Mountains® Version 11

Release Notes

Version	Date	Illustrated articles
11.2.11426	April 14th 2026	What's new in 11.2
11.1.11404	March 23rd 2026	
11.1.11355	February 2nd 2026	
11.1.11278	November 17th 2025	What's new in 11.1
11.0.11215	September 15th 2025	
11.0.11155	July 17th 2025	
11.0.11118	June 10th 2025	What's new in 11.0

Digital Surf Software Updates
www.digitalsurf.com/support/software-updates

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Version 11.2.11426

What's new

	Multi-technology features
	Real amplification factor in 3D
Real Amplification factor in 3D view study	The user can now set an Amplification factor in the 3D view study. An amplification factor set to 1 displays the surface using its real physical XYZ shape (Normalize). An amplification factor bigger than 1 stretches the real surface shape along the Z axis. An amplification factor lower than 1 compresses it. The Z height of several surfaces (having the same XY size) now becomes visually comparable: simply use the same settings for the corresponding 3D studies (copy/paste of settings can help). The Amplification factor can be set using the mouse, using a cursor, or by typing a value in the 3D view study ribbon (also available in multi-selection). This applies to: 3D view study on Surface, Surface-image, Series of surfaces and Multi-channel image studiables. It can also be used in other studies showing 3D view (i.e.: Summary of the current operator).
Amplification in percent still available in 3D view study	Note that the Amplification in percent, used in previous versions, is still available as another amplification mode. It is the default factory setting, at 10%. This percentage is calculated from XY lengths, regardless of the real Z values. 100% corresponds to the surface filling a 1*1*1 cube. This amplification in percent is useful for templates or SmartFlows if you can't anticipate the surface real aspect ratio.
	Automatic shape positions in "Extract areas" operators
Result pickers in "Extract areas" operators on surface (and other studiables)	You can now define regions of interest located by previous studies in the workflow: Result Pickers are available in "Extract areas" operator on surface and other studiables having image-like visualization. Result Pickers can be used for any extraction shape position or size value. This applies to: Surface, Surface + image, Multi-channel image, Series of surfaces, Image, Series of images, Hyperspectral image, IV spectroscopy image and Force volume.
Absolute value unit in Extract area operators on surface (and other studiables)	It is now possible to use XY Absolute unit for position settings in "Extract areas" operator on surface and other studiables having image-like visualizations. (The Absolute unit has more consistent position reference than a relative unit). This applies to: Surface, Surface + image, Multi-channel image, Series of surfaces, Image, Series of images, Hyperspectral image, IV spectroscopy image and Force volume.
Center position in Extract area operators on surface and profile (and other studiables)	You can now set the center position of a rectangular shape in the "Extract areas" operators, even with Result pickers. You can then center the region of interest on previously detected features. Note than the previous setting definition using shape edge positions is still available. This applies to: Surface, Surface + image, Multi-channel image, Series of surfaces, Image, Series of images, Hyperspectral image, IV spectroscopy image, Force volume, Profile, Series of profiles, Spectrum and IV curves.
Exclude surrounding NMP in Extract area operators	It is now possible to automatically crop the studiable, in order to exclude surrounding non-measured points, in "Extract areas" operators. This applies to: Surface, Surface + image, Multi-channel image, Series of surfaces, Hyperspectral image, IV spectroscopy image, Force volume, Profile and Series of profiles.
	Ring shape in "Extract areas" operators
Ring shape in Extract area operators on surface (and other studiables)	A ring shape has been added to the "Extract areas" operator on surface and other studiables having image-like visualizations. This applies to: Surface, Surface + image, Multi-channel image, Series of surfaces, Image, Series of images, Hyperspectral image, IV spectroscopy image and Force volume.
	Enlarged automatic studiable selection in Stitch operator
Enlarged automatic selection in the "Stitch" operator	In the automatic mode of the Stitching operator, the user can now automatically select the leaf studiables (i.e. last studiable of the workflow branch), or studiables generated by an operator type (i.e. leveled studiables). This applies to: Surface, Surface-image, Multi-channel image and image studiables.

	## Result picker in the “Rotate” operator
Result picker in the “Rotate” operator on Surfaces and Images	It is now possible to use a Result picker in the 'Rotate' operator. This applies to Surface, Image, Surface + image, Series of surfaces, and Multi-channel image studiables.
Result picker in the “Rotate” operator on Contour profiles	It is now possible to use a Result picker in the ‘Rotate’ operator on Contour profiles.
	## Kolmogorov statistical test
Kolmogorov-Smirnov test	The Kolmogorov-Smirnov normality test (D-score and P-value) has been added to the following statistical studies (on a population of documents or on Series of results): Histograms, Boxplots and Scatter plots. Several reference distributions are available (Normal, Exponential, Logistic, Log-normal, Weibull)
	## “Extract areas” operator ergonomics
Ergonomics of the “Extract areas” operator dialog on surface (and other studiables)	The "Extract areas" operator dialog on surface studiables has been redesigned for better usability. It also applies to other studiables having image-like visualization. The unit settings list is now homogenized with other operators. When modifying an extraction shape, the extracted area preview is now updated in real time, and the size, in metric units, of the extracted studiable is displayed in real time. The size of the source studiable is also displayed. The center of rectangular extraction shape is visible in the preview, in the Summary of the current operator study, and in the extraction shape displayed in the study of the source studiable. This applies to: Surface, Surface + image, Multi-channel image, Series of surfaces, Image, Series of images, Hyperspectral image, IV spectroscopy image, Force volume, Profile, Series of profiles, Spectrum and IV curves.
Ergonomics of the “Extract areas” operator dialog on profile (and other) studiables	The "Extract areas" operator dialog on profiles has been redesigned for better usability. It also applies to other studiables having graph-like visualization. The unit settings list is now homogenized with other operators. When modifying the extraction shape, the position of the center (respectively border) moved is displayed in real time in the preview. The center of rectangular extraction shape is visible in the preview. This applies to: Profile, Series of profiles, Spectrum and IV curves.
	## Other
Mask applied on several layers	For Multi-channel images, in the Apply a mask of non-measured points operator, it is now possible to apply the mask on several layers.
Multiple document saving	When closing multiple documents, the following actions are now available in a clear dialog: "Save all documents" and "Do not save any document".
Notification of theme change to host application	Applications integrating Mountains® as an ActiveX control are now notified of theme changes from within the Mountains® interface so they can also update.
	# Profilometry features
Custom evaluation length in the "Parameters table" study	It is now possible to define a custom evaluation length in the Parameters table on Profile and Series of profiles. The evaluation length is taken into account before any requested operations (such as Form removal).
Low-pass and High-pass multiscale analysis	Low-pass (waviness) and High-pass (roughness) filters are now available in the “Multi-scale filter bank” operator on surfaces and on profiles. You can then analyze the effect of cut-off values on visualizations or on downstream calculations. The “Bandpass filter bank” operator has been renamed “Multi-scale filter bank” operator.
Min/max of deviation in the "Advanced contour analysis" study.	The user can now display the position and the values of the minimum and maximum deviations in the "Advanced contour analysis" study on Profile and Contour profile studiables.
Improvements in “Extract local contour” operator	The Remove outliers function is now also available for the Polynomial method in the Extract local contour operator. The interface of the “Extract local contour” operator has been improved: When using the Detection line method, the line is now displayed. When using the Derivative profile method, its unit is displayed. All detected points of the current auxiliary profile are displayed. The selection of pairs of points is more explicit.
Hiding the results table in the "Parameters table" study	The user can now hide the parameters table in the "Parameters table" study when the studiable is shown in the study.
Automatic overlap calculation in "Stitch together in 3D space" operator	In the "Stitch together in 3D space" operator, for surfaces measured successively around a cylinder, it is now possible to let the software automatically find the overlap between surfaces, in the pre-alignment phase. For this cylinder measurement scheme, "Calculated overlap" and "Estimated radius” are now displayed in the dialog. This applies to Surface and Surface + image studiables.

Removal of FFT resampling preference	The resampling preference for FFT algorithm in the "Metrology / filtering" section of the Global preferences has been removed.
	SEM and Light microscopy features
	Image subtraction
New “Subtract” operator on Images	The "Subtract" operator now applies to Image studiables, allowing the user to quantify image differences.
	Image data bar removal
Image data bar removal	The user can now remove image data bar in the "Scale the image" operator, without rescaling. It is useful if the image is already loaded at the correct scale. This setting is directly available as a quick pre-processing operator. It applies to Images and Series of images
	SPM features
	New “Estimate quality of curves” operator
New “Estimate quality of curves” operator on Force-Volumes	The new "Estimate Quality of curves” operator generates a map of the quality of the Force curves, using a pre-trained machine-learning predictive tool. It can also generate a Force-Volume keeping only good quality force curves. Note: The pre-trained database was developed using polymer-type materials and blends.
	New “Find a model” operator
New “Find a model” operator on Force-Volumes	The new “Find a model” operator guides the user in the indentation analysis tool and determines the best fitting model for each force curve. The “Find a model” operator can generate a Model map (Hertz, DMT, JKR), a Load map, and a Tabor map. Note: The pre-trained machine-learning database was developed using polymer-type materials and blends.
Model map in indentation analysis of Force-Volumes	The Force curve analysis study can now use a Model map as an input, to automatically use the most appropriate model for each force curve in Indentation analysis of Force-volume studiables.
New type of studiable: Label map	The Model map generated by the Find a model operator, and usable by the indentation analysis in the Force curve analysis study on Force-Volume, is stored as a new studiable type: Label Map studiable. A Label map studiable contains class information for each map pixel (i.e. Hertz, DMT or JKR model), and a color associated with each class. Two studies are available for this new studiable type: Label map view (displaying pixels with their class color and a legend with class name and color), and Identity card (displaying classical information such as Spacing, and the number of classes).
	Tip radius & Poisson’s ratio parameters
Tip radius and Poisson’s ratio values	The software can now read the tip radius and Poisson's ratio values from the data files when loading, and store them in the studiable. These values can be used as settings in the “Find a model” operator and in the 'Indentation analysis' tool of the Force curve analysis study on force-volume studiables.
	Other
Curve zoom in IV spectroscopy image view study	It is now possible to zoom in the curves of IV spectroscopy image study.
IV curve addition	Using the “Add/Subtract” operator, you can now add the values of an IV curve to the values of all the IV curves in IV curve studiables or IV spectroscopy images.
Bands creation in the "Use spectral bands" operator	Buttons have been added to the "Use Spectral Bands" operator on IV spectroscopy images to allow users to more easily add or remove a band, or to remove all bands.
	Spectroscopy features
	Deferred calculations in the “Peak fitting” study
Ergonomics in the “Peak fitting” study	From the Peak fitting settings dialog, it is now possible to define all peak settings (fitting zone, cursors and automatic baseline). It applies to Spectrum curve and Hyperspectral image studiables.
Deferred calculations in the “Peak fitting” study	It is now possible to postpone automatic calculations, if necessary, in the “Peak Fitting” study. This is especially useful in the case of large datasets (or several peaks to fit) to be able to modify all the parameters before running the calculations once finished. It applies to Spectrum curve and Hyperspectral image studiables.

Curve zoom in Hyperspectral image view study	It is now possible to zoom in on the curves of a Hyperspectral image view study.
	Other
Spectrum addition	Using the “Add/Subtract” operator, you can now add the values of a spectrum to the values of all the spectra in a Spectrum curve or a Hyperspectral image.
“Convert to series of surfaces” operator on Hyperspectral images	The “Convert to series of surfaces” operator now allows the conversion of hyperspectral image studies into Series of surfaces.
Bands creation in the "Use spectral bands" operator	Buttons have been added to the "Use Spectral Bands" operator on Hyperspectral images to allow users to more easily add or remove a band, or to remove all bands.
	License
Reference guide access	The access to the complete Reference guide now only depends on the license type (and not on the installation package anymore). A complete re-installation of the software is no longer necessary when your Free-trial license (with limited reference guide) is reprogrammed as a commercial license (with complete reference guide).
	Updates and translations for Interface & Reference Guide
User interface	New texts related to new features have been added to the user interface (in English). They have been translated into all available languages: French, German, Italian, Spanish, Japanese, Chinese, Polish, Korean, Brazilian Portuguese. Note: A complete retranslation into Japanese is in progress. This means that the style and vocabulary might not be homogeneous for the moment.
Reference Guide	The Reference Guide has been updated with the descriptions of most new main features and improvements (in English). It has been translated into all available languages (French, German, and Japanese). Note: A complete retranslation into Japanese is in progress. This means that the style and vocabulary might not be homogeneous for the moment. You might find some English sentences (in the Japanese Reference Guide).

Bug corrections (A and B Type)

	Type	Bug Description
MNT-12911	A	A crash may occur in the “CAD compare” study on Shell studiables if the study is duplicated and one or other of the studies is deleted.
MNT-12596	A	The software may crash when loading a document containing add-ons in an anterior version to that in which the document was created.
MNT-12962	A	In some rare cases, a crash may occur when hovering the mouse over an add-on study or operator in the workflow.
MNT-13029	A	The offset along the X axis of certain profiles within a Series of profiles studiable is not preserved when the "Level" operator is applied if the chosen leveling operation method is 'rotation'.
MNT-13054	A	The results of the “Level” operator on Series of profiles studiables can be different from those obtained with the saved settings if a specific profile is extracted and the Total Least Squares Line (TLSLI) method is used on the same profile in the document.
MNT-13383	A	The results of the “4 quadrant reconstruction” operator may inverse the height/depth if the images are larger than 8 bits/pixel and the older algorithm, kept for compatibility, is used on Image studiables.

MNT-1006	B	The display of the extracted area in the "3D view" study on Image studiables is not working correctly when an Image studiable is applied as a texture.
MNT-9131	B	Exporting a 3D View study of a Multi-channel cube in PDF format gives an incorrect visualization.
MNT-10018	B	The state of the selected panels is not saved when Mountains closes and reopens if the "Display/Display of panels" preference in the "User Interface" section is set to "Non-contextual display" in the General preferences.
MNT-12155	B	The directional arrows for moving the planes in the 3D view study on Hyperspectral image studiables are not operational.
MNT-12503	B	Rising edges are detected below 0 (and falling edges above 0) in the "Extract local contour" operator on Surface studiables
MNT-12507	B	The center of rotation is not calculated correctly in the "CAD compare" study on Shell studiables when selecting the [Manual pre-alignment] or [Deviations] buttons in the study menu.
MNT-12533	B	The color display of deviations is a uniform color in the "CAD compare" study on Shell studiables.
MNT-12607	B	The Z-axis scale is not displayed correctly in the 3D view of the "Summary of the current operator" study after a substitution of the studiable.
MNT-12674	B	The center of rotation of the 3D view is off-center in the "IV spectroscopy analysis" analysis example document.
MNT-12834	B	The shown position of the tolerances is off-center for deviations on closed, circular profiles in the Advanced contour analysis study.
MNT-12880	B	Changing the product to a minimum product compatible with the document results in the loss of elements.
MNT-12912	B	The zoom of the Nominal model and the center of rotation are incorrect in the "CAD compare" study on Shell studiables.
MNT-12970	B	Roughness and Metalness material property settings are not saved in 3D views of studiables when closing and reopening a document
MNT-13028	B	The Reference Guide is not redirected to the correct page when accessed from studies or operators in a Free trial version.
MNT 13261	B	An erroneous warning message may be observed in the message bar of the document for documents containing a leveling operator on Profile studiables.
MNT-13268	B	The result of the "Multiply/Divide" operator on Hyperspectral image and Spectrum curve studiables is incorrect in the workflow when the Z axis unit is per another unit (count/pm, etc.).
MNT-13361	B	The “Stereoscopic reconstruction” operator does not work if the General preferences of the software are configured to use Imperial units.

Bug corrections (A and B type)

	Type	Bug Description
MNT-12896	A	The residue is not displayed and the RON parameters of the ISO 12181 standard are not calculated in the "Advanced contour analysis study" on Contour profile studiables when saving and then reloading the document.
MNT-12911	A	The software may crash when deleting a "CAD compare" study on Shell studiables if the study has been duplicated.
MNT-12915	A	The 3D views do not display and the software may crash if the path to the Mountains® document contains Asiatic characters.
MNT-12962	A	The software may crash when hovering the mouse over a Python addon (study or operator) or when recalling a Python addon operator if the Python version used is 1.13.
MNT-12975	A	Mountains cannot read a license validity if the SMP (Software Maintenance Plan) date is beyond January 19, 2038.
MNT-13054	A	Validating the "Level" operator dialog box on Profile studiables using the “Total least squares (TLSLI)” method and disabling the "Set the origin of the Z-axis as the mean of the included zones" option does not produce the same results as applying these same parameters on the Profile studiables after saving them. The results are also not identical when reopening the document.
MNT-13173	A	The axis of rotation of the cylinder in the preview results "Mesh + deviations" in the dialog box of the operator "Fit a geometric form" on Shell studiables is incorrect if the "Least squares cylinder" option is selected.
MNT-13229	A	STL files are always loaded as Shell studiables, irrespective of whether or not that is the correct data type or if the product can handle that type of studiable.
MNT-12155	B	The X, Y and W-planes can no longer be moved using the arrow keys in 3D view studies on Hyperspectral image studiables.
MNT-12834	B	The tolerances on deviation shown for the drawing of circles when using a "Circle (from closed profiles)" element in the "Advanced contour analysis" study on Contour profile studiables are erroneous.
MNT-12869	B	A band observed when the "Apply in real time" option is checked in the “Canny Detection” dialog box of the [Canny Edge Detection] button in the “Line Edge Roughness Analysis” study on Image studiables is no longer detected when validating the dialog box.
MNT-12882	B	The contour drawing is incorrect in the "Extract local contour" operator on Surface studiables when using the "Outlier cleaning" option on the "Parallel contour profiles" extraction shape.
MNT-12886	B	TIFF files can be loaded as Surface studiables instead of image studiables if there is Z axis information in the file, whether or not the Z axis is in a length unit.
MNT-12895	B	It is possible to create a "Force curve analysis" study by selecting two force volume studiables (instead of creating two "Force curve analysis" studies, one for each selected studiable).
MNT-12897	B	The icons of the Selection and Dimensional tools in the "Advanced contour analysis" study are incorrectly redisplayed when changing the Unit system between Metric units and Imperial units in the Global preferences of the software.
MNT-12901	B	The names of the elements in the Series for force curves or Force volume studiables are not saved in the documents if they have been modified in the "Rename the elements of the studiable" dialog box of the studiable from the workflow.
MNT-12903	B	The lowest point does not appear in the extracted surface studiable generated by the "Extract projected surface" operator on Point cloud studiables.

MNT-12904	B	A retract point of the previous segment is assigned to an empty segment in the "Force curve analysis" study on Force curve-type studiables when copying the "With corrected segments" studiable (or when opening a document containing a studiable of this type).
MNT-12906	B	The "Cantilever spring constant" on Force curve, Series of force curves and Force volume studiables is lost on .BCRF format files.
MNT-12916	B	The 3D view study on Surface, Image, Surface + image, Series of surface, Multi-channel image, Shell, Hyper spectral image and IV spectroscopy image studiables may be incorrectly reconstructed in the "Remove form" operator after a change in the workflow.
MNT-12918	B	The "Summary of the current operator" study can show partial results of a different zone if the "Extract areas" operator is called twice.
MNT-12940	B	It is not possible to enter values in the combo-box of the option "Use Z axis origin as the reference height" of the "Step width section in the "Settings" dialog box of the "Step height" study in Profile studiables.
MNT-12951	B	The Undo/Redo function does not work when defining a tolerance limit from the 'Tolerance limits' manager dialog box in the Result Manager contextual menu.
MNT-12951	B	The Undo/Redo function does not work when defining a tolerance limit from the 'Tolerance limits' manager dialog box in the Result Manager contextual menu.
MNT-12956	B	A crash may occur when loading a document containing add-ons if the document was created in a later version of Mountains and is loaded in a previous released version.
MNT-13000	B	The bottom vertical cursor of the mask preview's vertical palette is difficult to select in the "Apply mask of non-measured points" operator dialog box on Surface, Surface + image and Multi-channel image studies if it overlaps with the top cursor.
MNT-13002	B	The settings dialog box of the "Lead twist" analysis study does not open anymore when launching the Smartflow by a command file.
MNT-13022	B	It is not possible to load an RGB image containing more than 715 million pixels.
MNT-13123	B	The "Convert W-axis" operator on Spectrum curve and Hyperspectral image studiables does not function if the units of the Z-axis are in "count/pm" (metric units).
MNT-13185	B	The display of results in the "Hyperspectral image view" study on Hyperspectral image studiables is incorrect after insertion of the "Normalize spectrum curves" operator from the workflow with the choice of the SNV (Standard Normal Variate) normalization method.
MNT-13055	B	Copying a 3D view study and pasting it into a new illustration as a bitmap image displays multiple, overlapped copies of the 3D view study.

What's new

	Ergonomics and automatic updates in the "Stitch" operator
Ergonomics in the "Stitch" operator	The user interface for the selection modes in the "Stitch" operator has been standardized. A distinction was introduced between manual selection and automatic selection in order to facilitate understanding of the selection and filtering of the studiables.
Automatic updates to the previous studiables in the "Stitch" operator	The list of previous studiables of the selected studiables (root or leaf, meeting the criteria for potential filtering) in the "Stitch" operator present in a document is now automatically updated (during application in SmartFlow/Analysis examples, loading of studiable, insertion of an operator, renaming of studiables...)
	Other general features
Changing studies names	It is now possible to define a new name for studies, just as it is for studiables. This new custom name will be retained when using automation features (analysis examples, SmartFlows, substitution). The modified names are also displayed in the Result Manager, the "History of current studiable" study, in statistical studies and statistical documents. The name obtained via the COM interface IXOperatorNode::get_Name is also affected.
Partially transparent Addons	It is now possible in Addons studies to define the areas (rectangles) within which the study is drawn. This allows users, for example, to create Addons studies that automatically draw based on page changes (useful for large tables that don't fit on one page).
Loading profilometry data as Surface + image or multiple studiable	Where appropriate, profilometry data (notably DATx files from Zygo instruments) is now loaded either as a Surface+image studiable or as multiple root studiables.

Bug corrections (A and B type)

	Type	Bug Description
MNT-12677	A	The software may crash when loading a Spectrum curve studiable with coordinates (W, Z) from a text file if the Z axis information is in the 5th column.
MNT-12760	A	The software may crash when applying the "Mesh the point cloud" operator on a Point cloud studiable containing few points.
MNT-12317	B	The "Spherical caps" feature does not detect the lower caps of the spheres in the "Particle analysis" study on Surface, Image, and Multichannel image studiables when the "Threshold Detection" method is selected.
MNT-12639	B	The management of non-measured points is incorrect when applying the "Detect structure" operator on studiables containing a large number of non-measured points. It applies to Image, Surface and Multi-channel image studiables.
MNT-	B	It is impossible to load studiables in FITS file format if the file size exceeds 5 GB.

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MNT-12722	B	The "Generate whole content" button in the "Colocalization" study on Image studiables does not work in the MountainsSEM® Color product.
MNT-12732	B	Loading a studiable in ASCII format does not work correctly if the date of the file is January 1, 1970.
MNT-12735	B	The topography channel is not read in .NHF files.
MNT-12737	B	Applying the "Correct the shell" operator on Shell studiables does not correct duplicate vertices.
MNT-12764	B	It is not possible to save a document containing a Profile studiable in PDF format if the "Imposed range" option is selected for the vertical axis (Z) of the profile in the "Axis settings" dialog box.
MNT-12771	B	The width of the Custom bands in the "Level line by line" operator on Surface and Multi-channel image studiables changes with orientation, and cannot be modified if the band is positioned horizontally or vertically.
MNT-12773	B	The W-axis is exported in mm (instead of nm) when the "Export curve" button is pressed or the "Fill/Save the spectrum curve" menu option is used on a Spectrum curve studiable.
MNT-12774	B	The text content pasted into the clipboard of the "Parameters Table" study on "Profile" studiables is not up to date when the studiable used for calculations is displayed in the study.
MNT-12815	B	The "Studies" and "Operators" menu tabs do not appear when using the command "LOAD_STUDIABLE" in a command file.
MNT-12857	B	The copied current workflow selection is not retained when switching from one open document to another.
MNT-12674	B	The center of rotation of the "3D view of the multi-channel image" study is not correctly centered in the "IV Spectroscopy Analysis" document accessible via the "Analysis Examples" menu in the "Help" tab.

What's new

	Multi-technology features
	Enhanced positions in 3D studies
'Free rotation' mode in 3D views	In studies showing 3D views, it is now possible to rotate 3D views at any orientation, even on the side. The constrained mode keeping the camera upright, is still available for surfaces, and has been added on Shells and Point clouds
'Orthographic' projection mode in 3D views	In studies showing 3D views, perspective can now be removed to obtain an orthographic projection.
Circle 2 Flight path for animation in 3D views	In studies showing 3D views, a "Circle 2" (less inclined) Flight path animation is now available.
Dimension block in color in 3D views	In studies showing 3D views, it is now possible to choose the font color of the Dimension block.
	AI segmentation and improved navigation in the "Particle analysis" study
AI segmentation in the "Particle analysis" study	A new segmentation method using neural networks has been added to the "Particle analysis" study. The method is applicable to round and compact particles, but also to particles of various shapes. It is very effective for contiguous particles. The AI segmentation method dialog allows the user to: Pre-process the image using a smoothing filter, Guide the algorithm to an order of magnitude of the particles size (in case of limitations of the completely automatic method), and Fine tune the quantity of points to be included into the particles. This applies to Surface, Surface + image, Image and Multi-channel image studiables.
Visualization of small particles in "Particle analysis" study	The particle label is now displayed on the "Particle analysis" study image when selecting a row in the study's results table. Clicking on the label in the image displays the zoomed particle and, temporarily, the inspection box. This makes it easier to navigate and zoom in on small particles.
	Modernized Load and Save dialogs
Document and studiable visualizations in load and save dialogs	The dialogs for opening documents, loading studiables, and exporting images now enables the user to preview the document or studiable in bigger size.
Windows explorer Quick access and theme in Open and Save dialogs	The Open and Save dialogs have been updated to the latest Windows style, allowing the user's Windows explorer Quick access, and following the Windows theme. To maintain all functionalities, text, options, sub-menus and checkboxes have been added to the open and save dialogs. This applies to the following dialogs: Load/Save a studiable, Open/Save a document, Export results, Apply a template, Substitute the current document, Open/Save Background page, Export the document as one image per page, Export frame as image, Select a folder for the Smartflow manager, Statistical population, Select dynamic statistical population, Import/Export of statistical definition text files (STS), Select a folder for profilometers, Select a folder for settings, Select a folder for the particle classification manager, Import/Export DXFs into the "Advanced contour analysis" study, Export contour deviations.
Shortcuts to Example studiables, templates and tutorials in the opening dialogs	The Load a studiable dialog now contains shortcuts to Example studiables folder. The Open a document dialog now contains shortcuts to the example documents and tutorials folders.
Exported image resolution preview	By changing the resolution in the image export dialog, the user can preview the result in real time in the preview.

	Automatic color in frames
Automatic color in frames	In frames (studies or illustrations), some color settings can use an Automatic color setting, to avoid having to change several settings when changing the background color of the frame. The Automatic color is set by default. See details below.
Automatic colors for text and lines	In studies, text and axis lines can now take an automatic contrasting color to that of the background. This applies to: The text and numbers of: Title, Graduations, Color scale, Dimension block in 3D, Tolerance limits text, Buttons, Date and Page number illustrations, Warning texts, Frame number. The lines of: Axis, Grid, Color scale outline, Box plots outline, Fractal regression line, Abbott curve and Histogram bars and outlines, Point cloud points This does not apply to the “Advanced contour analysis” study.
Automatic color for fill-in	In studies, some color settings used to fill-in portions of the frame can now use an automatic color: In 3D view, the automatic axis plane color (scale markers) is a color gradient of the Frame fill color. For graph visualization (Profile, Series of profiles, Spectrum, etc.), the automatic Graph fill color is the Frame fill color. The automatic Legend color is the Frame fill color. For image visualization (surface, image, force-Volume, etc.), the automatic Image fill color is either black or white depending on the Frame fill color.
	Other
Priority position of frames	The Priority position frame property places the frames having this property in front of the frames without this property. The Priority position property is enabled by default for all Illustrations except the Color background Illustration.
Default selection mode after creating a new shape in operators	In the “Extract areas" operator dialog, at the end of creating a new area to extract, selection mode is automatically restored, to prevent the inadvertent creation of new elements. This applies to Surface, Surface + image, Series of surfaces, Multi-channel image, Force volume, Hyperspectral image and IV spectroscopy image studiables. The same behavior applies to the” Extract profiles” and “Extract series of profiles” operators. This applies to Image, Surface, Surface + image, Series of surfaces and Multi-channel image studiables.
Transparent text box	It is now possible to directly insert a transparent text box without outline
Visibility of Blocks and planes panel in the 3D view on Multi-channel cubes	The Blocks and planes panel is now displayed by default in the ”3D view of the cube” study on Multi-channel cube studiables.
Frame number in multi-selection	The frame number is now displayed when selecting several frames.
Enrichment of Help/Support package	The Support package has been enriched with information about installation and license. A dialog has been added, to possibly add dumps files (to fix software crashes), and unsaved Mountains documents.
	Profilometry features
	AI segmentation in the “Particle analysis” study
AI segmentation in the “Particle analysis” study on topography	The AI segmentation method (described above in the “Multi-technology” section), can be applied to topography surfaces. Compared to other methods, it is particularly useful for agglomerated particles on a visible background.
	“Extract local contour” operator improvements
Better automation in the “Extract local contour” operator	In the Derivative detection method in the “Extract local contour” operator, the user can now choose to define the threshold of the derivative with an absolute value of local slope rather than a percentage. This is useful for automation.
Exclusion of outliers in the “Extract local contour” operator	In the Derivative detection method in the “Extract local contour” operator, an Outlier cleaning slider allows the user to discard a certain percentage of contour points whose slope is below the mean slope of all contour points. This applies to Surface, Image and Surface + image studiables
Circular residue by subtraction in the “Remove form” operator on Profiles	In the “Remove form” operator on Profile studiables, for circular form, the user can now choose to calculate the residue by subtraction perpendicular to the Z axis (without unrolling the profile). This allows the initial length of the profile to be preserved.
Dilation of Non-measured points in the “Remove outliers” operator	In the “Remove outliers” operator, the user can now choose whether or not to delete points by dilating all original non-measured points of the source studiable.
S-filter information in the "Parameters table" study	Information has been added next to the S-filter checkbox in the dialog of the "Parameter table" study to explain the function according to the context.

	Shell and Point clouds
Improved optimization in the “Remesh the shell” operator on Shells	The Optimize function of the "Remesh the shell" operator on Shells has been improved. (The optimization reduces the number of triangles in flat areas while preserving the details where there are local curvature changes).
Better alignment in the “3D Stitch” operator	The pre-alignment on the “Stitch together in 3D space” operator on Point clouds or Surfaces is now faster and more precise.
Ergonomics in the “Remesh the shell” operator on Shells	The interface of the "Remesh the shell" operator dialog on Shell studiables has been simplified. The Reduce and increase settings have been merged in a Resample setting. The Optimize settings uses a slider rather than a drop-down menu.
Homogenization of operators on Shells	The dialogs of some operators on Shells now better follow dialog interface rules. For example, settings that affect the preview but not the generated studiables are placed in a preview button above the preview.
	SEM features
AI segmentation in the “Particle analysis” study on SEM images	The AI segmentation method (described above in the “Multi-technology” section), can be applied to SEM images. This AI segmentation method overcomes the limitations of classical Threshold or Watershed detection (ie challenging contrast, or particle overlap).
SEM-BSE dialog in “Particle analysis” study	The SEM-BSE segmentation dialog in the “Particle analysis” study on image (or image channel of MCI) has been homogenized with Multi-channel cubes.
	Spectroscopy features
XY cursor in the “Grid view” study on Multi-channel images	A common cross-hair XY cursor for all channels is available in the “Grid view” study on Multi-channel image studiables. The cursor can be positioned at an XY position and synchronized with those of other studies.
Quality factor parameter in the “Peak fitting” study on spectrum	The Quality factor parameter can now be calculated in the “Peak Fitting” study on Spectrum curves and Hyperspectral images. The Quality factor parameter is useful in the field of nanoIR to analyze resonance. (Q = f/▲f, where f is the frequency at resonance (peak position) and ▲f is its bandwidth (FWHM)).
SHO model in the “Peak fitting” study on spectrum	The SHO modeling function can now be used to fit curve in the “Peak fitting” study on Spectrum curves and Hyperspectral images. The SHO (Simple harmonic oscillator) function is useful in the field of nanoIR to analyze resonance.
AI segmentation in the “Particle analysis” study on spectral maps	The AI segmentation method (described above in the “Multi-technology” section), can be applied to spectral maps.
	Licenses
Interface of the License information dialogue	The License information dialog has been modernized for better understanding. Additional information is now visible: Current version of Mountains, and (if connected to Internet) the Highest eligible version.
Question in Contact dialog	The Contact dialog available from the License information dialog has been modernized and now allows you to ask a question.
Online SMP renewal	The Software Maintenance Plan renewal dialog now contains a link to purchase the renewal on our online webstore.
Question in SMP renewal	The Contact dialog available from the Software Maintenance Plan renewal dialog has been modernized and now allows you to ask a question.
	Updates and translations for Interface & Reference Guide
User interface	New texts related to new features have been added to the user interface (in English). They have been translated into the following languages: French, German, Italian, Spanish, Japanese, Chinese, Polish, Korean, Brazilian Portuguese. Note: A complete retranslation into Japanese is in progress. This means that the style and vocabulary might not be homogeneous for the moment.
Reference Guide	The Reference Guide has been updated with the descriptions of most new main features and improvements (in English). It has been translated into French and German. The Japanese translation will follow in a Service Pack. Note: A complete retranslation into Japanese is in progress. This means that the style and vocabulary might not be homogeneous for the moment (between Interface and Reference Guide, and inside the Reference Guide itself).

Bug corrections (A and B type)

	Type	Bug Description
MNT-12132	A	The software may crash when opening the "Calibrate constants" operator dialog box on a Force volume studiable that does not contain a distance signal.
MNT-12196	A	A crash may occur when recalling the Extract profiles operator from the Summary of the current operator study if the operator dialog contains more than one profile and one of the extractions is deleted.
MNT-12252	A	The cursor on the W-axis in the "Peak fitting" study on Spectrum curve and Hyperspectral image studiables does not follow the movement of the curve and axes.
MNT-12261	A	The result of the Detect structures operator using a reference structure may have incorrect axis sizes if the spacing of the points in the reference structure and the full source studiable is different. Affects Surface and Image studiables.
MNT-12272	A	The results calculated in the "Parameters table" study on Series of profiles or Series of surfaces studiables can be wrongly adapted to the length unit if choosing the Gaussian option for the 'S-filter (λs)' in the operator dialog box.
MNT-12298	A	The calculation of the bandpass filtering on Surface studiables is incorrect when applying the "Metrological filter" operator.
MNT-12355	A	The software may crash when applying the "Fill in holes" operator on Shell studiables if substituting the studiable in a particular case.
MNT-12357	A	The software may crash when applying the "Fill in holes" operator as a Quick pre-processing operator on Shell studiables.
MNT-12408	A	The software may crash when renaming a class in the Classification dialog box of the "Particle analysis" study on Surface, Surface + image, Image and Multi-channel image studiables if the same name is assigned to two classes.
MNT-12420	A	The color of the pixels is incorrect in the "Image colorization" study on greyscale Image studiables.
MNT-12555	A	The software may crash when loading a document containing the "Correct the shell" operator on Shell studiables in a particular case.
MNT-12560	A	The original normals of the shells are not kept in the "Fill in Holes" operator on Shell studiables.
MNT-3548	B	The size of the points comprising a Point Cloud studiable is too small to be easily seen when printing.
MNT-11348	B	The size of the extraction box in the "Extract area" operator on Point cloud studiables cannot return to a manipulable size when one of the faces of the extraction box is modified.
MNT-11436	B	The [Enhancement] and [Studiable color] buttons are grayed out in the ribbon of the "Wear or deposit analysis" and "Thickness analysis" studies (2D and 3D views) on Surface studiables. The [Show color scale for Z axis] (Palette group) button is grayed out in the "Thickness analysis" study (3D view) on Surface studiables.
MNT-11442	B	The pre-defined 3D display of views on Surface studiables does not display correctly when reloading a document.
MNT-11483	B	The position of the image-graph separation line in the "View of the hyperspectral image" and "Summary of the current operator" studies on Hyperspectral image studiables is not preserved during a copy/paste operation.
MNT-11654	B	The "Automatic full screen" mode in the "CAD compare study" on Shell studiables does not always work correctly.
MNT-11662	B	The definition for the Maximum caliber parameter in the "Particle Analysis" study in the Reference Guide is incorrect and corresponds to the Maximum Feret diameter instead.
MNT-11764	B	It is no longer possible to modify a custom path shape during its construction when applying the "Extract profiles" or "Extract areas" operators on Surface, Image, Surface +image, Multi-channel image, Hyperspectral image and IV spectroscopy image studiables.
MNT-11774	B	The color of a shell studiable in 3MF format is not respected when loading into the software.
MNT-11841	B	The Use studiable properties option is available when it shouldn't be in the Grid wizard section of the "Stitch" operator dialog box on Surface, Image, Surface + image and Multi- channel image studiables.

MNT-11853	B	The Extraction shape cannot be correctly manipulated in the "Extract projected surface" operator on Shell studiables.
MNT-11942	B	The software is slow when a lot of addon parameters are displayed in "Parameters table" studies.
MNT-11993	B	The roughness profile is identical to the waviness and the source profiles (rather than being flat) if the cut-off is set to zero in the S-filter (λs) section of the Select parameters dialog box of the "Parameters table" study on Profile studiables.
MNT-12015	B	The transparency of the "3D view of the Surface + image" study uses the grayscale palette in the Color menu rather than the default palette on Surface + image studiables.
MNT-12119	B	The "Incompatible document" band is shown at the top of the document if the loaded document contains an obsolete but convertible Parameters table study.
MNT-12133	B	It is not possible to launch an Indentation analysis on Force curve, Series of force curves and Force volume studiables if the Spring constant is missing.
MNT-12150	B	The Wait cursor usually displayed during long calculations of the software is missing when the status bar is hidden.
MNT-12157	B	The coordinates of the Y-plane in the "3D view of the Hyperspectral image" study on Hyperspectral image studiables are incorrect. The Y-axis is inverted.
MNT-12159	B	The terms Raman shift and Raman signal are always used in the table of the "Spectrum curve view", "Stacked view", "Strips view" and "Peak fitting" studies on Spectrum curve and Hyperspectral image studiables as well as in the Select parameters dialog box, whether or not the data is Raman, rather than adapting to the name of the W axis as in the "Hyperspectral image view" study.
MNT-12166	B	The deactivation of the option Light interaction - Shadow effect in the "3D view of the surface" study on Surface studiables is not preserved during the copy/paste operation.
MNT-12181	B	The Indentation points I0/Ip0 could sometimes be found outside of the working window during indentation analysis on Force curve and Force volume studiables thereby affecting the numerical results calculated on these points.
MNT-12182	B	SmartFlows of more than one page are not added to the first available page of the document when applied.
MNT-12188	B	The dimensions of an addon study are lost when copying/pasting the study.
MNT-12195	B	It is no longer possible to specify the division size in the Axis settings of the "Summary of the current operator" study on Profile studiables.
MNT-12215	B	Selecting a cell in the table of the "Particle analysis" study can change the order of the particles in the selected column on Surface and Image studiables.
MNT-12230	B	The "Remote spikes" operator's instruction on Spectrum curve studiables is too restrictive (the limitation on the maximum size of Spikes and Holese has been removed; the limit is the x-size of the area to be studied).
MNT-12247	B	The shortcut keys for scrolling through the "View of a hyperspectral image" study on Hyperspectral image studiables are inconsistent with shortcut keys in other areas of the software.
MNT-12248	B	The specified offset on the Y-axis is inversed in 3D views on Shell studiables when applying the "Convert to shell" operator.
MNT-12257	B	The modification of the deviation spacing in the "Advanced contour analysis" study on Profile studiables does not work.
MNT-12258	B	The modification of the deviation margins is no longer applied on both sides of the profile in the "Advanced contour analysis" study on Profile studiables.
MNT-12264	B	The application of the Average the profile option in the "Extract profiles" operator dialog box is different for oblique profiles to that of horizontal or vertical profiles on Surface, Image, Surface + image, Multi-channel image, Hyperspectral image and IV spectroscopy image studiables.
MNT-12269	B	The Rzx parameter of ISO 21920-2 on Profile studiables is not calculated correctly.
MNT-12313	B	It is not possible to modify the reference frame for alignment of several frames.
MNT-12319	B	The manual cut-offs are not correctly taken into account when applying the "Metrological filter" operator.
MNT-12337	B	Some "Move" actions in documents created in V7 (or previous) are not applied in the Advanced contour analysis study on Profile studiables when the document is loaded in the current version.
MNT-12369	B	Several visualizations or functions are not available in the Source view of the "Extract surface" operator on Shell studiables.

MNT-12419		The display of vertical Profile studiables is not correctly centered in the "Load a studiable" dialog.
MNT-12462	B	The frames become misaligned with the calculation area and distort as the zoom moves in the "Valley depth measurement" study on Surface and Multi-channel image studiables.
MNT-12462		The error message is missing from the Advanced contour study on profile studiables if a DXF is loaded that contains only elements which are not supported by the software.
MNT-12569		It is not possible to create a result using the Results calculator if the results to be used are based solely on constants or on the Rnd function if it returns a value of less than 1, but greater than or equal to zero.

What's new

	Transparent forms in 3D views of operators
Transparency in 3D preview of operator dialogs	In the dialog box of several operators on Surfaces, it is now possible to display some previews in 3D. The source studiable is then displayed together with transparent layers, to bring an informative visualization about the operator settings (for example, threshold planes in the "Threshold" operator). This applies to the operators: "Threshold", "Level", "Remove form", "Metrological filter", on Surface, Surface + Image, Series of surfaces and Multi-channel image studiables. More information for each of them below.
Transparent thresholding plane in the "Threshold" operator	The "Threshold" operator dialog preview can display the source studiable in 3D with its transparent thresholding planes.
Transparent leveling plane in the "Level" operator	The "Level" operator dialog preview can display the source studiable in 3D with its transparent levelling plane. For minimum zone method, the two parallel enclosing planes are displayed.
Transparent fitted form in the "Remove form" operator	The "Remove form" operator dialog preview can display the source studiable in 3D with its transparent fitted form. The "Remove form" operator dialog has also been reorganized.
Transparent waviness in the "Metrological filter" operator	The "Metrological Filter" operator dialog preview can display the source studiable in 3D with its transparent waviness form.
Settings for 3D in dialog preview	Buttons above the preview allow to switch between 3D or Pseudo-color visualization. In 3D visualization, the result studiable preview is also in 3D, and a change in choice of 2D/3D above one preview window is dynamically applied to the other. The last-used preview visualization is remembered for the following opening of the dialog.
	Transparent forms in Summary of the current operator
Transparent 3D forms in the "Summary of the current operator" study	In the "Summary of the current operator" study, for some operators, the 3D view now displays the same transparent forms as the ones in the operator's previews. This applies to the same 4 operators listed above: "Threshold", "Level", "Remove form" and "Metrological filter" on Surface, Surface + Image, Series of surfaces and Multi-channel image studiables.
3D view by default in the "Summary of the current operator" study	For the 4 operators listed above, 3D visualization is now the default visualization mode in the "Summary of the current operator" study.
3D setting buttons in the "Summary of the current operator" study	3D rendering and accessories buttons have been added to the ribbon of the "Summary of the current operator" study in 3D mode (if available). On Surface + image and Multi-channel image studiables, channel buttons are also available to select texture.
	Feret parameters and unit choices in the "Particle analysis" study
Feret parameters in the "Particle analysis" study	The Min Feret diameter and the Perpendicular Feret diameter (xLF) have been added in the "Particle analysis" study parameters. The Max caliber parameter has been renamed Max Feret diameter.
Unit of particle density and area in the "Particle Analysis" study	The user can now fix particle density units (by nm2, µm2, mm2, cm2) in the "Particle Analysis" study. The "Density (in Pixels)" (in Particle/pixel^2 unit) and "Area (in Pixels)" (in pixel2 unit) are now available.
Palette color mapped to Z scale height in the "Threshold" operator	In the "Threshold" operator dialog, the color palette on the right is positioned so that the color corresponds to the height of the Z scale. It applies to the Surface, Image, Surface + image and Multichannel image studiables

	Cursor on W axis of spectrum
Cursor on the W axis of spectrum	The user can move a cursor (vertical dotted line) along the W axis of Spectrum curves. This allows the user to display the values of the W position and spectrum intensity in the information parameters. It is available for all studies on Hyperspectral image and Spectrum curve studiables (it was previously only available on some studies for Hyperspectral images). This cursor can be synchronized among several studies (all the synchronized cursors move together)
	Scrolling across spectral data
Slices image scrolling	In the Cinema mode of the "View of a Hyperspectral image" study, the scrolling speed of the images of the slices has been optimized.
Visualization of current spectrum	In Optimize for current curve mode, the Z-range is adapted when scrolling among the spectra. It is now available for all studies showing Spectrum curves (it was previously only available on the "View of a Hyperspectral image" study).
Keyboard shortcuts	In all studies showing Spectrum curves, you can now scroll across the spectra using the same keyboard shortcuts. Modified shortcuts allow the user to skip non-measured spectra.
	Other improvements in Spectral studies
Curve position in the "Strips view" study	The vertical axis of the "Strips view" study now allows you to display either the spectrum curve number, or the curve position (included in the T axis). It applies to Hyperspectral image, Spectrum curve, IV spectroscopy image and IV curve studiables.
Normalize view in all studies	A [Normalize] button is now available on all studies displaying Spectrum curves. The "Normalize" study is now obsolete and is no longer available from the ribbon. When opening documents created with a previous version, the study is replaced by a "Spectrum curve view" study with normalization activated.
Interface adjustment in Spectrum curve view and Peak fitting	The interface to choose curves to display (envelope, mean etc.) has been simplified and homogenized with the "View of a hyperspectral image" study. Another little ribbon simplification has been made. It applies to "Spectrum curve view" and "Peak Fitting" studies on Spectrum curve and Hyperspectral image studiables.
	Other
Composite rendering and slider behavior	In the studies, when Composite rendering is activated, the user can no longer select a channel which is not included in the composition. The Comparison slider has a similar behavior, for better understanding.
Crop points outside range in 3D	In 3D view study, the Crop points outside imposed scale range option is now placed in the [3D shape] sub-menu.
Updates for Installation guide	The technical specifications of the Installation guide have been updated.

Bug corrections (A and B type)

	Type	Bug Description
MNT-11862	A	The software may crash when loading a TXT file if the Show a dialog box when loading a text file option is not checked in the Loading data/Text file format section of Global Preferences.
MNT-11975	A	The software may crash when clicking on one of the Extraction shapes f(Radial or Double parallel extraction shapes), selecting the Average the profile option and then entering the Half Width value in the "Extract local contour" operator on Surface studiables.
MNT-11980	A	The calculation of the Average the profile option in the "Extract profiles" operator is not correct in the "Step height calculations" study on Surface, Surface + image, Multi-channel image studiables.
MNT-12023	A	The software may crash when a document containing a 3D view study using an uninstalled font is opened.
MNT-12026	A	Some fonts do not work in 3D view studies and could cause the application to crash.

MNT-12033	A	The software may crash in the "3D reconstruction using four quadrant images" operator on Image studiables when the reconstruction method 'Optimize for objects on a flat background' is selected and the threshold slider is moved.
MNT-12043	A	The Peak position values (P1, P2…) in the result's table of the "Peak fitting" study on Spectrum curve and Hyperspectral image studiables do not respect the order of the peak positions on the study graph.
MNT-12146	B	The software may crash when opening the "Enhance" operator dialog box on Image studiables
MNT-11831	B	Studies on the page of the document may be incorrectly placed with regards to elements on the page background.
MNT-11845	B	Some parameters of the "Peak fitting" study (Initial time (t0), Time constant 1 (tau1) and Time constant 3 (tau2)) are not expressed in the correct unit in the study's results table.
MNT-11846	B	The Area normalization method in the "Normalize" operator on Spectrum curve and Hyperspectral image studiables can show negative/inverted spectrum curves. This also applies to the Normalize option in the "Spectrum curve view" and "View of a hyperspectral image" studies.
MNT-11859	B	The names of the F-operators applied to addon parameters on Profile studiables are incorrect.
MNT-11861	B	Parameters are deselected in the 'Tolerance limits' manager dialog box every time the tolerance is modified.
MNT-11864	B	The software may crash when creating a "3D view of the surface" study on Surface studiables if default settings have been saved in version 11.0.11118.
MNT-11865	B	The addon update dialog, when requested from outside Mountains®, is not closed when the Yes button is used.
MNT-11886	B	The Surface + image studiable resulting from the application of the "3D reconstruction using four quadrant images" operator on Image studiables does not have two distinct top and bottom parts if the reconstruction method 'Optimize for two-level crenels separated by a step of' of the 'Default algorithm (recommended)' choice is selected.
MNT-11893	B	A hypertext link is not correctly created and does not work when exporting the numerical results of a document to a text file in CSV format if the text file name contains spaces.
MNT-11907	B	Results in an "Advanced contour analysis" study on a Profile studiable may not be calculated in some rare cases if the original document was created in a very old version of the software in Japanese language and there are a large number of dependencies in the study.
MNT-11909	B	The "Advanced contour analysis" study on Contour profile studiables can be very slow to load and open for studies with thousands of elements with many dependencies.
MNT-11919	B	It is not possible to navigate in the series in the Source preview of the "Extract areas" operator dialog box on Series of surfaces and Series of images studiables.
MNT-11926	B	The Hide checkbox disappears in the Add RGB in the background image dialog box of the "Colocalization" study on Surface and Image studiables when resizing the dialog box
MNT-11937	B	An isolated point in a "Profile" studiable is not present in the result when applying the "Level" operator if the Minimum zone line (MZLI) option is selected in a particular case.
MNT-11953	B	Image studiables having 16/24/32 bits per channel are not always loaded with their full resolution.
MNT-11961	B	Synchronization between the source view and the result view in operators on Shell studiables is lost "(Extract area", "Extract projected surface", "Extract contour profile", "Fill in holes", "Metrological filter" and "Fit a geometric form" operators).
MNT-11976	B	Multiple instances of Mountains® (rather than multiple tabs) may be launched when loading several documents from the file explorer in some configurations.
MNT-11981	B	The saving of the settings of the Min/Max value of the Imposed scale option is not preserved in the Scale range section of the Settings for Z-axis on Surface studiables.
MNT-12057	B	The "Table of results" study is not always updated after the modification of the numerical results generated by an operator using MATLAB™.
MNT-12062	B	The parameters of the "Peak fitting" study are not displayed in the study's result table or in the Result manager.
MNT-12077	B	Mouse selection of the bars that define the fitting zones is difficult in the "Peak fitting" study on Hyperspectral image and Spectrum curve studiables.
MNT-12082	B	Selecting the Spectral Curve (W) attribute in the synchronization manager on spectral studies for W axis synchronization is lost after saving and reopening the document.
MNT-12088	B	The magnetic grid is only displayed on the first page of the document if documents' margins are displayed.

MNT-12116	B	Loading a document containing an unknown study or addon operator generates an error message (instead of loading the document and displaying warnings for studies and operators that could not be loaded).
MNT-12149	B	The “Table of results” study does not display results generated using the Result calculator if the document has been saved in version 10.0.

What's new

	Homogenization of Spectral studies
Normalized display in Spectral studies	A normalized display is now available on most studies on Hyperspectral image and Spectrum curve studiables. The [Normalize] button has been added to the "Spectrum curve view", "Strips view" and "Stacked view" studies.
Cursor on spectrum axis in "Spectrum curve view" study	A movable cursor is now displayed in the "Spectrum curve view" study. It is possible to display the corresponding abscissa (W) and ordinates (Z) of the current spectrum in the study's results table (by selecting them from the Information tab of the Select parameters dialog).
Simplified Spectrum curve parameter	The Spectrum curve parameter now only displays the current curve element number. (Coordinates in pixel have been removed). This concerns all studies on Hyperspectral image studiables (except 3D).
Statistical parameters removed in Spectral studies	The statistical parameters have been removed from the "Spectrum curve view" study and the "Peak fitting" study. A message informs the user when loading documents created in previous versions of the software. It is still possible to create statistical studies from series of results, coming from the "Spectrum curve view" study or "Peak fitting" study.
Skip empty curves in Spectral studies	When navigating through spectra, the user can now skip the pixels with empty curves (non-measured points) using Ctrl+Page up/Page down shortcut. This concerns all studies on Hyperspectral image and Spectrum curve studiables.
Shortcut to navigate between slices of Hyperspectral images	In the "View of a hyperspectral image" study, the user can now navigate between slices (W spectral axis) using the Shift+ Page up/Page down shortcut.
Homogenization of spectrum curve style interface	The ribbon buttons for curve visualization and style, have been homogenized with Hyperspectral image study interface. This applies to "Spectrum curve view" and "Peak Fitting" studies on Hyperspectral image and Spectrum curve studiables.
[Analysis] group on spectral studies ribbon	The [Peak fitting] button in the Studies tab on Spectral studiables has been moved to a new [Analysis] group.
	Removal of non-applicable preferences
Removal of non-applicable preferences	The Global Preferences of the software are now displayed only if applicable on user product. This concerns the following preferences: . The 3D preferences and the Spectral Axis Orientation in the Axis settings section. . The Create Multi-channel image function in the Other actions section. . The Types of studies in the Default studies, Exporting studiables and Default Smartflow sections. . Show Cloud point studiables in the in the Default Smartflow, Default studies, Exporting studiables sections.
	Other general features
Reduced calculation time in the "Stitch together in 3D space" operator	The calculation time has been improved in the "Stitch together in 3D space" operator on Point cloud and Surface studiables.
Increased cinema speed on Hyperspectral images	The speed showing slices along the spectral axis (W-axis) using an animation has been improved on Hyperspectral image studiables. The rendering has been also optimized when scrolling through the slices. This also applies to IV spectroscopy image studiables.
Information on obsolete 3D view on Multi-channel cubes	A message now suggests using the new "3D view of the cube" study on Multi-channel cube studiables, where applicable, when reloading documents created in previous versions.

Link to direct print	The user can create a button or a hyperlink in the document, that directly prints the document without any dialog. It replicates the last-used printer settings.
Studiables list in operator dialogs	The list of selectable studiables in the following operator (or study) dialogs, now display an improved and homogeneous interface: “Create series of surfaces”, “Create series of profiles”, “Create multi-channel image”, “Create series of force curves”, “Create series of images”, “Add/remove surfaces”, “Add/remove profiles”, “Add/remove channels”, “Add/remove overlay”, “Add/remove force curves“, Add/remove images”, “Add/remove spectrum curves”, and “Patch”.
PDF export on command	It is now possible to export the current document as a PDF using a simple command line (name and path is no longer required).

Bug corrections (A and B type)

	Type	Bug Description
MNT-10985	A	The software may crash when calculating parameters on deviations on Shell studiables if they contain infinite values.
MNT-11463	A	Curves inserted in the result of the “Add/remove spectrum curves” operator on Spectrum curve studiables may be lost when recalling or recalculating the operator if the added curves are no longer available (deactivation of the operator that applies to the added curves).
MNT-11584	A	The 3D view of the “Summary of the current operator” study is not updated properly in some cases during studiable substitution.
MNT-11663	A	The calculation may take a long time or the software may crash when applying certain combinations of operations from the Alignment and Post-processing sections in the “Stitch together in 3D space” operator on Shell studiables.
MNT-11709	A	The software may crash when loading old documents containing a “Summary of the current operator” study on Shell or Point cloud studiables.
MNT-11733	A	The software may crash when exporting the “Summary of the current operator” study on Multi-channel image studiables as an image.
MNT-11754	A	The unit is incorrect by default when first launching the software and when restoring factory settings in the “Extract areas” operator. Affects all studiable types.
MNT-10302	A	Rendering colors are not preserved in the “CAD compare” study on Shell studiables when reloading a document in a particular case.
MNT-11778	A	The software may crash when loading a document containing studies with synchronized cursors in a particular case.
MNT-10286	B	The “Extract contour profile” operator on Shell studiables never generates a closed contour profile, and the ‘Create circle (from closed profile)’ tool in the “Advanced contour analysis” study on Profile and Contour profile studiables therefore cannot be applied.
MNT-11431	B	The color scale is not shown in the 3D view of a “Thickness analysis” study when loading documents where this was visible if they were created in previous versions of the software.
MNT-11494	B	It is not possible to optimize the palette of the reconstructed tip in the 3D view Tip surface of the “Tip deconvolution” operator.
MNT-11524	B	The spacing between the contour lines is incorrect in the “3D view of the surface” study if the Imposed scale option in the Scale range section of the Z-axis settings is selected.
MNT-11537	B	The display of the curvature in the Color options in the “3D view of the shell” study on Shell studiables is not reapplied when reloading documents created in previous versions of the software.
MNT-11550	B	The normalization mode in the X/Y-axis settings in the “3D view of the multi-channel image” study on Multi-channel image studiables is not recovered when reloading old documents.
MNT-11555	B	The filling is incorrect in the “Morphological envelopes” study on Profile studiables.
MNT-11560	B	Only the maximum amplification is visible in the 3D view of the “Thickness Analysis” study. The studiables are displayed without their actual position in the “Wear or Deposit” study.
MNT-11572	B	The topography and intensity layers share the same palette in the “3D view of the surface + image” study on Surface + image studiables.

MNT-11573	B	The 3D view result disappears in the “Map local properties” operator when displaying the intensity layer of a Surface + image studiable.
MNT-11574	B	It is not possible to change the Source view channel in the “Map local properties” operator on Surface + image studiables.
MNT-11576	B	The order of studiables in the Available studiables list in the “Stitch together in 3D space” operator on Surface studiables is incorrect when recalling the operator.
MNT-11579	B	Undo/redo of the application of the options of the [3D shape] button in the 3D view studies does not work.
MNT-11601	B	Updating from some builds in version 10 to version 11 via the Download new major version button in the Search for updates function in the Help tab can result in downloading an incomplete or unusable file.
MNT-11602	B	Graduation displays are sometimes incorrect in the 3D view of studies.
MNT-11613	B	The number of points shown in the visualization of the Resolution under the [3D shape] button is incorrect in the “3D view of the surface” study on Surface studiables.
MNT-11614	B	The Optimize setting in the Resolution option in the [3D shape] button of a 3D view study is not applied by default when creating a studiable of higher resolution than the current 3D preferences. Affects Surface, Image, Series of surfaces, Surface + image, Multi-channel image, Multi-channel cube, Shell, Hyperspectral image, IV spectroscopy image studiables.
MNT-11615	B	The Optimize feature from the [Resolution] button in the “3D view of the surface” study is not taken into account when reloading documents created in previous versions of the software.
MNT-11639	B	The 3D view of the “Wear or Deposit” study on Surface studiables is displayed outside the frame if the option A single thickness layer is selected in the Selection of analyzed layers dialog box.
MNT-11646	B	Modifications to the Object colors and 3D print options are not taken into account in the preview of the Export options for the 3MF file format on Surface + image studiables.
MNT-11650	B	The validity of tolerances is not always correctly updated in the “Table of results” study when a result used in the Define tolerance limits dialog box is modified.
MNT-11652	B	It is not possible to colorize the mesh using curvature in the “3D view of the shell” study on Shell studiables after applying the “Correct the shell' operator.
MNT-11659	B	The extraction area in the “Extract areas” operator on Shell or Point cloud studiables is shifted when recalling the operator.
MNT-11665	B	Editing a constant in the Result calculator renames the constant rather than updating it.
MNT-11700	B	The width of the averaging area is not preserved when loading a document containing the “Extract profiles” operator on Surface studiables if the document was created in version 9.
MNT-11712	B	The display of the curvature in the Color options in the 3D view study on Shell studiables is incorrect after copying and then pasting the frame.
MNT-11713	B	The rendering in the “3D view of the shell” study on Shell studiables is not saved when using the Save settings option of the [Save/apply settings] button.
MNT-11732	B	The Z-axis settings of the 3D view of the “Wear or deposit” study are not taken into account and the Color scale is not modified when the Imposed scale option of the Scale range section is selected in the Settings for the Z-axis under the [Axis settings] button.
MNT-11755	B	The deviations displayed in the Mesh + deviation view of the “Fit a geometric form” operator on Shell studiables do not always correspond to the current shape selected.
MNT-11775	B	Applying the Deviations setting as a 3D rendering on Shell studiables is lost when saving and reloading the document.
MNT-11803	B	The “Correct the baseline” operator does not properly correct all spectrum curve studiables when selecting the Set average selection to 0 option in the Settings section in a particular case.

What's new

	## General features for all products
	### Copy/paste part of the workflow
Application of a part of the workflow on another studiable	The user can apply a part of the document workflow (operators and studies) on another studiable, using Copy/Paste. The studiable can be in the same document or in another document. This can be considered as a temporary SmartFlow (with only one root studiable).
Extraction of a part of the workflow in another document.	Users can now copy a part of the document workflow, and paste it in another document (or in the same document). For example, this allows you to extract studiables, their treatment (operators) and analysis (studies), without upstream pre-processing, or coming from an overloaded document.

Modification of the studiable on which a branch of the workflow is applied	It is now possible to modify the studiable on which a branch of the workflow is applied. Using drag and drop in the workflow, a branch can be moved to another studiable of the same document, without modifying the position of the studies in the document. This allows the user to rapidly visualize the application of the current analysis on another studiable.
	Export PDF in batches – Merge documents
Batch export of several documents to PDF, RTF, print	It is now possible to export several Mountains® documents at once in PDF or RTF format. The user can choose the file names and the export folder location. PDF format allows sharing with any user, whereas RFT format allows insertion in a document editor software. Selected documents can also be batch printed.
Merge of Mountains® documents	It is also possible to merge several Mountains® document into a single PDF or RTF document. The user can choose the order of the documents to be merged.
Access to the Batch export dialog	The Batch export dialog is available from the Document tab, from the File tab, and from the contextual menu of the Mountains® File explorer panel.
	Navigation box
Navigation box in studies	A navigation box is now temporary displayed when zooming in image views on studies. It shows the position of the zoomed zone in real time on the full zone. The zoom zone position can be modified on the fly using the mouse. This Navigation box is also displayed when zooming in operator previews. The navigation box is available for Surface, Surface + images, Multi-channel image, Series of surfaces, Series of images, Force volume, Hyperspectral image, IV spectroscopy studiables.
	Easy positioning of frames in document
Visual indicators for alignment	When moving frames in the document, temporary visual indicators are now visible, and magnetism can be used to facilitate alignment with other frames.
Frame alignments	The position of two (or more) frames can be horizontally or vertically aligned on their borders or their centers. It is also possible to align several frames on the center (or borders) of the page.
Vertical or horizontal frame distribution	The position of three (or more) frames can be distributed to get the same horizontal or vertical distance between neighboring frames.
Properties dialog in multi-selection	The frame Properties dialog is now available when selecting several frames. In particular, it allows you to change the size of several frames at once.
Moving frames with directional keys	The keyboard directional arrows now move the frame position. Shift+arrow moves the position of the zoomed portion in the study, and Ctrl+arrow moves the cursor if any.
	New "Document" and "Illustrations" tabs
Document tab	The Edit tab has been renamed "Document" and reorganized. The Document tab displays editing functions related to the format and layout of the current document. It also contains export functions.
New "Illustrations" tab	The illustrations frames, previously included in the Edit tab, are more directly accessible in a new "Illustration" tab. Shapes and Arrows illustration settings are directly available from ribbon's buttons. The Illustrations tab contains frames useful for commenting on your analysis, or to give instructions (text, circle, image, etc.), to ensure traceability (date, username, document path, etc.), to enable navigation (hyperlinks between documents or to a website, etc.) or to facilitate the use of the document (action button for operator recall, document saving, etc.).
View tab	The View tab has been reorganized. It displays functions to personalize the workspace, define frame positioning and change the Zoom.
Page viewer panel display	The Page viewer panel now appears when first opening Mountains or when restoring factory settings. When updating or reinstalling Mountains, the Page viewer panel follows the previous user choice as set in the View tab.
	Product level choice
Compatibility between document and product level	The software now evaluates compatibility between the current document and the products in the range. The user thus benefits from assistance to choose the necessary product level when purchasing or upgrading (see below).
Incompatible document	When the current document is not fully compatible with the current product level, the user can open the Compatibility dialog from an information strip at the top of the document locally. This dialog displays the list of product levels (product name and necessary modules) authorizing all the functions contained in the current document. The user can copy the name of the product levels into the clipboard.

Incompatible study or operator	When the document contains a feature not available in the current product level (study, operator), the user can open the Compatibility dialog from the contextual menu of the corresponding line in the Workflow panel. In this case, the Compatibility dialog displays the list of product level compatible with this particular feature.
Switch to compatible product	Using a Free trial, OEM demo or Loan license, the dialogs allow the user to switch to a compatible product.
Compatibility dialog access	Even if the current document is fully compatible, the Compatibility dialog can be displayed, from the Help tab, License dialog.
	Home screens
Shortcut and Splash screen	The Shortcut icon and the Splash screen have been redesigned.
Home and Learning tabs in the Home dialog	The Home dialog page has been refined and now has two sections for greater readability. The Learning section allows the user to discover Mountains® using various resources. The Home section invites the user to start working (new document or studiable, recent document or studiable), and to discover new version features.
Blue gradient color theme	Mountains® 11 introduces a customized modern “Blue gradient” screen theme, set by default. The “Blue gradient” color is a gradient from dark blue to lighter blue, with touches of “jungle green”.
	Other general features
Operator recall button creation	You can rapidly insert a button to recall an operator from the operator line in the Workflow panel.
Vertical text in Screen notes and bubbles	The text can be positioned vertically in the Screen notes and Bubbles illustrations.
Color of tables with results in studies	All tables listing parameters or results in studies now use the same light green as in the “Parameters Table” study, for greater consistency. This applies to all studies generating results, and to the “Table of results” study.
Shortcuts to Tolerance limits from the “Table of results” study	You can open the Tolerance limits dialog by double-click on the Pass/Fail or Tolerance column of the “Table of results” study. If a line or a cell was previously selected, the corresponding parameter will be selected in the Tolerance limits dialog. The corresponding parameters are also directly selected in the ‘Tolerance limits’ manager dialog, when you select one or several lines in the “Table of results” study, and you click on the [‘Tolerance limits’ manager] button.
Saving multiple studiables	The saving of several studiables at the same time is now possible from the contextual menu on a multi-selection of studiables in the workflow.
Link to license details from About dialog	A Show license dialog box link is displayed in the About dialog, to rapidly access more details about the license.
Default data display in Global Preferences renamed	The Loading data / Default SmartFlows preference, and the Data display / Default studies preference have been renamed and reorganized for better clarity.
Read only text in the file name	[Read only] text is displayed at the top of the software window after the file name, if the file has a “Read only” attribute. The information strip at the top of the document is no longer displayed.
[Assemble] ribbon group reorganized	The [Assemble] group of the operator ribbon has been splited into three groups: [Assemble], [Add/Delete] and [Create]. These groups are or are not, visible depending on the operators available for the studiables.
Loading studiables in all products	All studiable types can now be loaded into all products (provided that the file format is included in the product). Only the “Identity card” study can be displayed. For some studiable types (e.g., surface-image), extraction operators have been added in relevant products. In the File explorer panel, the icons of all studiable types (of file formats included in the product) can be visualized.
Distinguishing RGB images from grayscale images in the name	The distinction between RGB and grayscale images has been added to the name of the studiable type displayed in the workflow, as is done in the identity card. “Grayscale image” or “RGB image” is displayed when hovering over the icon.
Enhanced integration of Mountains® from external applications	It is now possible to get a separate Mountains® application window when driving Mountains using ActiveX from an external application (it was previously only possible to integrate Mountains interface inside the external application window). It is also possible to drive several Mountains windows. The applications run separately, preventing one application from crashing even if it crashes in another window. The Software Development Kit documentation has been updated (available from the Automation tab).

	Multi-technology features
	More realism in 3D rendering
3D rendering engine more realistic	All studies and operators using 3D rendering with light effect, now benefit from a physically based rendering, resulting in a more realistic display. It concerns the 3D view study on Surface, Series of surface, Surface + image, Image, Multi-channel image, Multi-channel cube, Shell, Cloud of points, Hyperspectral image and IV spectroscopy image studiables, the "Wear and deposit analysis" study on Surface, Series of surfaces, Surface + image and Multi-channel image studiables, and the 3D previews in the operators "Single-image reconstruction", "Stereoscopic reconstruction", "3D reconstruction using three images", "3D reconstruction using four quadrant images".
Improved graduation display	The graduation texts are sharper and with less overlap.
Intuitive rotation in 3D renderings	The center of the rotation is now the center of the zoomed zone (and not the center of the surface) in 3D view renderings.
	3D view study's ribbon
Material settings in 3D view study	Roughness and metalness visual aspects can now be defined (using sliders), on all renderings using light. It replaces the previous Gloss setting.
Lines on top of rendering in 3D view study	The lines can now be displayed on top of any rendering (lines, mesh, contour lines).
3D view ribbon reorganization	The ribbon of the 3D view studies has been reorganized for more intuitive settings.
Slider for amplification in 3D view study	A slider can now be used to set the z amplification.
Modernized icons in 3D view study	Some icons of the 3D view study have been modernized.
	X - Y cursor on surfaces and images
X-Y cursor on surfaces and images	A cursor can now be displayed in some studies on Surface, Image and comparable studiables. The cursor shows two perpendicular crossed dotted lines. The studies with cursor can display X and Y position values (in the current coordinate system, relative or absolute) and the Z value if applicable (in the current Z scale) of the current surface element in the study's table. In automation context, the X-Y cursor position is defined in absolute coordinate values. This applies to "Pseudo-color view" and "Summary of the current operator" studies on Surface, Series of surfaces, Images, Surface + Image, Multi-channel images and Multi-channel cube studiables, to "Photo simulation" and "Contour lines" studies on Surface studiables, and to the "True color view" study on Image and Series of images studiables. The values are not included in the result manager.
	Stitching operator
"Stitch" operator redesigned	The "Stitch" operator dialog has been completely redesigned for better ergonomics, allowing for covering a greater number of cases, and expanded automation possibilities (see below).
Big preview in "Stitch" operator	The grid view (showing the position of each studiable in its corresponding tile), is displayed in a big preview. The user can switch between the grid view and the result preview.
Semi-automatic method in "Stitch" operator	The manual positioning has been replaced by a semi-automatic setting called Use studiable properties. This method uses rules to position the studiables in the grid view, using starting position on a corner, filling path, and sorting rule (from studiable name, measurement date or studiable number in the workflow). It also allows the user to define a global overlap between tiles. Manual refinement of the position of a tile is possible, with transparency effects and optional magnetism between tiles. The completely automatic methods ('Use XY absolute coordinates' and 'Use automatic feature detection') have been renamed but not modified.
Easy and automatable selection of studiables in "Stitch" operator	A searching bar can be used in the "Stitch" operator, either to temporarily help the user to find and select a compatible studiable, or to define studiable selection rules applicable in automation contexts (for example, to select all surfaces after micro-roughness filtering, regardless of the number of surfaces in the document). The reference studiable is identified in bold text.
	New "Extract local contour" operator on surface and on image
New "Extract local contour" operator on Surface and Image	The new "Extract local contour" operator locally detects edges and generates a Contour profile from Surface, Surface + image and Image studiables. The edge detection method is applied on extracted auxiliary profiles.

Extraction shapes in “Extract local contour” operator on surface and image	The user can select and position different profile extraction shapes (parallel, double parallel, and radial). The number of profiles (extraction resolution) and optional average width can be defined.
Edge detection methods in “Extract local contour” operator on Surfaces and Images	The edge detection applied on the extracted profiles uses either Threshold, Derivative, or a Polynomial method. The user can choose to detect only rising, only falling edges, both rising and falling, or the average. For the derivative method, it is possible to set the searching window size, to smooth the derivative, and to fine tune the detection sensitivity.
	Correlation in “Scale sensitive fractal analysis” (SSFA) study on Series
Scale of better correlation between T axis and developed length in SSFA study on Series	In the “Scale sensitive fractal analysis” study, it is now possible to evaluate the correlation between a variable T along a Series (entered by the user), and the developed profile length (or developed surface area) at a defined scale. You can display the Regression coefficient R^2 coefficient along the series in function of the scale. The maximum of this graph gives the scale at which there is the better linear correlation between developed length (or area) and a variable. It allows the user to find at which scale a variable has an effect on the surface. The variable can be a value of the fabrication process (e.g., polishing speed) or a functional property (e.g., tribological behavior). This applies to Series of profiles and Series of surface studiables.
Statistical studies on SSFA study for Series	It is now possible to apply statistical studies (“Control Chart”, “Scatter plot”…) on the results of the “Scale sensitive fractal analysis” (SSFA) study on Series of profiles and Series of surfaces studiables.
	Classification in “Fiber analysis” study
Classification in “Fiber analysis” study	It is now possible to classify the fibers in the “Fiber analysis” study. The classification functions are identical to the ones in the “Particle analysis” study. In particular, you can classify the fibers using parameters values or a combination of parameters values, exclude classes from calculation, display color by class and legend, calculate statistical parameters by class, and share classifications on other documents or with colleagues. The “Fiber analysis” study is available for Image studiables (in particular SEM images), and for Surface-type studiables.
Histogram display in “Fiber analysis” study	It is now possible to hide the histogram or to change its color in the “Fiber analysis” study.
Dynamic images from “Fiber analysis” study	Dynamic image export is now available for all images produced by the “Fiber analysis” study on surfaces or on SEM images.
	Edge preserving filters
Edge preserving filters in “Spatial filter” operator	The ‘Bilateral’ filter and the ‘Guided’ filter have been added in the “Spatial filter” operator. Those filters reduce noise while preserving the edges. Sliders are available to find the best compromise between noise reduction and edge preserving. This also applies to Image, Series of images, Surface, Surface + image, Series of surfaces, Multi-channel image, Multi-channel cube studiables.
	Cube cutting planes
XY cutting planes in Multi-channel cubes	Cutting plane in X or Y direction can now be displayed in the “Pseudo-color view” study on Multi-channel cube studiables (previously only Z was displayed).
	Adaptation of tools to more studiable types
Availability of operators or studies on Surface + Images	The “Fit an asphere” operator, and the “Volume parameters”, “Sk parameters” and “Slope distribution” studies are now available for Surface + image studiables.
Availability of operators on Series of surfaces	The “High/Low pass filter”, “Morphological filter” and “Edit axes” operators are now available for Series of surfaces studiables.
Availability of operators on Series of images	The “Rotate”, “Enhance the image”, “Homogenize lighting”, ”High/Low-pass filter”, “Convert to series of surfaces” and “Convert RGB to monochrome image” operators are now available for Series of images studiables.
Availability of operators on Series of profiles	The “Morphological filter” operator is now available for Series of profiles studiables.
	Linked studies
Synchronization between studies	It is now possible to link the attributes of several studies of the same document (synchronization). It means that if several studies are synchronized using a link concerning an attribute, the modification of this attribute in one of the studies, modifies this attribute in all other linked studies accordingly. See below the attributes that can be linked.

XY-position synchronization	The position of the X-Y cursors can be linked between studies. X-Y cursors positions are defined in absolute coordinate's values. Error cases (for example cursor position outside of the study's border) are managed with informative error messages. This applies to the "Pseudo-color view" study and to the "Summary of the current operator" study on Surface, Series of surfaces, Images, Surface + Image, Multi-channel images and Multi-channel cube studiables, to "Photo simulation" and "Contour lines" studies on Surface studiables, and to "True color view" study on Image and Series of images studiables. This X-Y position can also be linked with studies on Hyperspectral images studiables (and on IV images studiables). It concerns cursor positions in the "View of a hyperspectral image" and "View of an IV spectroscopy image" studies and displayed curve for the other studies ("Spectrum curve view", "Peak fitting view", "Normalized view", "Stacked view", "Strips view").
Zoom in % (XY) synchronization	The image zoom level (in %) can be linked between studies. This applies to all studies with surfacic image visualization (e.g., "Pseudo-color view" on Surface studiables, "Grid view" on Multi-channel image studiables, "View of a force volume", "View of a hyperspectral image", etc.)
Zoom in absolute value (XY) synchronization	The image zoom level and position (in metric unit) can be linked between studies. This is particularly useful with different visualizations of the same sample with common coordinates system. This applies to all studies with surfacic image visualization (e.g., "Pseudo-color view" on Surface studiables, "Grid view" on Multi-channel image studiables, "View of a force volume", "View of a hyperspectral image", etc.)
Zoom in % (curve) synchronization	The curve zoom level can be linked between studies. This applies to all studies on Profile, Series of profiles, Multi-channel profiles, Spectrum curve, Series of Force curve and IV curve studiables.
Element number synchronization	The element number can be linked between studies. This applies to all studies with several elements, on Series of Profiles, Series of surfaces, Series of images, Multi-channel images, Multi-channel profiles, Series of force curves studiables.
Force curve synchronization	The force curve number can be linked between studies. This applies to "Force curve analysis" and "Force volume" studies.
Force curve segment synchronization	The displayed segment (approach or retract) can be linked between studies. This applies to "View of a force volume" study.
Spectrum curve synchronization	The spectrum curve number can be linked between studies. This applies to all studies on Hyperspectral image, IV curves and IV spectroscopy image studiables.
Spectrum curve (W) synchronization	The position number on the spectral axis can be linked between studies. This applies to the studies "View of a hyperspectral image" and "View of an IV spectroscopy image".
Cutting planes synchronization	The slice numbers of (X, Y and Z) cutting planes on cube can be linked between studies. This applies to the "Pseudo-color view" and 3D view studies on Multi-channel cube studiables.
Synchronization manager	The Synchronization manager dialog allows you to create, modify and delete links between studies inside a document. It is available from any study containing synchronizable attributes.
Synchronization management shortcuts	When selecting several studies containing synchronizable attributes, a link button directly opens the Synchronization manager dialog with the corresponding selected studies.
Link icon in the study	If the selected study is linked to another study in the document, a link icon is visible in the top right corner.
	## Profilometry features
Curve export in the "Slope distribution" study	The slope distribution values can now be exported to a text file from the "Slope distribution" study. This applies to Surface and Surface + image studiables.
Display of parameters in "Rk (Sk) parameters" study	In the "Rk (Sk) parameters" study, the display of parameters in the table below the curve, and the settings dialog, are now identical to the ones of the "Parameters table" study. More pre-processing settings are thus available (e.g., microroughness), and more information can be displayed (e.g., warnings). This applies to the "Rk parameters" study on Profiles and Series of profiles studiables and to the "Sk parameters" study on Surface, Surface-image, Multi-channel Images and Series of surfaces studiables.
Automatable exclusion zones in the "Level" operator on Profiles	Exclusion zones in the "Level" operator on Profile studiables, can now be defined in metric units, in relative or in absolute coordinates. Result pickers can be used in automation contexts.
Fine spacing values for the 'Circular analysis' in Contour study	The 'Circular analysis' tool on a portion of a closed Profile studiable now accepts values with a precision of 0.1 degree.
Frequency index in "Frequency spectrum" study on Profiles	The frequency index is now a separated cursor parameter in the "Frequency spectrum" study on Profile studiables.

Homogenization in the “Level” and “Retouch points” operators on Profiles	The interface for units’ choice has been homogenized with “Extract profiles” operator in the “Level” and “Retouch points” operators on Profile and Series of profiles studiables (%, points, metric unit, and metric unit in absolute values).
Homogenization of operator dialogs	A few last operators have been redesigned to conform to the operator’s dialog interface guide. Profile or Series of profiles: “Extract area”, “Convert to sliding profiles”, “Concatenate two profile”, “S-filter”. Series of surfaces: “Extract transversal profile”, “Filter using PCA”.
	## Shell and Point cloud features
New operator “Stitch together in 3D space”	The “Stitch together in 3D space” operator now allows you to automatically assemble Surface (and Surface + image) studiables with Point cloud studiables, using recognizable points in the overlapping zone.
Automatic fit with partial Shell in “CAD compare” study	The pre-fit function is now compatible with a partial Shell in the “CAD compare” study on Shell. This allows the user to compare a partial shell (actual data (e.g., measured shell)) with the CAD model (nominal model) that represents the entire work piece. It is an alternative to the manual mode, which is slower and requires the user to locate the right critical points.
New “Fill holes” operator on Shells	The new “Fill holes” operator on Shell studiables reconstructs the missing parts of a mesh. Two filling options are available: One for covering relatively flat areas (Relatively planar holes) and the other for areas with curvature (Highly curved holes). It is possible to fill only holes that are smaller than a particular area.
Simplification of the “Mesh the point cloud” operator	The dialog box of the “Mesh the point cloud” operator has been simplified and optimized: several settings previously available are now automatically calculated from the Cloud geometry. Calculation is now faster.
Export Point cloud to PLY	It is now possible to export a point cloud in PLY format.
	# Spectroscopy features (for Spectroscopists or SPM users)
Exponential fit in “Peak fitting analysis” study on spectra	‘Single exponential’, ‘Stretched exponential’, ‘Double exponential’ curve and ‘Logarithmic’ curve fitting are now available in the “Peak fitting analysis” study on spectra. In particular, it can be used to study time decay when the W axis represents time. It applies to Spectrum curve and Hyperspectral image studiables.
Cursor coordinates in Hyperspectral images and IV spectroscopy images	All studies on Hyperspectral image studiables now display homogenized XY cursor coordinates. Coordinates of the cursor can be displayed in absolute coordinate, and in points. The current signal name can also be displayed. It also applies to all the studies on IV spectroscopy image studiables.
Position of extracted line of spectra	The curve position in Spectrum curve studiable, after the extraction of a line of spectra in the “Extract series of spectrum curve” operator is now stored as a T axis value and renamed Position of the spectrum curve. It starts from 0 (it previously was coordinates on the source “View of a hyperspectral image” study). This also applies to IV curve studiables.
Proportion kept in “View of a hyperspectral image” study	The proportion of the spectra and the image sizes are now kept when resizing the “View of a hyperspectral image” study. The proportion is also kept in full screen mode.
“Use spectral bands” operator on IV spectroscopy images	The “Use spectral bands” operator has been adapted to IV spectroscopy image studiables (it was already available on Hyperspectral image studiables). It can create colorized maps using user-defined color assigned to values (Area, FWHM, Max, Max amplitude, Max position) calculated on bands in the W axis.
	# New Mountains® Products
New MountainsSPIP ® Nanospectral Starter and Expert products	The MountainsSPIP® range is extended with the addition of the MountainsSPIP® Nanospectral Starter and MountainsSPIP® Nanospectral. This is destined for users working on both SPM and Spectral technologies (e.g., nano-IR and TERS). This completes the MountainsSPIP® products: MountainsSPIP® Starter, MountainsSPIP® Expert, MountainsSPIP® Academy and MountainsSPIP® Premium.

New MountainsSEM® Image Analysis product	The MountainsSEM® Image range is extended with the addition of the MountainsSEM® Image Analysis product. It is specifically aimed at users performing 2D SEM image analysis, and offers features such as semi-automatic object colorization, particle analysis and correlative analysis with EDS maps. This completes the MountainsSEM® range: MountainsSEM® color, MountainsSEM® Expert and MountainsSEM® Premium.
Four-quadrant reconstruction improvement	The reconstruction of topography from the 4 images of a 4-quadrants BSD detector has been improved. In particular, it gives better results on geometrical features. Previous methods are kept for compatibility.

Updates and translations for Interface & Reference Guide

User interface	New texts related to new features have been added to the user interface (in English). They have been translated into all available languages: French, German, Italian, Spanish, Japanese, Chinese, Polish, Korean, Brazilian Portuguese, Russian. Note: A complete retranslation into Japanese is in progress. This means that the style and vocabulary might not be homogeneous for the moment.
Reference Guide	The Reference Guide has been updated with the descriptions of most new main features and improvements (in English). It has been translated into all available languages (French, German, and Japanese). Note: A complete retranslation into Japanese is in progress. This means that the style and vocabulary might not be homogeneous for the moment. You might find some English sentences (in the Japanese Reference Guide).

Bug corrections (A and B type)

	Type	Bug Description
MNT-10391	A	The software may crash if you filter the tree structure of a composite (Surface+image, Multi-channel image, etc.) studiable by name in the studiable explorer panel.
MNT-10835	A	The Ssw parameter (dominant wavelength) calculation on surface studiables according to ISO 25178 can be incorrect on surfaces having little or no dominant wavelength.
MNT-11045	A	The sofware may crash when opening the “3D reconstruction using three images” operator on Image studiables.
MNT-11127	A	A crash can occur when opening the “Apply mask of non-measured points” operator on Surface, Surface + image, Multi-channel image studiables.
MNT-11402	A	Values in the “Table of results” study may be missing or incorrect in the result of the “Fit an asphere” operator on Surface and Profile studiables.
MNT-11507	A	The 3D view of the generated Shell studiable is no longer displayed in the “CAD compare” study when reloading older v10 documents.
MNT-4171	B	Changing the rendering mode to multi-selection on different studiable types in the 3D view study may result in invalid rendering in one of the selected studiables.
MNT-8355	B	The flat area is not respected when applying the “3D reconstruction using four quadrant images” operator on Image studiables in certain particular cases.
MNT-10520	B	The parameters of the “Sk parameters”, “Rk parameters” and “Parameters table” studies on Surface and Profile studiables are not calculated when using an ‘F-Operator’ of type ‘Absolute Total least squares sphere (Absolute TLSSP)' or ‘Total least squares circle (TLSCI)'.
MNT-10730	B	The “Add/remove image” operator on Series of images studiables does not display the studiables in the Available studiables section of the dialog box if the loaded data is very large.
MNT-10807	B	It is not possible to move between pages in a document by scrolling with the mouse wheel or using the scroll bar with the mouse if the [Page by Page] button is activated.
MNT-10886	B	Modifying the channel colors of a Multi-channel image studiable that is not a root studiable does not result in the colors being modified on the root studiable.

MNT-11021	B	Zooming using a rectangular shape in a “Grid view” study on Series of surfaces studiables does not display the correct view of the surfaces.
MNT-11036	B	The results from the “Result manager” of a document containing a “Result calculator” are incorrect when the document is reloaded.
MNT-11046	B	The software may crash when adding a “Resample” operator before a “Scale the image” operator on Image studiables in the workflow in a particular case.
MNT-11065	B	Statistical studies on Surface, Surface + image, Image and Multi-channel image studiables, using a class from a “Particle analysis” study as a filter, become empty if a class is renamed in the Classification dialog box of one of the studies in the statistical analysis.
MNT-11088	B	Results filtered in the Result manager may be incorrectly exported, as the filter can be incorrectly applied, particularly in an automated environment.
MNT-11089	B	Loading a Shell studiable in STL format does not work.
MNT-11097	B	Operator dialog boxes can be hidden if the user previously had 2 screens and only one is currently available.
MNT-11112	B	Duplication of an “Advanced contour analysis” study (Ctrl+D) on Profile or Contour profile studiables does not always work properly.
MNT-11130	B	The W-axis unit is incorrect if the Apply Jacobian intensity correction option is selected in the “Convert W-axis” operator on Spectrum curve studiables.
MNT-11132	B	The base line height is incorrect when selecting the Average the curve option in the “Extract series of spectrum curves” operator dialog box on Hyperspectral image studiables.
MNT-11138	B	All channels of studiables in ZMG format are not always loaded.
MNT-11142	B	Opening the Peak fitting properties dialog box in the “Peak fitting” study on ‘Hyperspectral image studiables can affect which curve is displayed.
MNT-11146	B	The Peak fitting properties dialog box in the “Peak fitting” study on Hyperspectral image studiables does not always display properties if the Hyperspectral image studiable contains non-measured points.
MNT-11149	B	Mountains® may use commas when dealing with real values instead of dots, depending on the regional settings of the host application, when running the software from a third-party application.
MNT-11261	B	The ‘V-groove analysis’ tool in the “Advanced contour analysis” study does not work if any tolerance is set when it is created.
MNT-11299	B	F-operators are not applied on studiables used for calculations of addon parameters.
MNT-11302	B	It is not possible to modify the palette of the 3D Result view in the “Map local properties” operator on Series of surfaces studiables.
MNT-11309	B	It is not possible to export the Abbott curve data to a text file in the “Sk parameter” and “Rk parameters” studies using the [Export curve] button.
MNT-11318	B	The settings in the Special options dialog of the ”Scale sensitive fractal analysis” study on Surface, Series of surfaces and Image studiables are not taken into account in the management of the study settings.
MNT-11328	B	The export of the numerical results to a text file in CSV format when applying a template or when using a command file is erroneous if a semi-colon is used in the results.
MNT-11334	B	The 'Calculate line width roughness' tools do not work when the selected segments are parallels in the “Advanced contour analysis” study.
MNT-11392	B	Inserting a “Result calculator” into a document does not generate an error message when being used in a product that does not contain this function. Affects demo and free trial licenses only.
MNT-11399	B	Some translations for form removal (F-operation) are missing from the Parameters table dialog box on Profile studiables.
MNT-11400	B	Some advanced calibration options are not translated in the “3D reconstruction using four quadrant images” operator on Image studiables.
MNT-14111	B	The points are reversed in Y in the 3D view study on Multi-channel cube studiables.
MNT-11452	B	The ‘S-filter (λs)’ filter is not applied on Profile or Surface studiables used by addon parameters even when requested.
MNT-11471	B	The channels are not correctly displayed when applying the “Threshold” operator on a Multi-channel image studiable if some channels are flat.

MNT-11472	B	The histogram of heights is not correctly displayed in the color scale on Multi-channel image studiable if some channels are flat.
MNT-11506	B	The pre-alignment of the Shell studiable in the “CAD compare” study is not preserved when the study is copied and pasted or when the document is saved and then reloaded.
MNT-11512	B	The generated Shell studiable is not redisplayed in the “CAD Compare” study when undoing a previous selection of the [Generate Shell and Deviations] button in the study.