Getting Started

GMS 3.1

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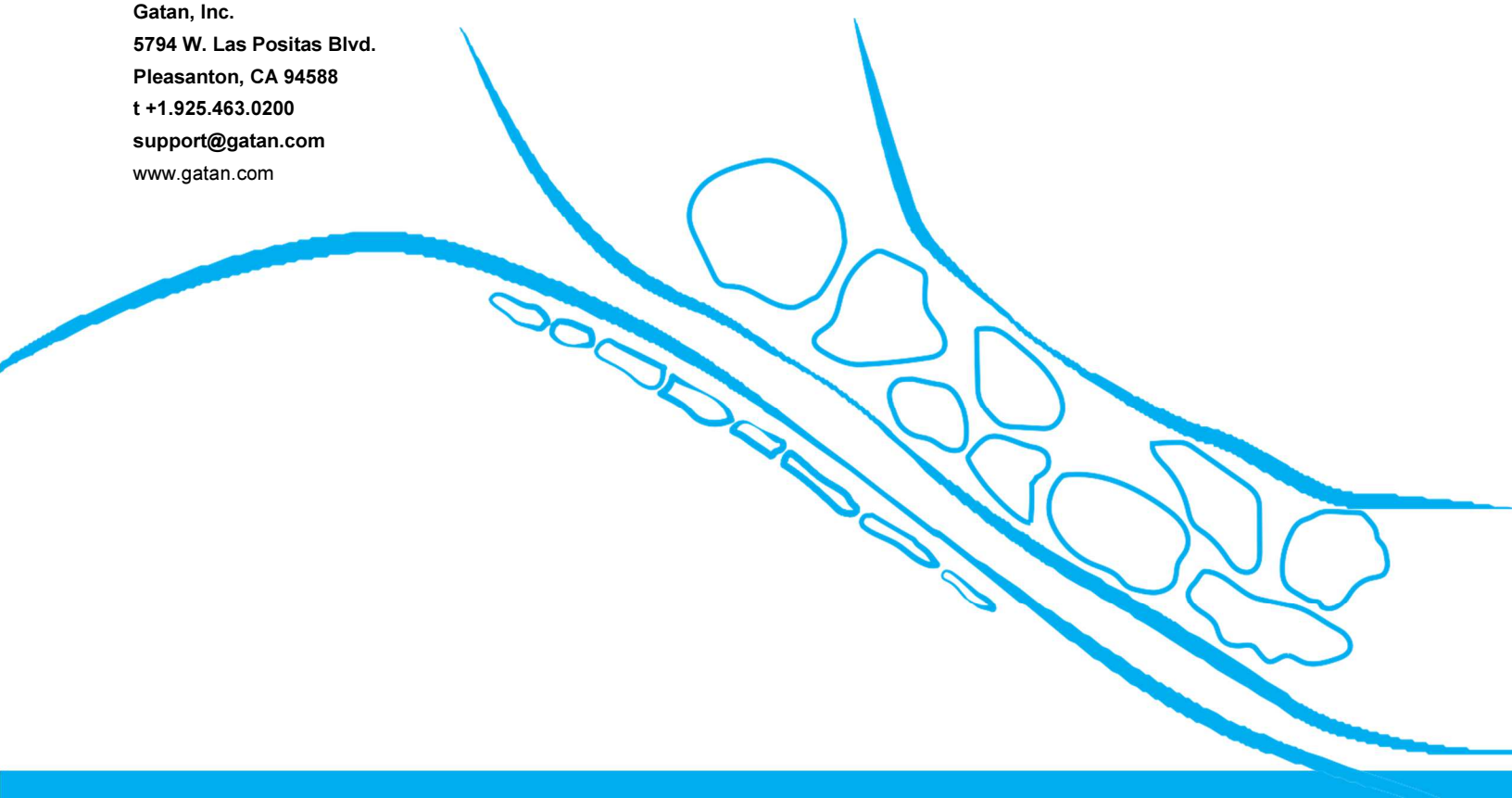

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1 Introduction

This document shows how to install Gatan Microscopy Suite® (GMS) 3 and highlights the main difference between 2.x and 3.x from the user perspective.

- GMS 3.1 is supported on Windows 7 Pro/Ultimate x64, and Windows Server 2008 R2 Enterprise x64
- The new software is delivered on a DVD
  - It is important to check for a DVD reader on existing computers for upgrades
- Multiple installations of GMS software on the same computer are not supported
- GMS 3 requires a new set of licenses
  - Pre 3.0 software licenses will not work
  - Correctly supplying the Site ID (IID) and a list of existing equipment will allow for the smooth creation of licenses needed for an upgrade
  - Licensing issues are discussed in Section 2 of this document.

1.1 What's new

The following sections discusses the new features introduced in GMS 3 software.

1.1.1 Technique-centric workflow

The guided workflow in GMS 3 software begins with the techniques panel containing a list of possible techniques. Selecting one of the techniques reveals the guided workflow. It is also possible for users to create their own custom technique with associated workflow.

1.1.2 Tabbed workspaces and data layout manager

GMS 3 software uses the concept of multiple workspaces to group related data together. This feature solves the problem of having too many images displayed at the same time, resulting in lots of confusion. Each workspace contains only related data: for example a set of images acquired form a camera, or data coming from one spectrum imaging (SI) experiment. Within each workspace a powerful data layout manager helps with laying out all the images and spectra.

1.1.3 Interactive microscope interface

GMS 3 software provides important insights into the set-up of your electron microscope, including high tension, magnification and illumination mode, and also the state of your camera, spectrometer and other Gatan devices. You can also interact directly with the microscope user interface to stop and start acquisitions, change insertion state of detectors and much more.

1.1.4 New EELS and EDS analysis

The electron energy loss spectroscopy (EELS) quantification routines in GMS 3 software use a model-based multiple least squares fitting (MLLS) approach and do an excellent job of separating overlapping edges, and provide full plural scattering/DualEELS support. When applied to a spectrum imaging experiment, the EELS routines result in far superior elemental maps: higher signal-to-noise ratio (SNR) and separation of elements with overlapping edges.

The energy dispersive x-ray spectroscopy (EDS) analysis routines have also been completely rewritten. They also use a MLLS fitting approach and full background modeling. The new routines result in faster, more accurate SI maps. Finally, EDS quantification uses the same simple user interface (UI) as EELS quantification.

1.2 Supported hardware

Not all hardware works with GMS 3.x software or on all Windows Operating Systems. The following list shows the hardware supported for GMS 3.0 and newer software. All legacy hardware not listed is not supported.

TEM product model number(s)	TEM product name	Windows 7 x64 (Professional or Ultimate)	Windows Server 2008 R2 x64 (Enterprise)
465	Vulcan™ cathodoluminescence detector		
777.U1, 777.U2, 777.U3	STEMPack™ spectrum imaging platform and upgrades		
806, 807	Advanced STEM detectors		
900, 90	SmartSet™ controller		
1905	Temperature controller		
976, 977	Enfinium™ spectrometer(s)		
963, 965, 966	GIF Quantum® energy filters		
967	GIF Quantum LS imaging filter		
702.70	(JEOL in-column filter)	≥GMS 3.10 (interfacing to a supported Gatan camera)	
830, 831, 832, 833	(Orius® cameras)		
894, 895, 994	(UltraScan® cameras)		
1000, 1010	(K2® cameras)	Not supported	
1095	(OneView™ camera)		
1095.U1	(OneView camera in IS mode)	Not supported	

SEM product model number(s)	SEM product name	Windows 7 x64 (Professional or Ultimate)
ChromaCL, ChromaCL2	ChromaCL™ and ChromaCL2™ systems	≥GMS 3.10
MonoCL4	MonoCL4™ systems (including Plus, Swift, and Elite instrument packages)	≥GMS 3.10

Specimen preparation product model number(s)	Specimen preparation product name	Windows 7 x64 (Professional or Ultimate)
685	PECS™ II system	≥GMS 3.10
695	PIPS™ II system	≥GMS 3.10
697	Ilion™ II system	≥GMS 3.10

2 Licensing

GMS 3.x software will require GMS 3 software licenses. All hardware is also licensed. If a license is not present for a specific piece of hardware, no support will be installed for that device.

The new licenses come in two configurations, Online and Offline. There will be up to two sets of files for each installation. One set will be Online with a *.glc license file and a *.txt file (which is a human readable representation of the license file set). The second set will be Offline with a *.glc license file and matching *.txt file. These two sets of files come on two CDs marked appropriately: Online and Offline.

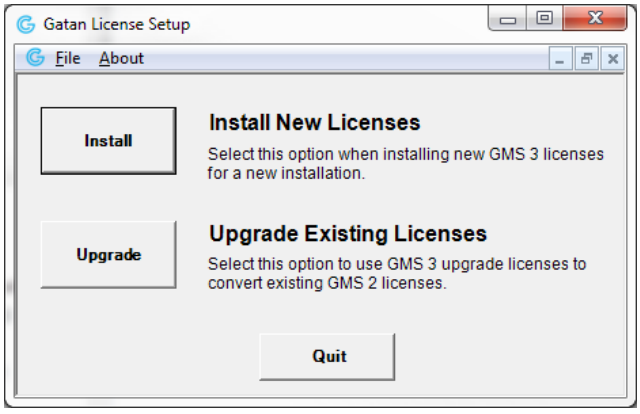
You should not install both the Online and Offline licenses on the same system. Doing so will result in the GMS Software Installer defaulting to an Offline installation.

For an upgrade, the upgrade licenses must match the existing IID (Site ID) of the current installation. The IID can be determined by looking into the license *.txt file. It can also be found in the registry at HKEY_LOCAL_MACHINE\SOFTWARE\Gatan\SID. This is recommended for advanced systems users only.

Installations making use of an upgrade license(s) from GMS 2.x to GMS 3.x must complete the license conversion process below in order to create the new permanent GMS 3.x license. New or non-upgrade installations do not need to complete this step.

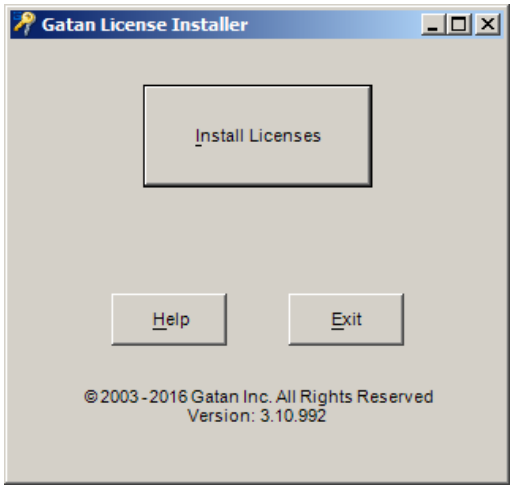
2.1 Installing licenses

Insert the appropriate license CD into the DVD drive; the LicenseSetup.exe application should automatically start. If not, use Windows Explorer to browse to the DVD drive and double-click on the LicenseSetup.exe file.



If you are installing new GMS 3 licenses for a new installation then click on the *Install* button on the Gatan License Setup screen (image above). If you are upgrading from GMS 2 and purchased upgrade licenses click on the *Upgrade* button and skip to the next section, 2.2 Converting licenses from GMS 2.x to GMS 3.x to continue with the Gatan LicenseConverter application.

Clicking the *Install* button starts the Gatan License Installer application. Once the screen below is shown then click on *Install Licenses.* The application will then install the licenses, pause briefly to indicate the number of licenses installed, and then exit automatically. If a problem is encountered during installation an error message popup will be displayed, otherwise license installation has been completed successfully.



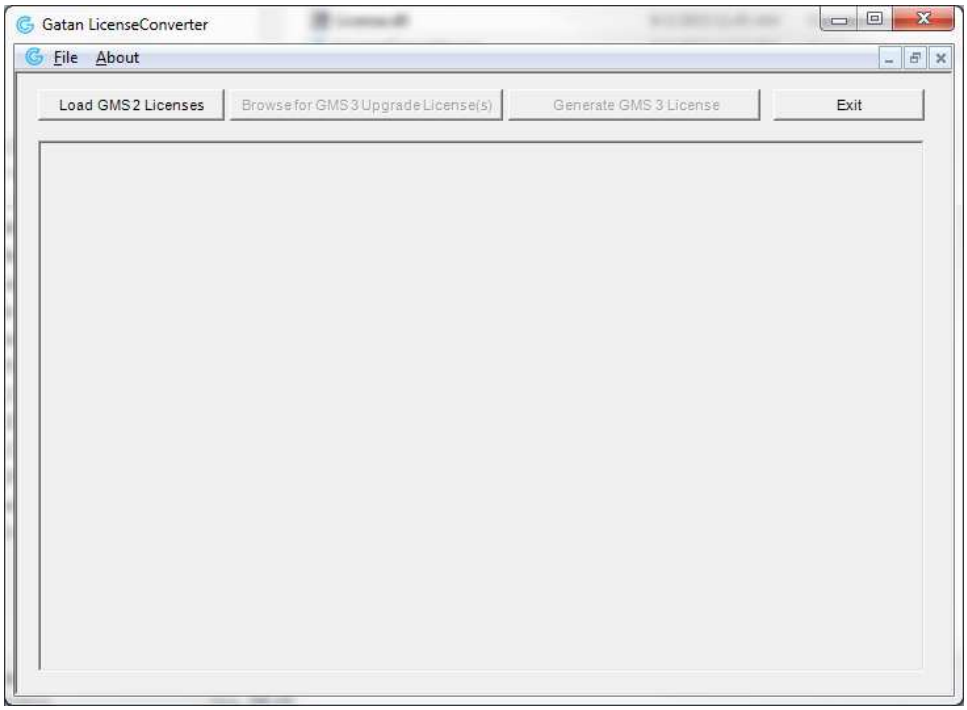
Remove the CD from the DVD drive and proceed to Section 3 to install the GMS software.

2.2 Converting licenses from GMS 2.x to GMS 3.x

Pressing the *Upgrade* button on the Gatan License Setup screen (image on previous page) will start the LicenseConverter application.

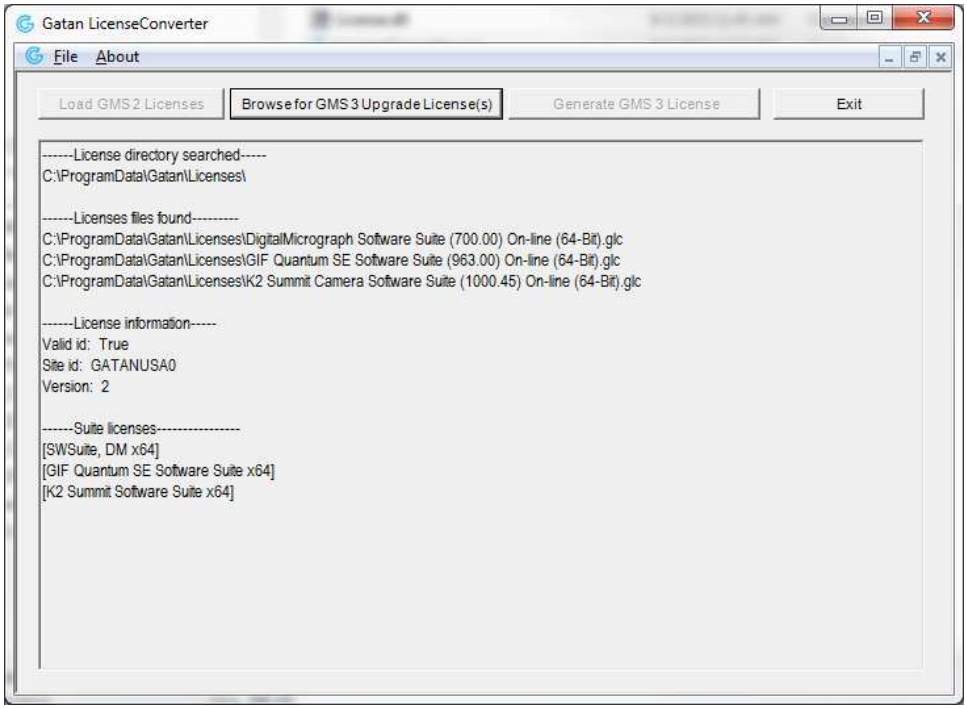
If you purchased a GMS 3 upgrade license(s) then you will need to follow the steps in this section to create the new permanent licenses for GMS 3. The LicenseConverter application uses your existing and installed GMS 2.x license(s) along with the GMS 3.x upgrade license(s) to create the new permanent GMS 3.x licenses for your system.

1 Click on the *Load GMS 2 Licenses* button.

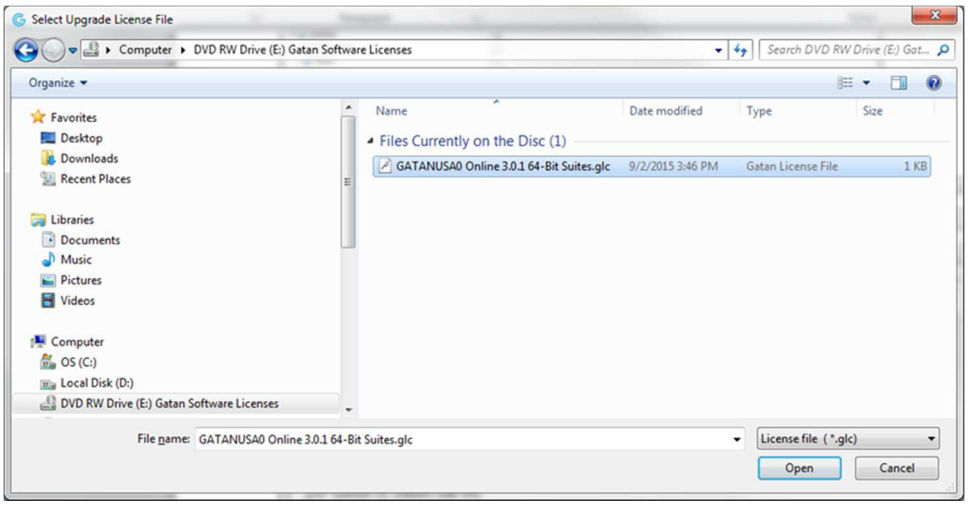


The LicenseConverter will then read the licenses installed on the system (If no licenses are found in the standard location then a folder browse dialog is presented to enable entering an alternate location to search).

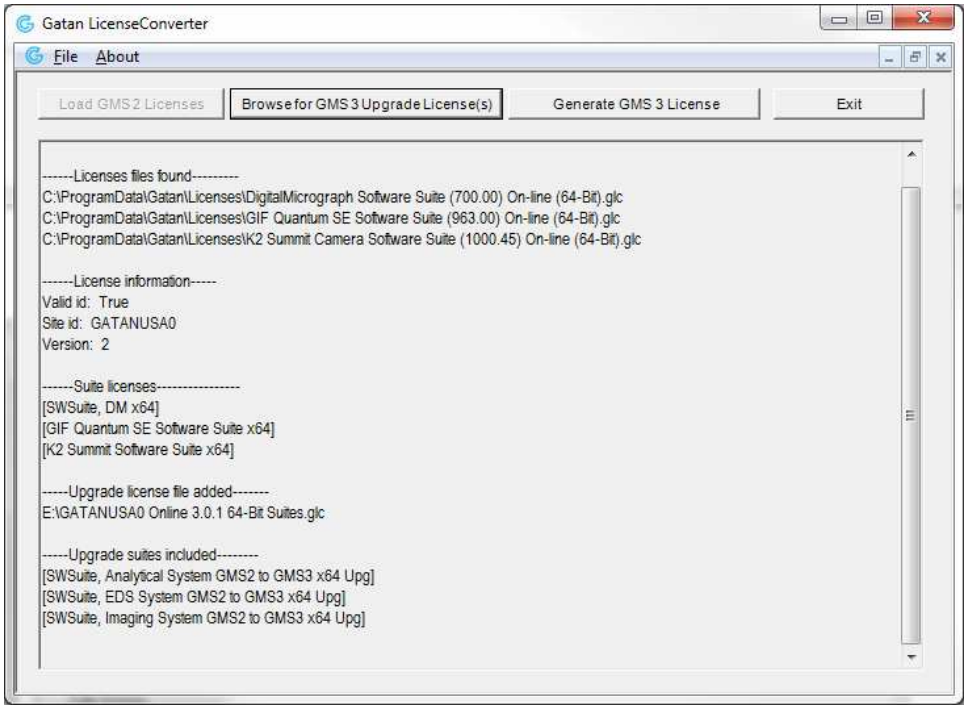
2 Next click on the *Browse for GMS 3 Upgrade License(s).*



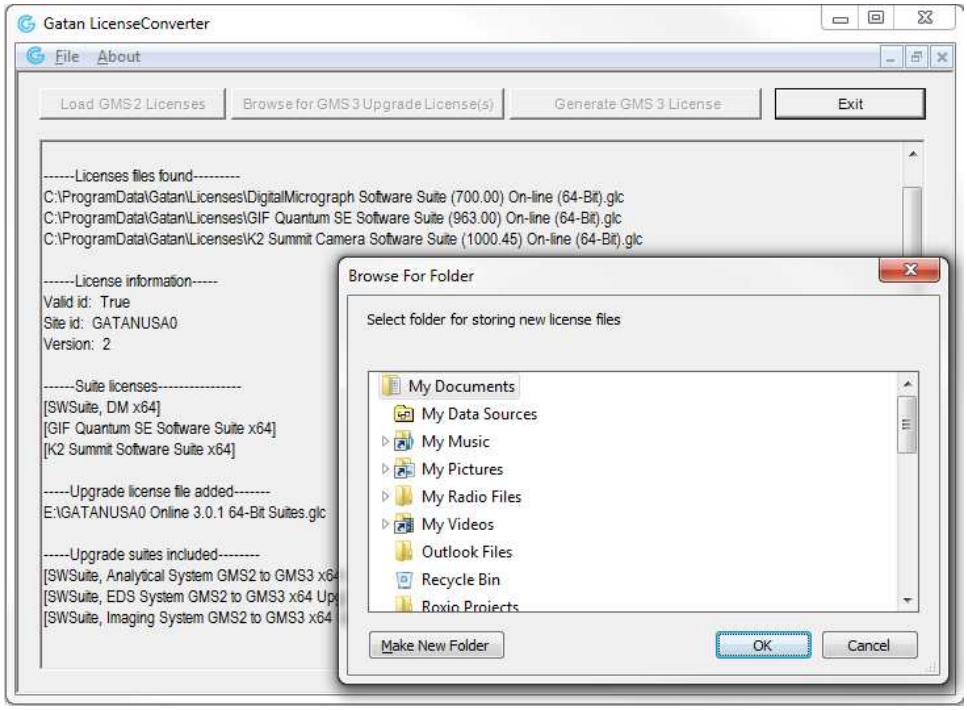
This will open a browse dialog that you can use to navigate to the location of the upgrade license(s) to use. Select the upgrade license you wish to utilize then click the *Open* button. Typically the license(s) would be found on the license CD delivered with your new GMS 3 software.



After clicking on *Open*, LicenseConverter will show information about the upgrade license that was added. If you have more one upgrade license to add then just repeat step 2 until all are loaded.

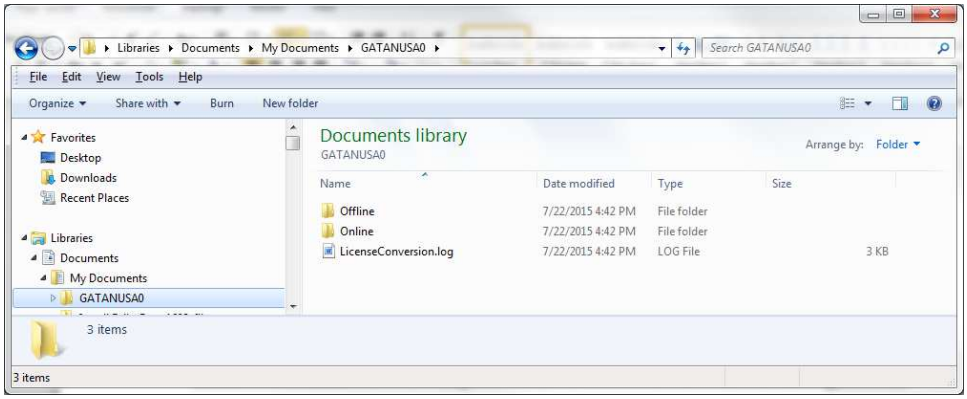


3 Next click on *Generate GMS 3 License.*



You will then be asked where to store the new license files.

4 Browse to an existing folder or chose to make a new folder and then click *OK*.



The LicenseConverter will make and store both the Online and Offline license files in the selected folder.

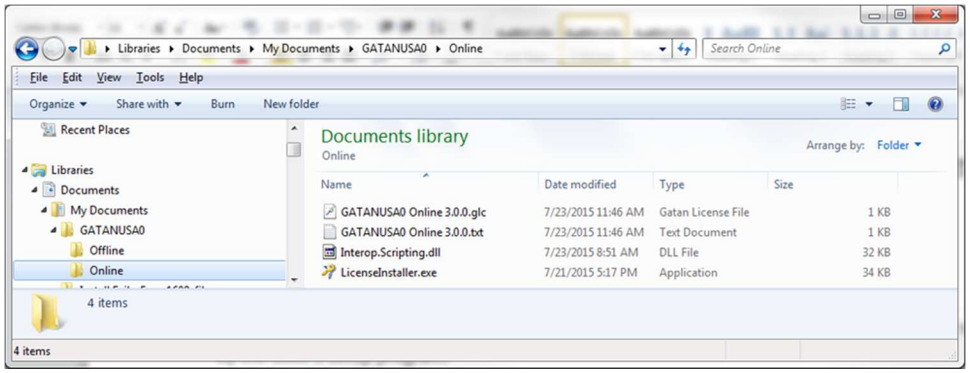
5 The new permanent GMS 3 licenses have now been created

Click *Exit* to close the LicenseConverter program.

2.3 Installing the converted license for GMS 3.x

Once you have converted your GMS 2.x license(s) to a GMS 3 license then it must installed. If you plan on moving to a new computer for GMS 3 then you must copy the appropriate Online/Offline license directory contents to that system first and then proceed with the license installation steps described below.

1 Open a Windows Explorer window and browse to the location where the new licenses were saved.



As mentioned earlier you should not install both the Online and Offline licenses on the same system. Double click on either the Online or Offline directory. Next double click on the LicenseInstaller.exe file.

2 Once the screen below is shown then click on *Install Licenses.*

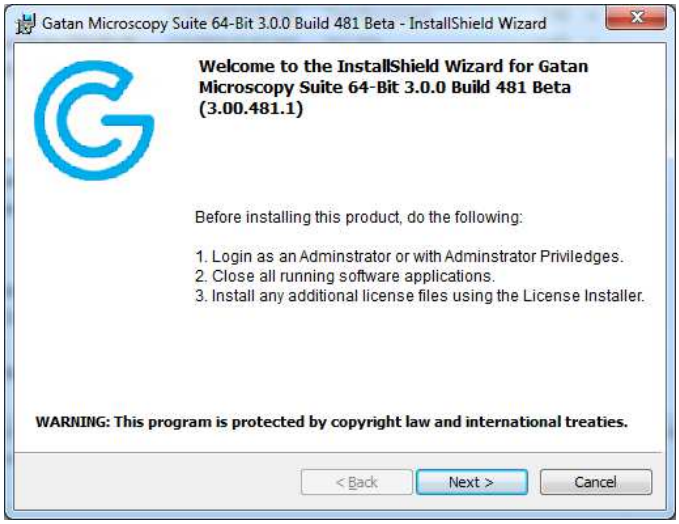
The application will then install the licenses, pause briefly to indicate the number of licenses installed, and then exit automatically. If a problem is encountered during installation an error message popup will be displayed, otherwise license installation has been completed successfully.

Following the completion of the license installation continue with Section 3 to install the GMS software.

3 GMS 3.x software installation

Place the GMS software installation DVD in the drive, setup should automatically run. If it does not then the installation can initiated by double clicking on the Setup.exe file.

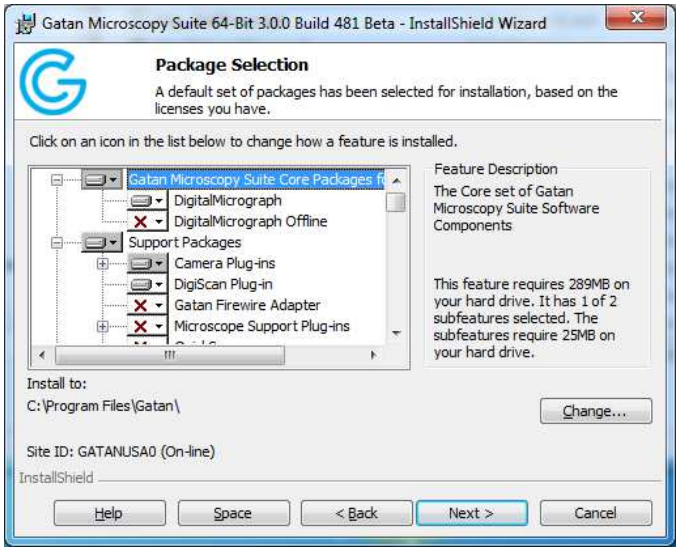
If may take a few minutes for the installer to extract, decompress, load, and stabilize on the first wizard screen shown below:



Hit *Next* to produce the License Agreement wizard screen. Please read the displayed terms and conditions, and if you agree, select I accept the terms in the license agreement radio button, and then hit the *Next* button.

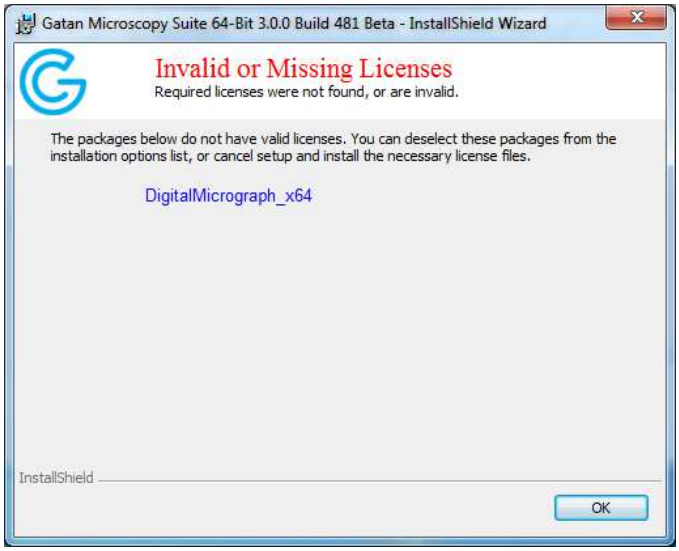
At this point a warning could appear if a mixture of Online and Offline licenses are present. In that case only the offline licenses will be used.

The next screen will show all the items licenses were installed for. There is no need to change any selections in this dialog.



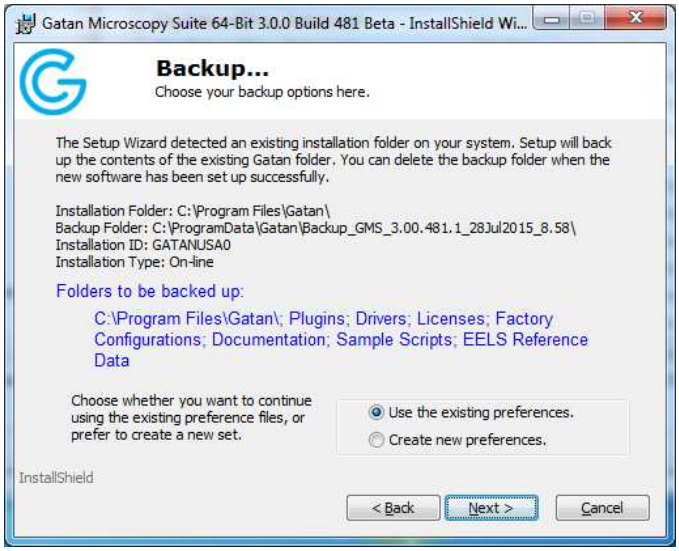
Hit the *Next* button to proceed.

If a package is selected, but has no installed license, a warning would be displayed:



Hit the *OK* button to return control to the Package Selection wizard screen. Then, unselect the referenced module(s).

If the install is an upgrade over an older GMS software version, back-up information for the previous installation is provided. All information regarding the location of the back-up is displayed in the dialog. Note that the installer permits the choice between using the existing preferences or create new preferences.

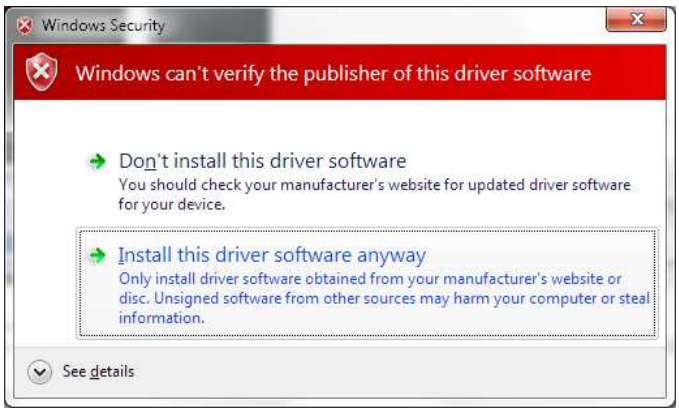


Hit the *Next* button to proceed.

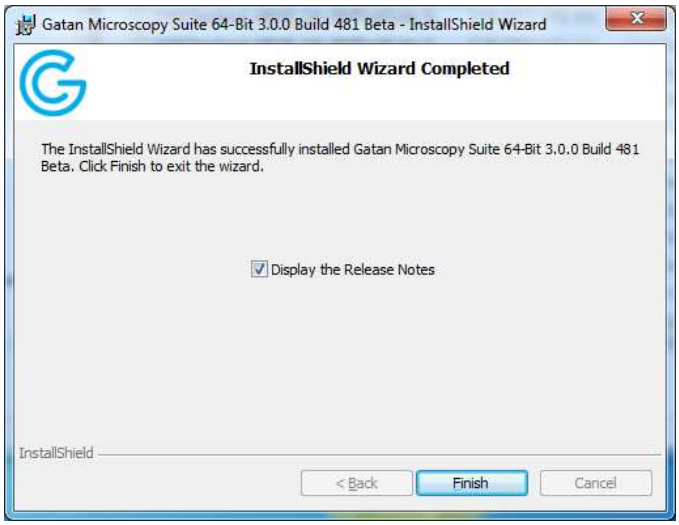
If changes had been made to the selected items in the Package Selection dialog, or if a mixed set of licenses (online and offline) were installed, a warning would be displayed which states that not all licensed packages were selected. Either correct the situation by hitting the *Back* button, or continue by hitting the *Install* button.

The software will now be installed and a progress screen will be displayed.

For online installs in a Windows 7 environment, Windows Security screens may also be encountered for hardware driver components. Select Install this driver software anyway (or equivalent message).



When the installation completes, the following dialog is displayed:

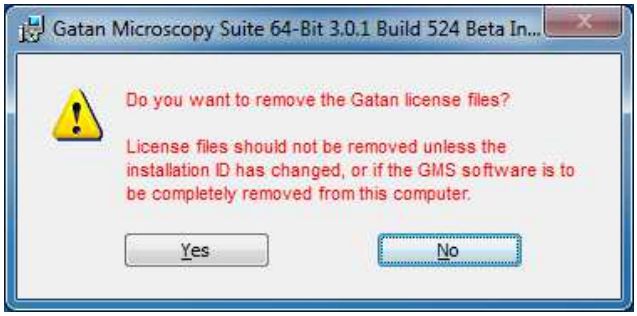


Hit the *Finish* button.

Installation is now complete. Depending on what modules were installed you may be asked to restart the system. Choose *Yes* or *No* in the dialog depending if you need to first save/close any other open applications on the system. After closing the open applications please restart the system before attempting to run DigitalMicrograph® (DM) software.

If no request to restart the system was presented then all installation has been completed and DigitalMicrograph software is ready for immediate use.

Note that during the uninstall process you may be asked to remove old licenses. Select the button that is appropriate for your situation. In most cases, *No* is the recommended choice.



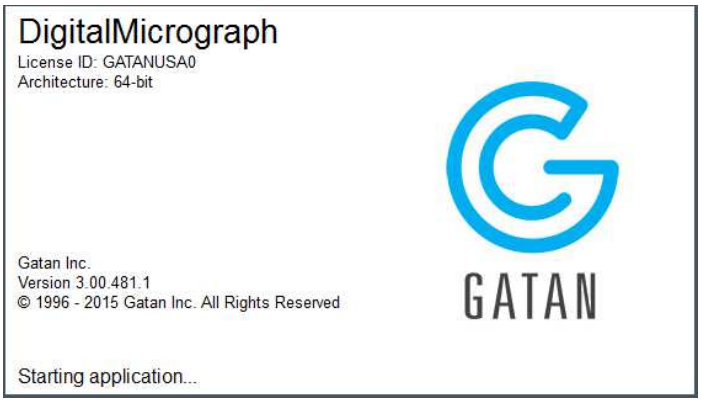
4 DigitalMicrograph

In GMS 3.x DigitalMicrograph software the user interface has undergone a major update. The palettes and menus offer much of the same functionality as earlier versions but the look and feel and behavior has changed significantly. The main changes in the DigitalMicrograph software interface are:

- Experiment oriented workflows
  - Palettes are organized into Techniques
  - Palettes can be collapsed if not needed
- Improved image management
  - Workspaces organize data
  - Automatic image layout
  - Toolbars replaced by right-click menus providing context based functionality
- Convenient window arranging
  - Auto-snap to close edges
  - Automatic resizing to match window size
- Interactive microscope diagram
  - Updates with changes in microscope
  - Simply click on device/detector to activate
  - Start simple acquisitions just by clicking
- Image browser
  - Thumbnail strip display of all image windows
  - Sortable, detachable, built-in image disposition functions

4.1 Splash screen

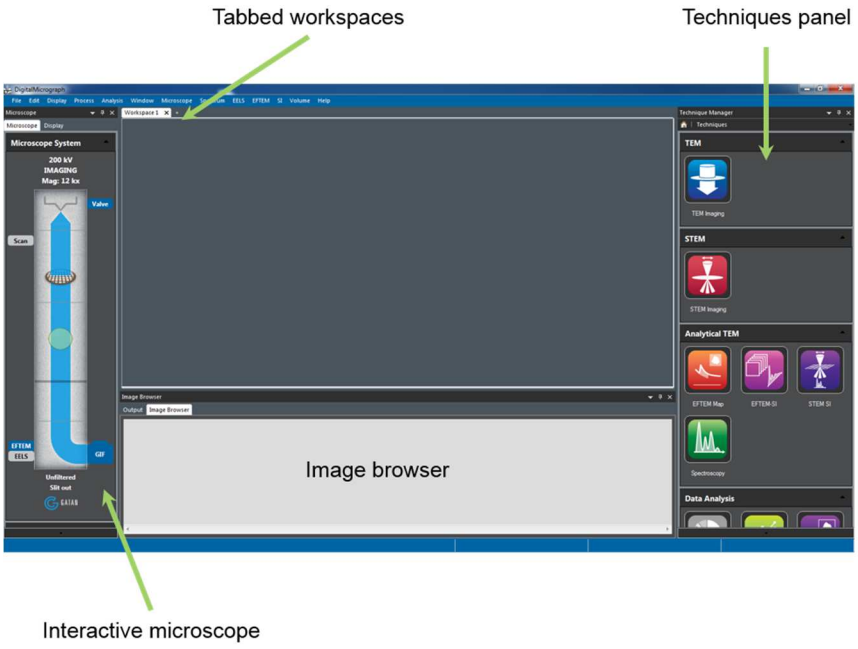
When starting DigitalMicrograph software, a splash screen is displayed providing information about the launch process. The screen shows the License ID, full version number, and progress on which plug-in is loading (in the bottom left hand corner).



A similar dialog is displayed when choosing About DigitalMicrograph from the Help menu.

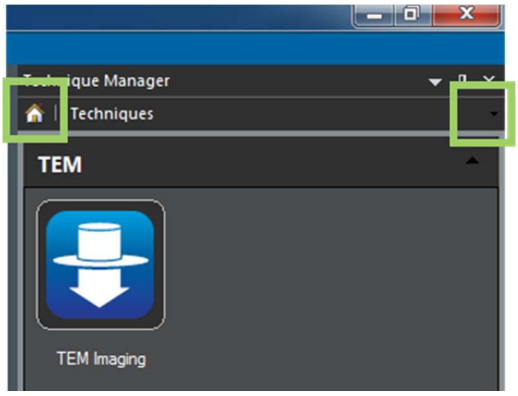
4.2 Overview of the DigitalMicrograph software interface

Below is a view of the main DM software interface. Each item indicates a major new interface feature in GMS 3.x software. A brief overview of each is given in the following sections.

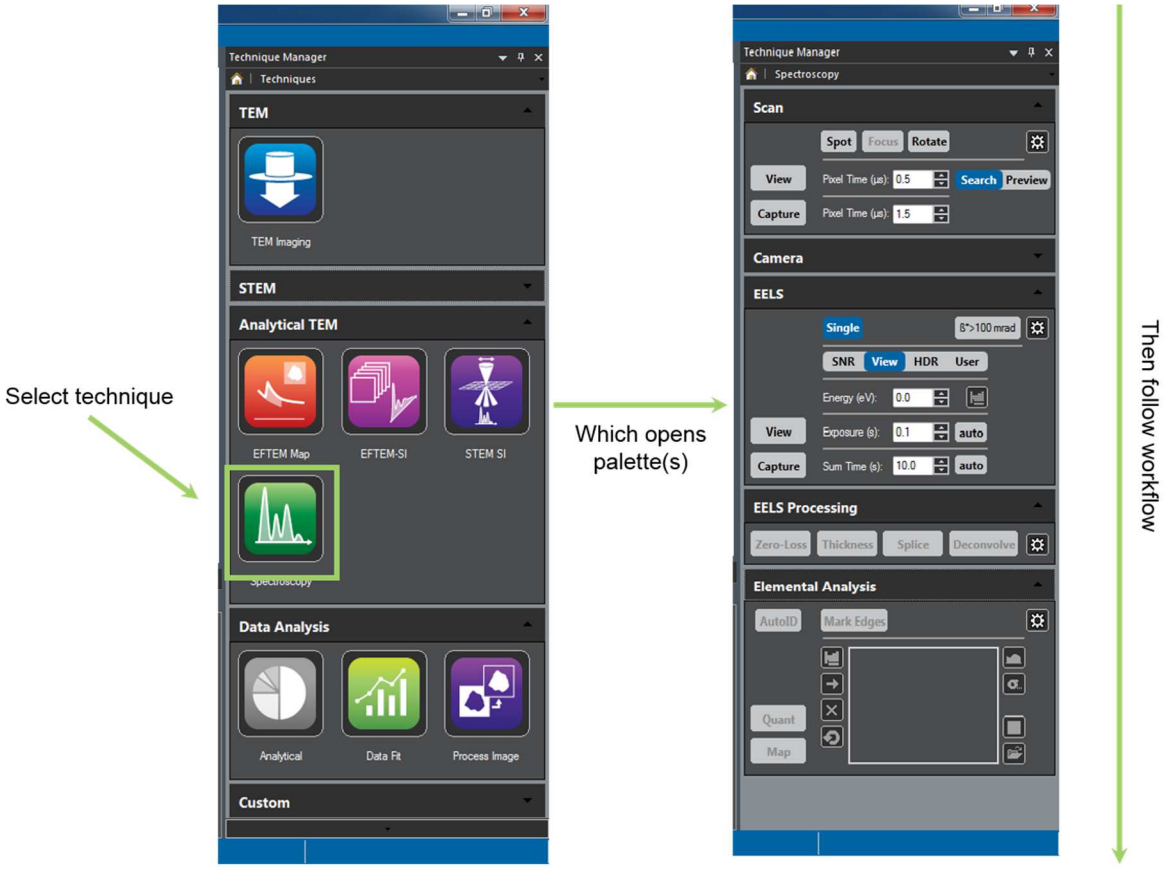


4.2.1 Techniques panel

Your specific equipment configuration and licensed options determine which Techniques shown. By clicking on a Technique icon the applicable palettes will be shown. You can use either the *Home* button or the drop down menu to change Techniques.

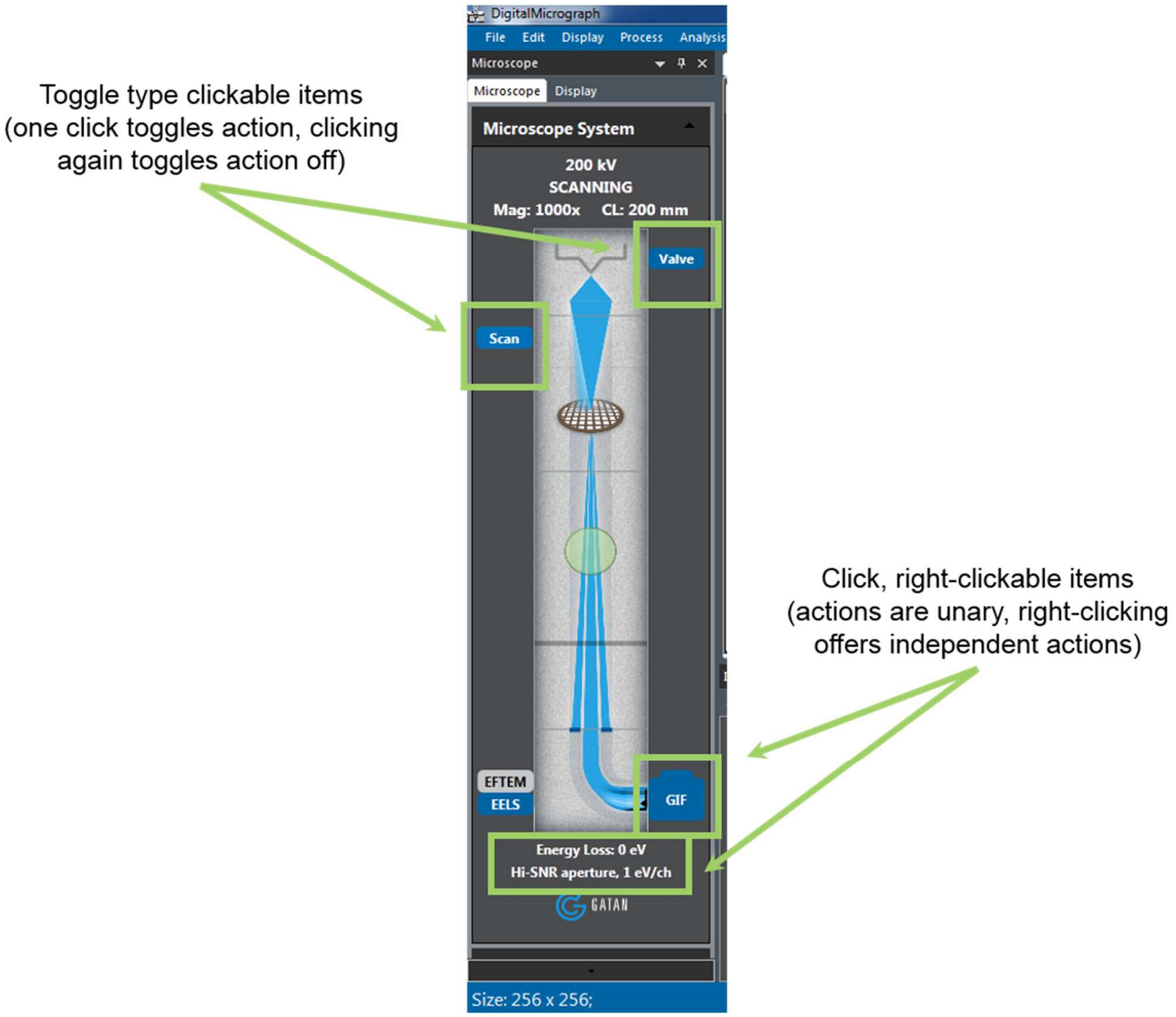


Clicking on a Technique icon will open the associated palettes.

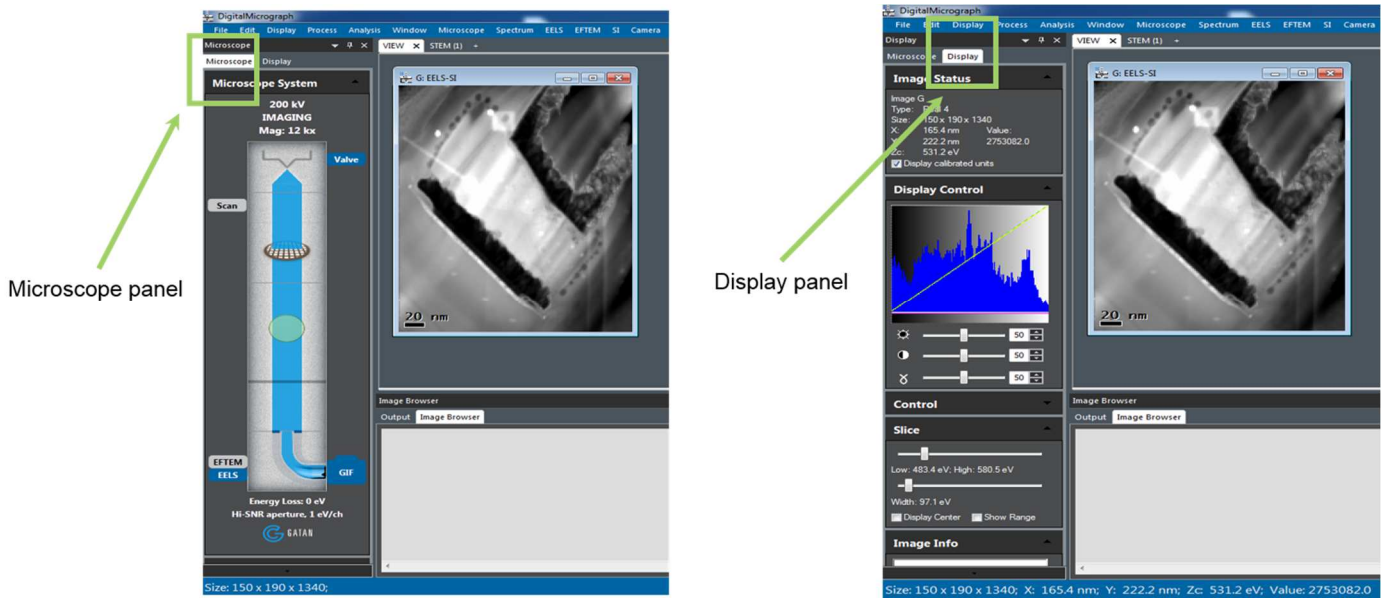


4.2.2 Microscope diagram panel and the display panel

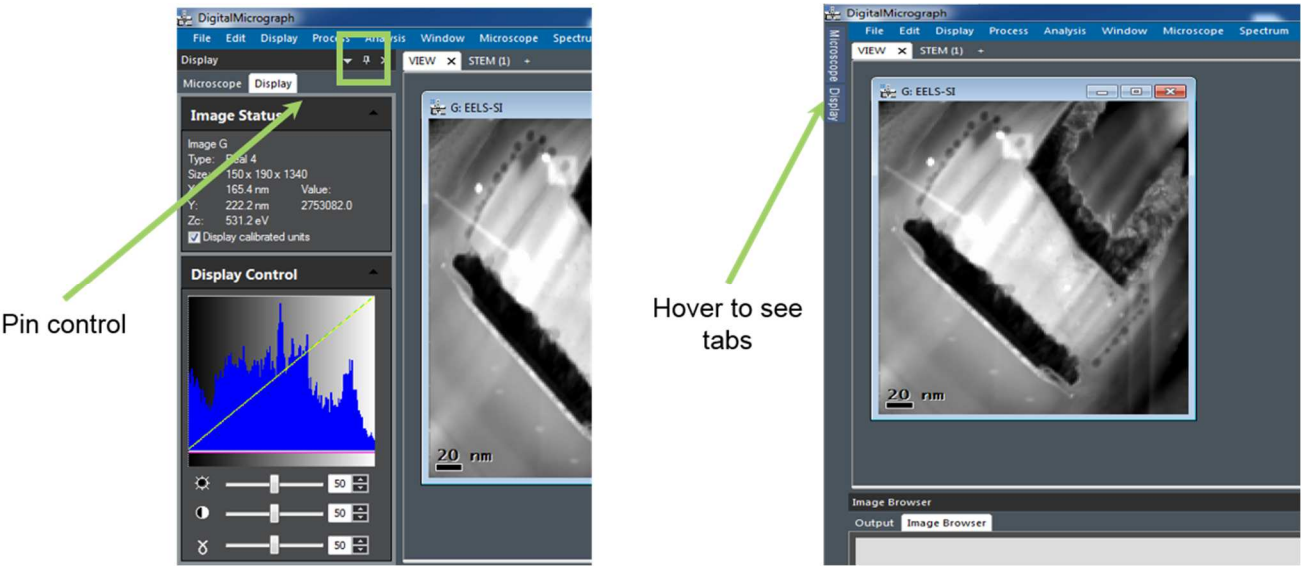
The microscope diagram panel shows the known state of the attached devices wherever possible (not all device report status). Similarly device control (for responding devices) can be accomplished by clicking on the representative portion of the microscope diagram. For select items additional right-click features are available. For example you may click on a camera icon to insert the camera while right-clicking on the camera icon presents the retract option.



Much of what was previously displayed in the left-hand palettes in GMS 2 software is now contained in the display panel. Simply select the display tab to see this information. The image information displayed is associated with the front most image or view.

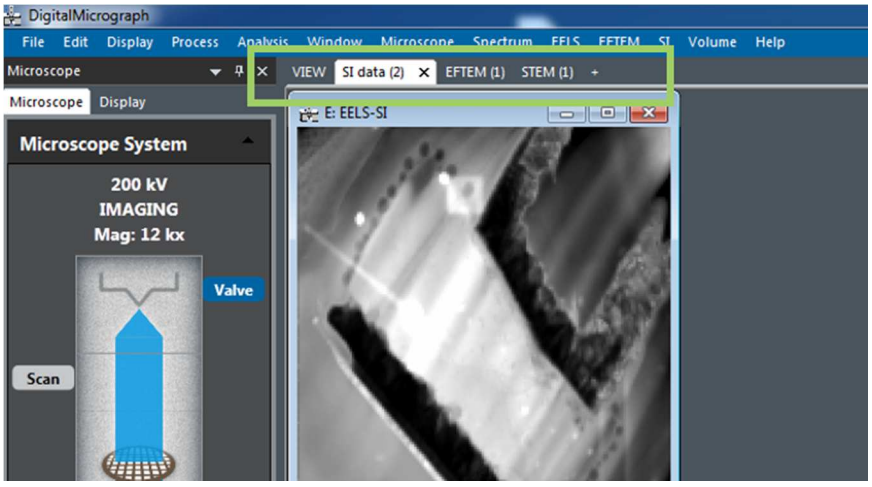


Clicking on the Pin icon will hide the entire left panel. Hovering the mouse cursor over the Microscope or Display tab will momentarily restore the corresponding panel, clicking the Pin icon a second time will restore the panel for constant display. The Techniques panel may also be pinned in a similar fashion.

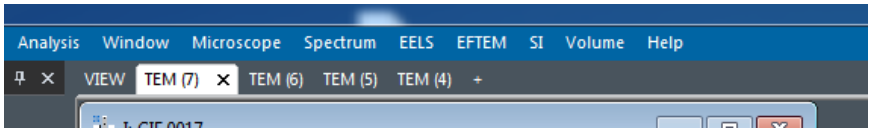


4.2.3 Workspaces and the view workspace

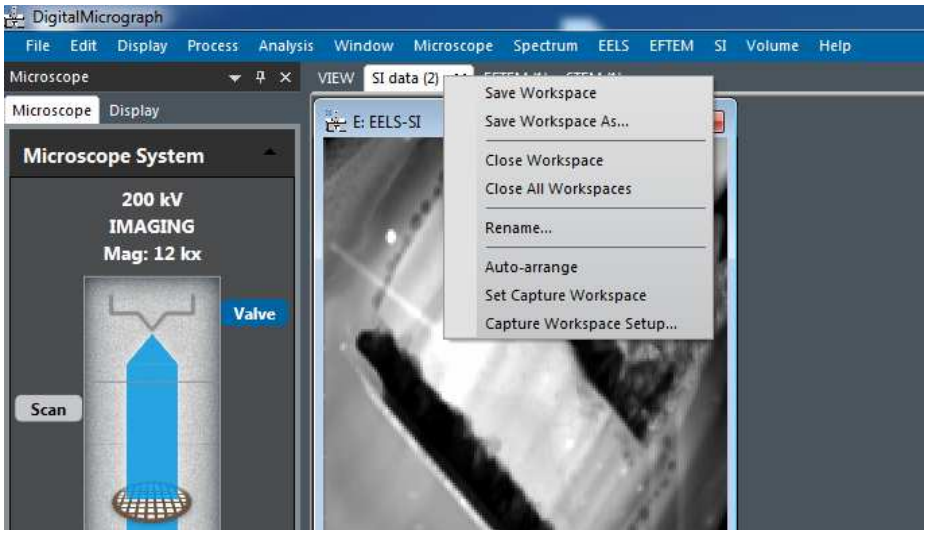
Captured images are directed to a uniquely named tabbed workspace. These automatic workspace names are based on the particular Technique being utilized. The screenshot below shows several named workspace tabs.



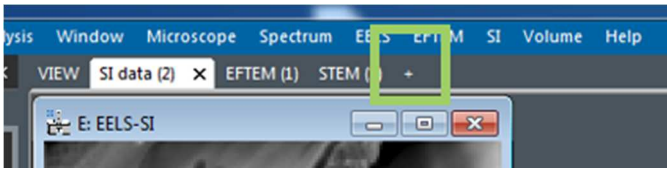
A new workspaces tab is automatically created once the workspace image capacity threshold is reached. This value is user controllable per technique.



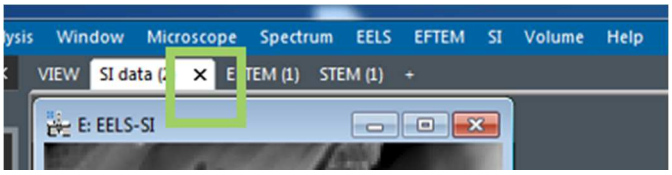
Right-clicking on the active tab brings up a menu of options. Workspaces can be saved in entirety including all images. The auto-arrangement of images, active capture workspace, and workspace options can also be setup through the use of the right-click menu.



A new workspace can be create by clicking on the + next to the last named workspace.

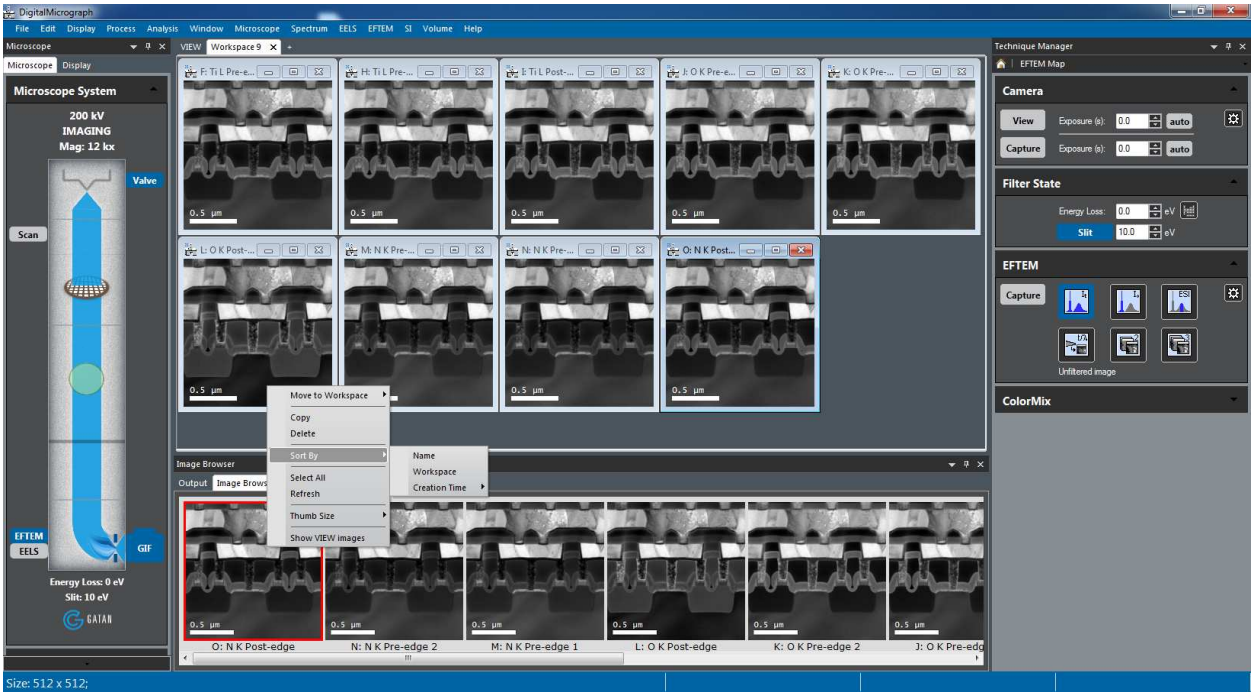


Clicking on the x at the right side of the tab will close the workspace. If the workspace contains any unsaved images, you will be prompted to save them.

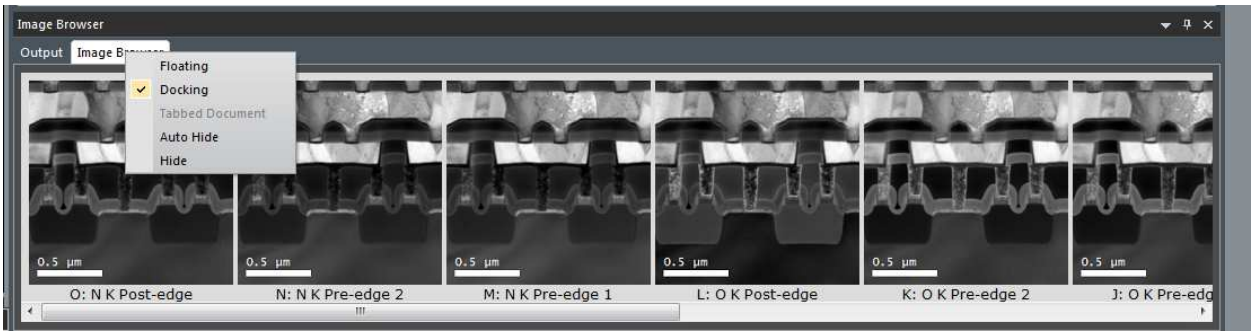


4.2.4 Image browser

The image browser window displays a thumbnail strip of all open images. The window can be scrolled left/right and sorted in various ways by accessing the right-click menu, just right-click on an image within the browser window. Additional functions allow images to be managed/dispositioned into a designated workspace.

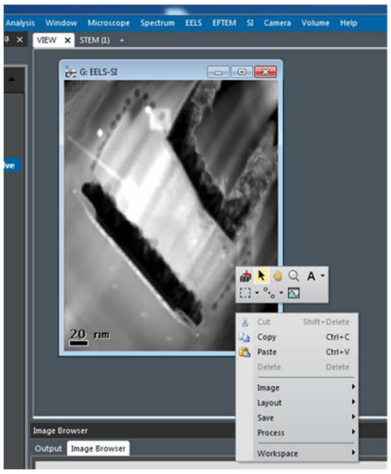


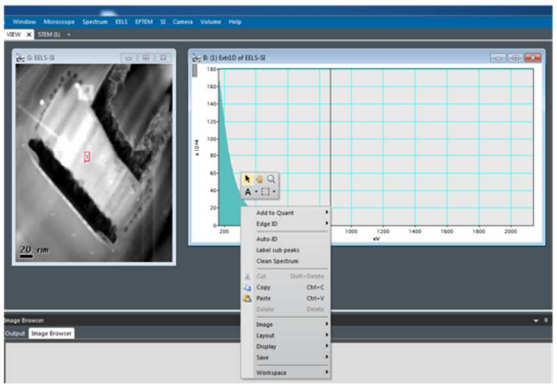
The image browser window may be detached and floated to any desired location on your display. Just click on the image browser window title bar and drag the window to the desired position. Alternatively you can right-click on image browser tab and select Floating.

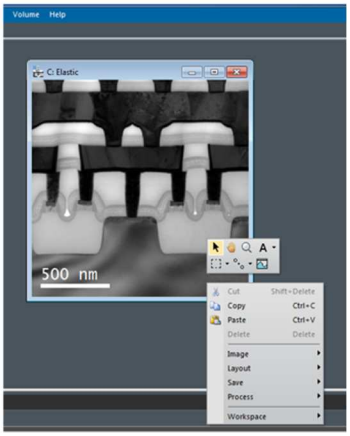


4.2.5 Right-click context based functionality

Functions previously contained in the toolbars in GMS 2 software are now accessed using right-click context based menus. Base functionality is always provided along with additional special functions based on the content of the image type being manipulated (2D/3D image, EELS/EDS spectra, SI image, etc.). Several variations are shown below.

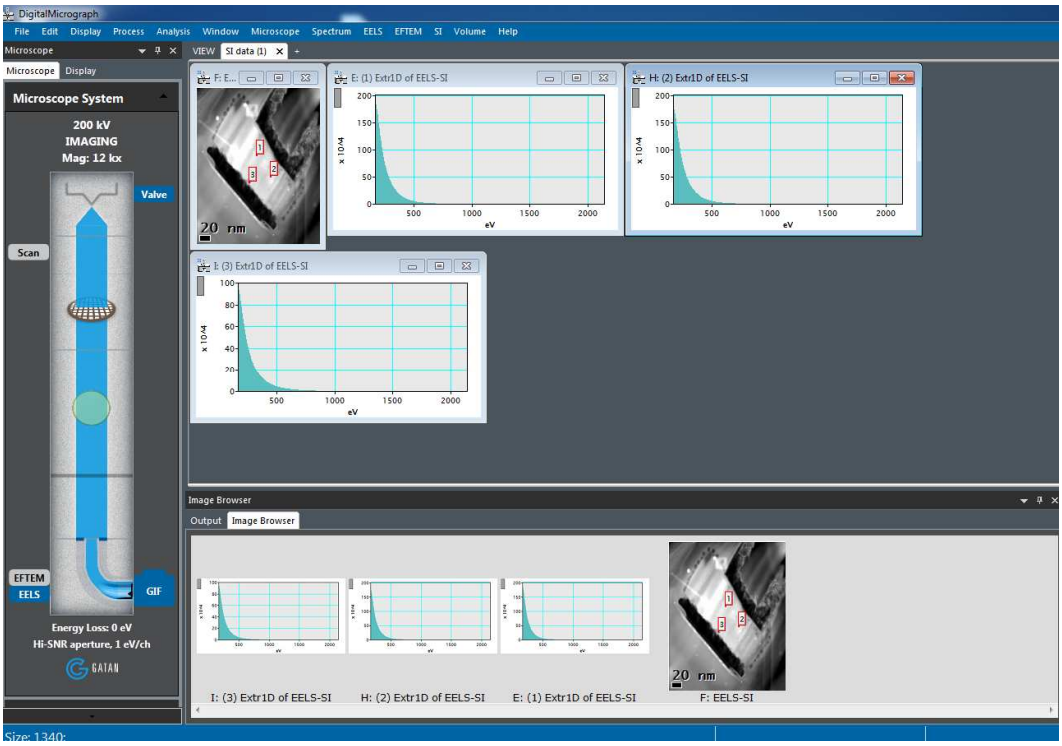




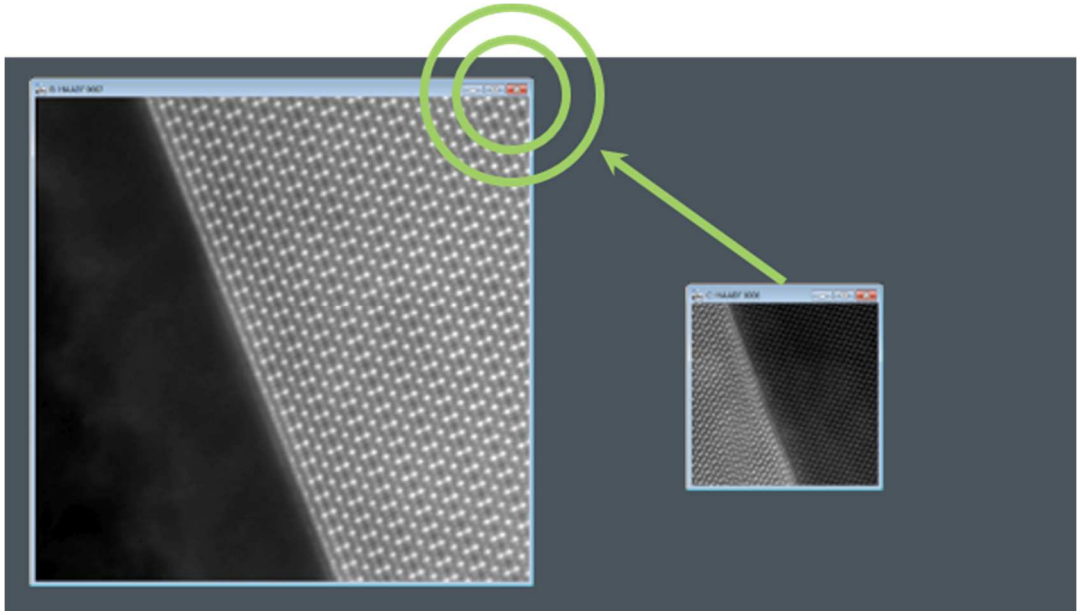


4.2.6 Working with images

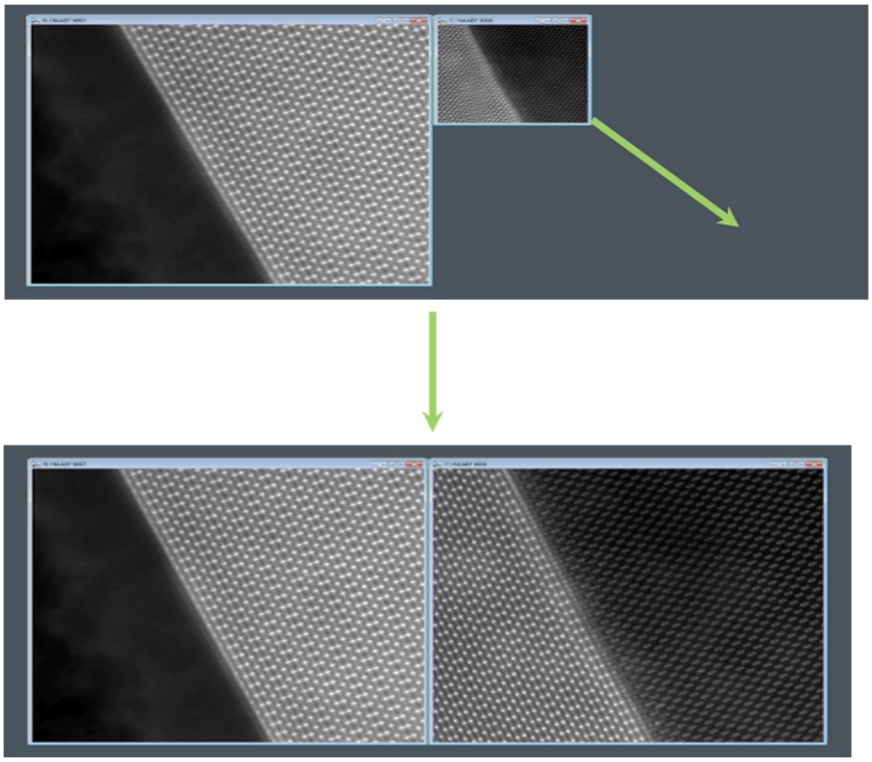
Image windows have automatic layout. DM software can automatically tile images of different aspect ratios. Simply right-click on the workspace tab and select Auto-arrange at any time.



When moving image windows, DM software will auto-align (i.e., snap) images to other images that are close by.

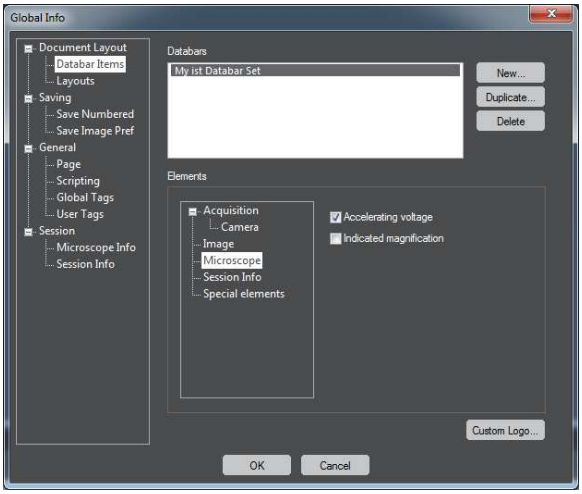


Resizing image windows is now restricted to avoid white border area. Resizing also auto-snaps to horizontal and vertical borders making it easy to resize to match neighboring images.



Adding a databar and layout

In GMS 2 software the concept of a databar was revised and the new concept of a document layout was also added. Any number of databars, or groups of items, can be defined. This is done through the Global



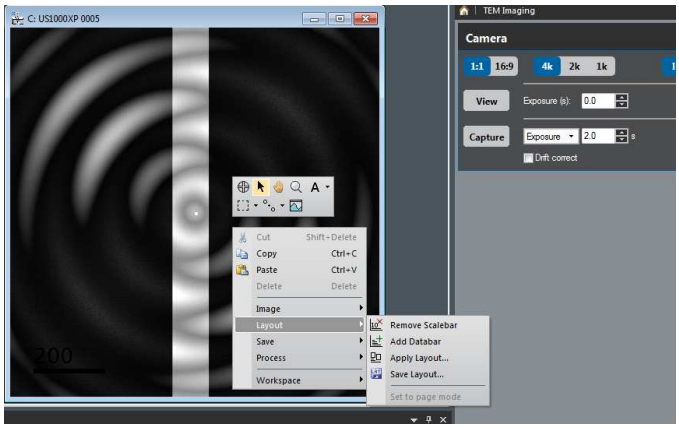
Info dialog (File\Global Info, Document Layout, and Databar Items). Define a New databar group name, then include the desired data items by setting the appropriate checkboxes.

Defining a databar by itself does not carry any implication about the position/color/font (etc.) of these data items. The new concept of a document layout describes how to draw a particular databar, its position/color/font etc. and whether to draw a scale-mark. A given group of databar items can be associated with more than one document layout – a document layout could be created for image mode and a different one for page mode, both of which refer to the same group of databar items.

Image documents now have a type. This defaults to Unknown but is set to Camera or DigiScan for documents containing images acquired from these devices. Layouts can be made the default for a particular document type and mode. Default layouts can be automatically applied after every acquisition. The check box on the layout page of the global info dialog does this. If there are no defined groups of databar items or layouts then checking this box will apply a scale-mark after every acquisition as in previous versions of GMS software.

Image document layout tools

Access to the layout tools has been moved to a right-click menu function. Right-click anywhere in the active image to bring up the right-click menu.



Scroll to the Layout menu and then select the desired function.

There are selections for adding or removing ( ) an existing scale-mark depending on the state. Also available are add or remove ( ) an existing databar depending on the state. If a new databar is added, a prompt is displayed to permit selection of the desired group name.

The last two selections ( ) apply or save a layout, prompting you for the layout name. When a layout is saved, there is an option to have it be the default layout for this document type and mode. This allows a particular group of databar items to be applied and laid out automatically after every camera or DigiScan acquisition.

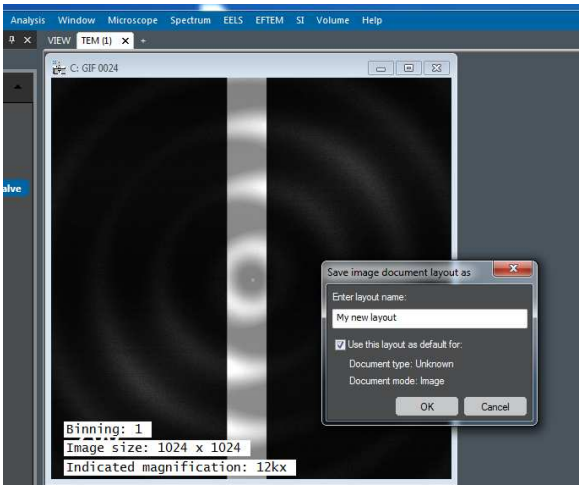
The Set to page mode selection ( ) switches the document mode from image to page and vice versa. It applies the default layout for that document type and mode in each case. This is convenient when you want a layout for viewing images as they acquired, but want to switch to a different layout for printing a document.

Basic image document workflow

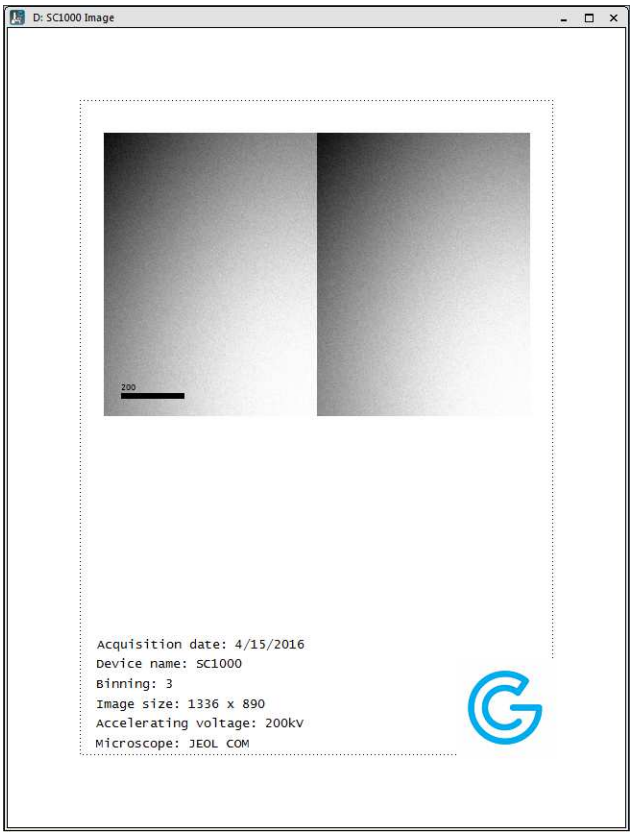
The first step is to create a databar group. This is done on the Global Info dialog; select the *New* button to display the Create new group of databar items dialog. Once a group name is defined it will appear in the groups list. Individual (data) items can be included in a group by activating the appropriate checkbox. The checkbox settings are automatically applied to the highlighted databar group name.

Next, acquire an image (or open an image document) to create an image document window. Then right-click on the image and select Layout→ Add Databar ( ).

Select the desired databar group name and press the *OK* button to add the associated data items to the image window. Now that the items are in the image document window, they can be moved, reorganized, change font, or colors as desired. Once the desired arrangement has been attained, right-click and select Layout→ Save layout ( ) to display the Save image document layout as: dialog.



Define an appropriate name for the layout, which can also be set as the default for the indicated document type and mode. Another useful step would be to format a layout for printing the image in page mode. Based on having saved the layout in the screen shown above, right-click and select Layout→ Set to page mode to produce the image shown below. In this state the individual items can be manipulated as desired, and then a new layout (for page mode) can be saved.



4.3 Additional installation information

The remainder of this manual provides additional installation information covering specific installation cases.

4.3.1 Folders

On Windows 7 there are two main locations for user writable data. Those are the [CommonAppsDataFolder]\Gatan folder and the [UserDataFolder]\Gatan folder. Appendix A: Common applications data folder and Appendix B: User data folder show what actual folders correspond to on the different operating systems.

4.3.2 Backups

The installer will back up the entire contents of any previous GMS 2.x software installation in the [CommonAppsDataFolder]\Gatan folder.

All preference files will be copied to the new preference file location as well as the Reference Images.

4.3.3 Plugins folder

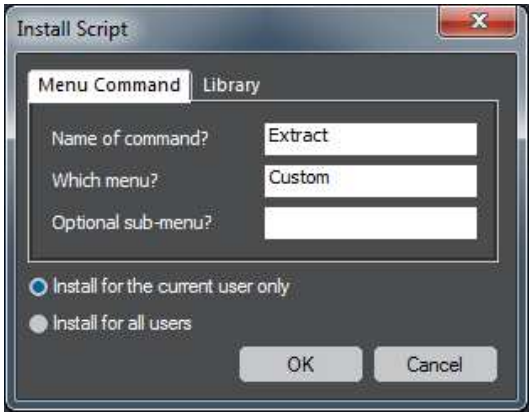
Two locations have been made available for users to install their own plugins.

1. The system shared plugins folder is “[CommonAppsDataFolder]\Gatan\Plugins”. This folder is read at DM software startup for any user. This would be the typical location for service plugins.
2. The user specific plugins folder is “[UserDataFolder]\Gatan\Plugins” where a user can put scripts and plugins that will only load when they are logged onto the system.

4.3.4 User preferences and custom functions

In addition to the system preferences files stored in the “[CommonAppsDataFolder]\Gatan\Prefs” folder, there is also a user preferences folder in the user area: “[UserDataFolder]\Gatan\Prefs”. These folders contain the *.prf file for preferences and stored Custom Functions.

When installing scripts from within DM software the user has two choices regarding who has access to the installed script, see the radio buttons at the bottom of the dialog shown below.



When choosing Install for the current user only, the Custom Function is stored in [UserDataFolder]\Gatan\Prefs\DigitalMicrographCF8.prf. When choosing Install for all users, the Custom Function is stored in [CommonAppsDataFolder]\Gatan\Prefs\DigitalMicrographCF8.prf.

5 Application layout

Other data that used to be stored in preferences is now stored in the registry. This applies to the location of the application window, which floating windows are open, and where they are displayed. This data can be found in HKEY_CURRENT_USER\Software\Gatan5\DigitalMicrograph. Deleting this key will result in DigitalMicrograph software resetting to the default layout.

Note: Extreme care should be exercised when making any changes to the Windows registry.

6 Moving to a new computer

If the GMS software is going to be migrated from one computer to another, certain files and folders that contain microscopy hardware setup data and preferences specific to your configuration environment will need to be copied from the old computer to the new computer.

Normally, when the GMS 3.x installer performs an upgrade over a GMS 2.x or 3.x configuration, all necessary hardware configuration and preference files would automatically be copied to their new locations. However, for the case of switching to a new computer, these folders and files will need to be copied manually. All files in the following folders should be copied from the old to new locations as follows (see Appendix A: Common applications data folder for OS locations of the CommonAppsDataFolder):

To the information in this directory to the new computer
[CommonAppsDataFolder]\Gatan\Prefs
[CommonAppsDataFolder]\Gatan\Factory Configurations
[CommonAppsDataFolder]\Gatan\Prefs
[CommonAppsDataFolder]\Gatan\Reference Images

In addition, the following files should be copied to the indicated folders when a Gatan instrumentation bin (GIB) exists:

To the information in this directory to the new computer
[CommonAppsDataFolder]\Gatan\Prefs
[CommonAppsDataFolder]\Gatan\ Factory Configurations\Filter\GIF

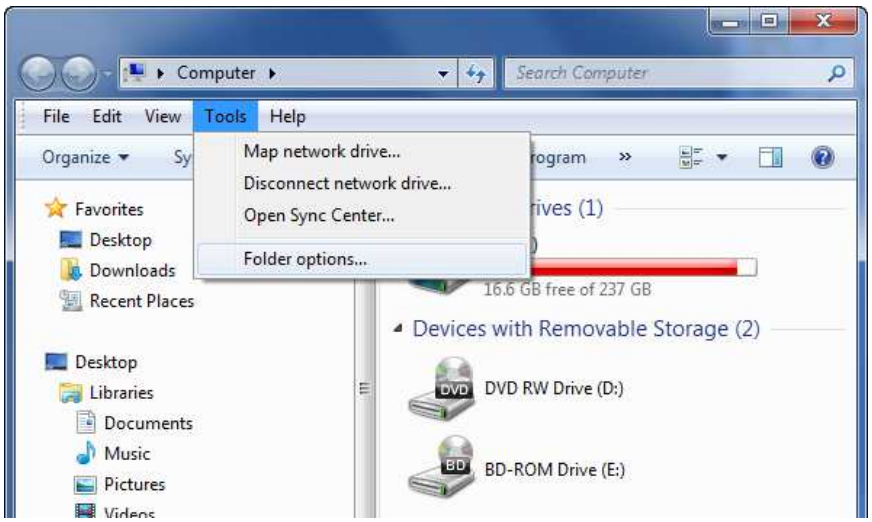
Appendix A: Common applications data folder

On Windows 7 the Common Applications Data Folder is located at C:\ProgramData. C:\ProgramData is a hidden folder, so to browse to this folder you have two options:

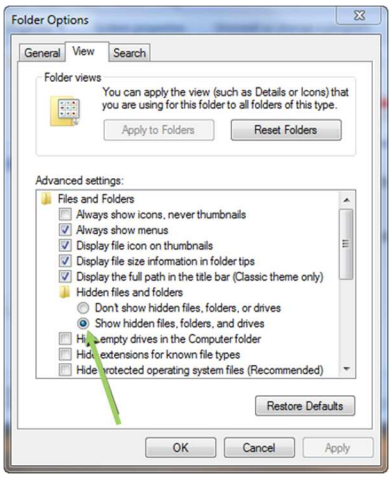
1 Set the system up to show hidden folders:

a. Open Explorer by double clicking on the Computer icon on the desktop

b. Choose *Folder options* from the *Tools* menu



c. In the *Folder options* dialog, click the *View* tab, and select *Show hidden files, folders, and drives*

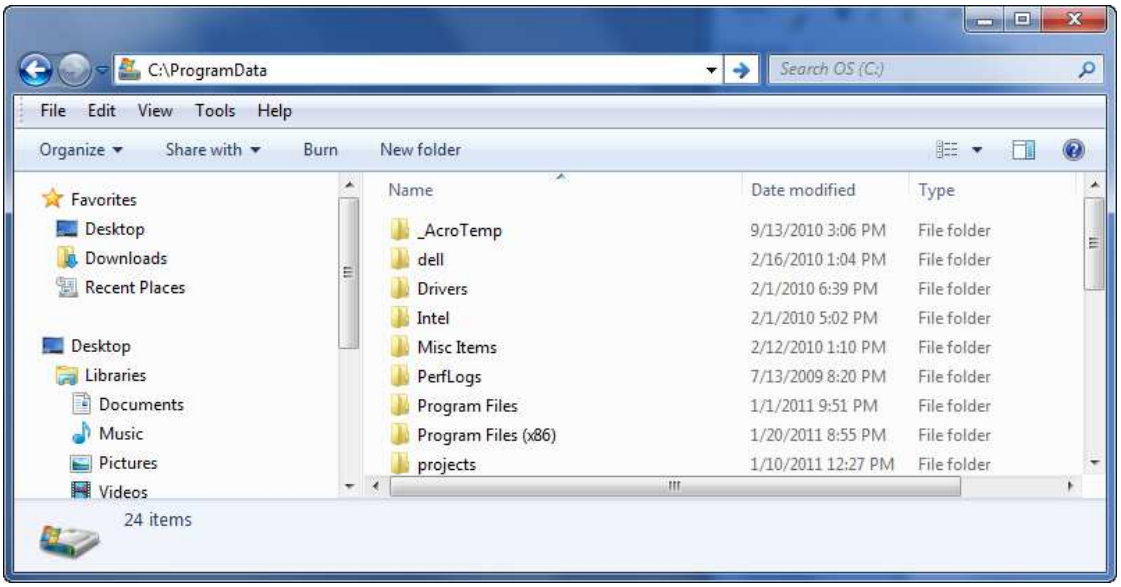


Hit the *OK* button. The C:\ProgramData is now displayed in Explorer and can be browsed to.

2 Browse by typing in the address bar:

a. Open Explorer by double clicking on the Computer icon on the desktop

b. Place the cursor in the address bar and type C:\ProgramData



c. And hit *Enter*. You are now in the C:\ProgramData folder as displayed in the address bar

Appendix B: User data folder

On Windows 7 the User Data Folder is at C:\Users\User-Name\AppData\Local where User-Name is the actual name of the Windows logon user. The AppData folder is a hidden folder, so to be able to browse to this location you have to either choose to not hide hidden folders or type the required path in the address bar, as explained in Appendix A: Common applications data folder.