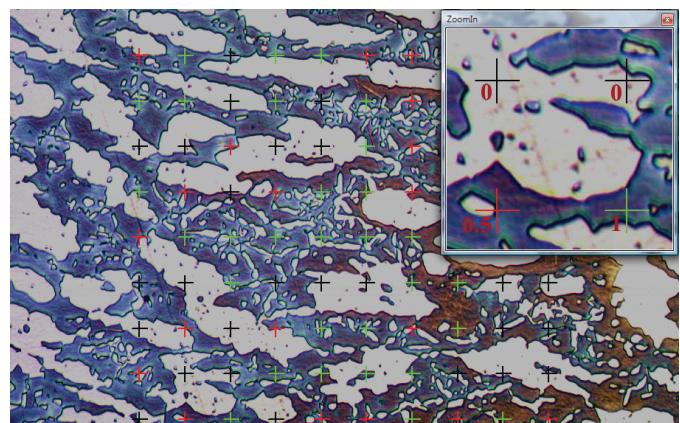
- Anisotropy index (Banding) value
- NL parallel (Banding) value
- NL perpendicular (Banding) value
- PL parallel (Banding) value
- PL perpendicular (Banding) value
- Degree of Orientation (Banding) value
- Mean spacing (Banding) value
- Mean free path spacing (Banding) value



Volume Fraction by systematic manual point count (ASTM E 562-05)

- This test method describes a systematic manual point counting procedure for statistically estimating the volume fraction of an identifiable constituent or phase from sections through the microstructure by means of a point grid. Residual Austenite and Ferrite volume ratio is measured often.

Testing Specification:- ASTM E562 - 05e1				
	A	B	C	D
1				
2	FERRITE DETERMINATION ON STAINLESS STEEL SECTION			
3	Testing Specification:- ASTM E562 - 05e1			
4				
5	Number	Source	Calibration	Date
6	1	NO Grid(1) (2)	pixel (Default)	Saturday, December 12, 2008
7	2	NO Grid(2) (2)	pixel (Default)	Saturday, December 12, 2008
8				
9				
10	Number : Block	Volume Ferrite %		
11	1:01	53		
12	2:02	42.5		
13				
14	Statistics	Volume Ferrite %	Volume Austenite	52.25%
15	Min	42.5	Volume Ferrite	47.75%
16	Max	53		
17	Mean	47.75		
18	Std.Dev.	7.424		
19	# Samples	2		
20	95% confidence	15.33		
21	Relative accuracy	32.104		
22				
23				
24				





IMT iSolution Quick-Scan™

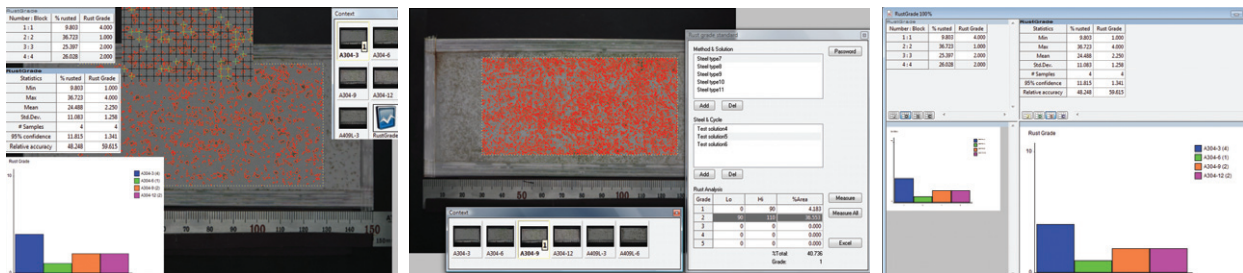


IMT Motorized Stage Control Applications

IMT iSolution **Quick-Scan™** is user application oriented solutions having intuitive interface
 IMT iSolution **Quick-Scan™** is the trade mark of IMT i-Solution Inc.

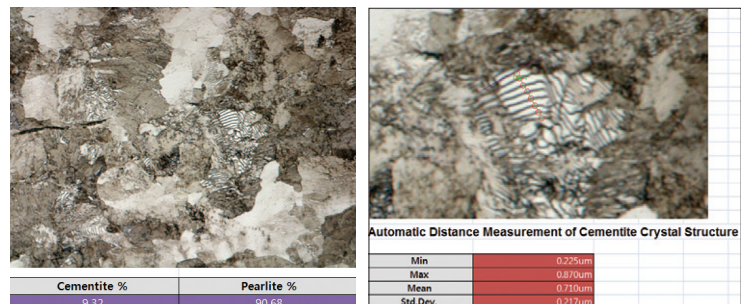
Rusting Degree Analysis (ASTM D 610-2008 and JIS H 8681-2:1999)

- This feature covers the evaluation of the degree of rusting on painted steel surfaces based on ASTM D610-2008. It provides a standardized means for quantifying the amount and distribution of visible surface rust. JIS H 8681-2: 1999 is for assessment of the corrosion resistance of anodic oxide coatings on aluminium and aluminium alloys based on JIS H 8681-2: 1999. Software also provides customized method and table with which user can create own criteria. By password option, all created criteria can be protected from unexpected change.



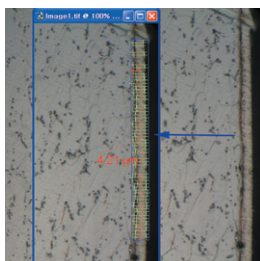
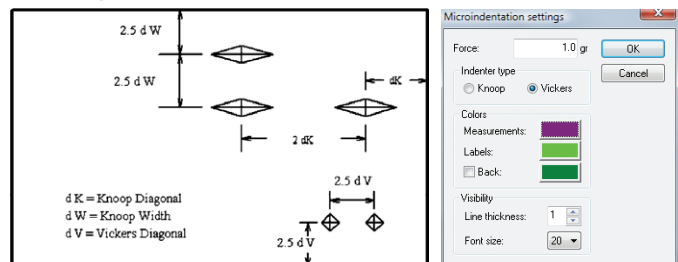
Cementite Crystal Structure Analysis

- Cementite volume Measurement :
Cementite and Pearlite Volume are measured to define the hardness and brittleness of materials
- Automatic Distance Measurement of Cementite Crystal Structure :
Each distance in Cementite Crystal Structure is measured automatically.



Microindentation Hardness Test (ASTM E 384-2008a)

- This feature covers determination of the microindentation hardness of materials. It covers microindentation tests made with Knoop and Vickers indenters. Measured data, statistics value, and image itself all together can be exported to MS Excel by a simple mouse click.



Layer Depth Measurement

- Average, Min, Max, Standard Dev. thickness of width are measured automatically by simply defining a box shape region of interest.
The number of scan line is up to 999.

iSolution DT-M / DT / DT-L

i-Solution™

iSolution FL / Auto

iSolution Lite

iSolution Capture



Specification	iSolution DT	i-Solution	iSolution FL/Auto	iSolution Lite	iSolution Capture
Acquire	●	●	●	●	●
Input Device					
1) TWAIN Support Devices					
2) WDM Support Devices					
3) IMT i-Solution Inc. cameras					
4) i-Link Support Devices					
5) Optronics digital cameras					
6) Jenoptik ProgRes digital cameras					
7) Nikon digital cameras					
8) Pixelink digital cameras					
9) Lumenera digital cameras					
10) Pixera digital cameras					
11) Scion digital cameras					
12) XLI digital cameras					
13) Matrix vision mvBlueFox digital camera					
14) Olympus digital cameras					
15) Leica digital cameras by TWAIN					
16) Carl Zeiss AxioCam digital cameras by TWAIN					
17) Qimaging digital cameras					
18) Diagnostic Instruments Spot digital cameras					
19) Ararray digital camera					
20) FlashBus frame grabbers					
21) Matrox frame grabbers					
Image Capture					
1) Time Lapse Capture					
2) Movie Recordings in AVI, MPG, MPEG, MOV					
3) Crosshair Generation on Live Preview Window					
4) Grid Mask on the Live Preview Window according to the Calibrated Scale					
5) Measurement on Live Preview Window					
Image File Format					
jpg, jpeg, jps, tif, tiff, bmp, gif, pcx, tga, mpg mpeg, avi, mov, img, rpt, txt and etc.					
Overlay					
1) Crosshair					
2) Grid mask					
3) Image					
4) Marker					
5) Time Stamp					
6) Measure					
Image	●	●	●	●	●
Mode Change, Clone, Crop, ROI, Resize Rotate, Split, Combine Color Plane					
Image Mode Change					
Grayscale, RGB, HSB, YUV, 8bit and 16bit per Channel ROI Control					
1) Rectangle, Arbitrary Rectangle, Ellipse, Arbitrary Ellipse, Polygon, Spline Shape, Magic Wand					
2) Copy, Paste, Crop ROI					
Combine					
1) Split Color Plane RGB, HSB, YUV					
2) Combine Color Plane RGB, HSB, YUV					
3) Combine Color Images directly by Mean, RGB, Fluorescence Mask and Add					
Sequence Control					
1) Play Forward and Backward					
2) Making Movie File(mpg, avi, mov) by captured Images					
3) Split Images from a Sequence Movie File					

Specification	iSolution DT	i-Solution	iSolution FL	iSolution Lite	iSolution Capture
View	●	●	●	●	●
Zoom Tools					
1) Zoom In, Out, and 100%					
2) Zoom In Window for More Accurate Edge Detection					
3) Zoom 10% to 1600% Fit to Window Context Window to Manipulate Several Images					
Edit	●	●	●	●	●
Undo, Redo, Copy, Paste, Paste New, Delete Delete All, Annotate, Image Information					
Annotate					
Line, Polyline, Spline, Rectangle, Ellipse, Text label					
Process	●	●	●	●	●
Filter, BCG Control, Pseudo Color					
Filter					
1) Edge : Gradient, Kirsch, Laplas, Sobel, Variance					
2) Enhance : Auto Brightness and Contrast, Average, Background Correction, Equalize, Median, Sharping, Smooth					
3) Morphology: Clean, Close, Dilate, Erode Fill Holes, Open, Split					
4) Special : Emboss, Negative					
Focus Enhancement (Extended depth of focus)	●	●	●	●	
1) Combine Individual Partly Focused Images into a Single In-Focus Composite Image					
2) Combine without Trace					
3) Auto Compensating Displaced Images from Stereo Microscope					
4) Live focus enhancement					
5) Perfect focus enhancement					
6) Fast focus enhancement					
7) Stereo microscope focus enhancement					
Image Stitching	●	●	●	●	
1) Perfect Auto Montage.					
2) Auto and Manual Image Stitching					
3) Stitching without Trace and Correcting any Irregularities in Brightness					
Live Image Stitching	●				
Calibration	●	●	●	●	●
Calibration					
1) Full Auto Calibration					
2) Semi-Auto Calibration					
3) Special Calibration X and Y					
4) Insert Calibration Marker					
5) Split Calibration Marker 4 and 16					
6) Save and Open Calibration					
7) Protection by Password					
8) Adjust by resolution					
Large Size Object Measurement	●				
1) Auto Objects Movement Tracking					
2) Semi-Auto Objects Movement Scan					
3) Manual Objects Movement Scan					
4) Graphic Window					
5) Generation of the Secondly Measurement Data from the First Measurement Data					
Development	●				
Customized Modules and Application					

Technology that will rewrite the history of Image Analysis.

Specification	iSolution DT	i-Solution	iSolution FL/Auto	iSolution Lite	iSolution Capture
Auto Edge Detector	●				
1) Auto Line Edge Detector					
2) Auto Point Detector					
3) Auto width detector					
4) Box edge detector					
5) Multi width detector					
Grid Mark	●	●	●	●	●
1) Grid Mark on the Live Preview Window based on the Calibrated Value					
2) Scale Marker on the Live Preview Window					
3) Grid Mark on the Captured Image based on the Calibrated Value					
4) Crosshair Generation on the Live Preview Window					
Manual Measurement	●	●	●	●	●
1) Point, Straight Line, Spline, Polyline, Polygon Rectangle, Circle, Best Fit Circle, Circle By 3 Points, Angle, Angle Between 2 Lines, Distance, Parallel Line Width, Lines From Common Perpendicular width measurement, perpendicular distance, Horizontal, line, Vertical line Reference Point, Perpendicular Line Length					
2) Auto Tracing Objects					
3) Select Tool for Edit Measurements					
4) Measurement Data					
5) Measurement Statistics					
Export to Excel	●	●	●	●	●
1) Export to Excel Gray Image Data					
2) Export to Excel Overlay and Original Image Measurement Data, Statistics, Chart					
3) Export to Excel by template					
Save	●	●	●	●	●
1) Saving Data by TXT File Format					
2) Saving image and the measurement data together by img File Format					
Report	●	●	●	●	
Report Generator					
1) Create Report					
2) Insert Image and Data					
3) Insert other OLE Objects					
Window	●	●	●	●	●
Split Horizontal, Split Vertical, Cascade Tile Horizontal, Tile Vertical, Arrange icons					
Dynamic User Interface (UI)					
1) Classic					
2) Modern					
Count and Size					
Auto Count Objects	●	●	●		
1) Auto Object Detection					
2) Edit the Counted Objects by Add, Subtract, Cut, Split, and Morphological Filters					
3) Set the Measurement Range					
Measurement	●	●			
1) Rectangle, Arbitrary Rectangle, Ellipse, Arbitrary Ellipse, Polygon, Spline Shape, Magic Wand					
2) Invert Objects, Separate Objects					
Advanced Fluorescence	●	●	●		

Specification	iSolution DT	i-Solution	iSolution FL	iSolution Lite	iSolution Capture
Measurement Parameters	●	●			
Area, Hole Area, Perimeter, Hole Perimeter, Max Length, Max Width, Average Dimension, Size by X, Size by Y, Average Chord, Min Feret Diameter, Max Feret Diameter, Average Feret Diameter, Equal Circle Diameter, Major Ellipse Diameter, Minor Ellipse Diameter, Line Length, Line Width, Ribbon Length, Ribbon Width, Circle SF, Ellipse SF, Roundness, Roundness-ALT, Elongation, Center X, Center Y, Angle, Red Color, Green Color, Blue Color, Hue, Intensity(Min), Intensity(Max), Intensity(Mean), Intensity(Integral), Intensity(Standard Deviation), %Area, %Hole, Convex Perimeter, Biovolume sphere/ ellipsoid/ rod/ cone/ irregular, Triangle Ri/ Ro/ Ai/ Ao/ C/ ER, Round Davg/ Dmax/ Dmin/ DE/ DR, Polygon Lmax/ Lin/ RD/ LR					
Measurement Data					
1) Measurement Data	●	●	●	●	●
2) Statistics Data from all Parameters	●	●			
3) Classification and Statistics for each Parameters	●	●			
4) Export to Excel Original Image, Overlay image Measurement Data, Statistics, and Chart in one step	●	●			
Objects Editing	●	●			
Target objects can be sorted by more than 65 measurement parameters as well as by the simple bright and color difference.					
Data Collector and Macro	●	●			
Profile	●	●	●	●	●
1) Straight Line					
2) Polyline					
3) Parallel Line					
4) Select and Change					
i-Solution/ iSolution DT-L/ DT/ DT-M include the below features also. Phase analysis Densitometry Live cell count Illuminator control Particle analysis Live focus enhancement (Live extended focus) Live image stitching Objects counting by volume. iSolution DT-L/ DT/ DT-M include the below features also. Graphite analysis in nodular cast iron (ASTM A247-2010, ISO/TR 945-2: 2011, ISO16112: 2006, KS D4302, JIS G5502), Ductile Iron, Gray Iron, Compact Graphite Iron Grain size measurement: ASTM E112 by visual comparison method Grain size intercept counting: ASTM E1382 by using image analysis software Grain size planimetric counting: ASTM E1382 by using image analysis software Chart navigator (Grain ASTM, Twin grain ASTM, ASTM A-247, ISO TR 945-2011, Sinter Cast CGI, ASTM A-247_2010 Nodule Size / Graphite Form / Flake Size Class / Distribution) Coating thickness measurement Particle shape and size analysis Live particle analysis by count and diameter DAS-ARP1947-2007-08 iSolution DT/ DT-M include all the features and the below also. Non-metallic inclusion rating analysis EN 10247 (2007), ASTM E45 (2002), E1245-03 (2008), DIN 50602 (1985), ISO 4967(1998), KSD 0204 (2002), KSD 0204 (1982), JISG0555 (2003). Two analysis approaches, Stereological measurements and JK inclusions ratings are implemented. The European and British Standard BS EN 10247 (2007) Filter cleanliness analysis: ISO 16232-10, ISO 4406-4407, STD 5091,52 Volume Fraction by systematic manual point count (ASTM E 562-05) Rusting degree analysis (ASTM D 610-2008 and JIS H 8681-2: 1999) Microindentation Hardness Test (ASTM E 384-2008a) Banding analysis by ASTM E1268 Fruit size analysis Yarn filament analysis iSolution DT-M include all the features and the below also. All motorized stage control applications including NMI (non analysis, Filter contamination analysis, Virtual slide, Automatic X/Y/Z positioning, and etc metallic). Customized application is available. Customized report, Z-depth measurement					

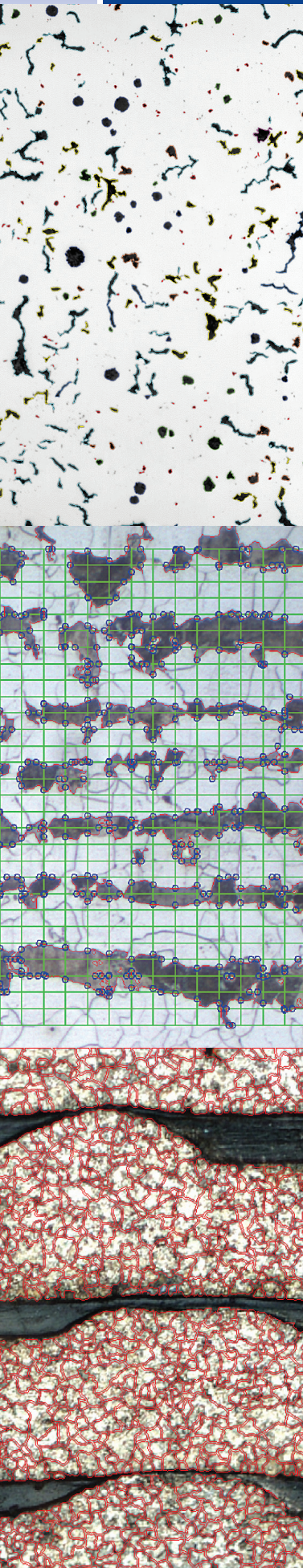
iSolution DT-M / DT / DT-L

i-Solution™

iSolution FL / Auto

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iSolution Capture



1207-Metal



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