



## Merge Healthcare

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### eFilm 2.1

eFilm 2.1 offers significant improvements to functionality in a number of areas.

#### eFilm Workstation 2.1

Users of the downloaded version – eFilm Workstation – will see the following improvements:

- **Incorporate Advanced Visualization Applications**

eFilm now supports a suite of Advanced Visualization applications. These applications will require additional licenses before they can be run via eFilm. Two packages will be available by download from the eCommerce web site:

- 3D/4D Review
- AccuStitch

The remaining packages will be sold via Merge eMed's direct sales channels as they will require extensive end user training:

- CalScore Review
- Colon Review
- Lung Review

- **New CD Burning Library – fewer “Unsupported Devices”**

eFilm 2.1 incorporates a new CD burning library. This library will attempt to write to any device. While success cannot always be assured, it is much more likely that eFilm will be able to write to a given device (especially a relatively new one) than it has been in the past.

- **Copy Annotation and Measurements**

This is intended to facilitate **Spine labeling** among other applications. The user can create Annotation and/or Measurement objects. They can position the mouse over the objects and select one of the objects to modify it. While an object is highlighted, they can right click and choose one of the options that is presented, including copying the object to all the images in the series, moving it, or deleting it.

- **Thumbnail sizes**

The size of the thumbnails can be adjusted to suit the user's preference, or an “auto” option exists which allows eFilm to choose the thumbnail size according to the monitor resolution.

- **Display RT Images**

The display of Radiation Therapy (RT) images is now supported.

- **Limit Range of MPR**

In order to save memory when performing MPRs (thereby permitting reconstructions of larger data sets), the user can specify that only a limited portion of the input stack is used to create the MPR images. Dashed lines that indicate the limits of the range are presented on the source stack. Also crosses are presented at the ends of the MPR control line that can be moved to change the length of the output images. This helps to ensure that only the relevant portions of the anatomy are included in the output images, which will reduce the total amount of memory required for the MPR operation, and allow eFilm to handle larger data sets as a result.



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- **Option to display Patient Age on Overlay**

An option has been added to the Preferences Properties page, that causes Patient Age is to be displayed on the Image Overlay.

- **Split a Series**

For a Series that has images that overlap (e.g. a multi-phase CT abdomen) eFilm can split the series into the appropriate number of sub-series (based on where they overlap in the patient) and the new sub-series that are created can be viewed independently. The new sub-series can also be synchronized using the manual or auto-synchronization feature, which is particularly useful when viewing multi-phase contrast enhanced studies.

- **Automatic Timed UI Locking**

To assist customers in achieving HIPAA compliance by restricting access to patient information, eFilm now offers an option to hide (and lock) the eFilm user interface after a settable period of inactivity on the part of the user. This behaviour can be controlled by an automation client such as a RIS. It is on by default.

After eFilm times out it will hide the User Interface and put up a message box requesting the user to provide their login credentials. In order to handle the case where a user may walk away from a workstation and not be available to unlock the eFilm session, there will also be an option to login a new user, which will end the previous user's session.

- **Audit Enhancements**

To assist customers in achieving HIPAA compliance eFilm logs events when certain operations are performed on data:

- Import or export DICOM or other formats of images
- Create or read DICOMDIR files, on any media that can be read by eFilm
- Retrieve or send images from/to any remote DICOM server, including the Image Channel
- View images
- Delete a study
- Print images
- User login/logout

All logging occurs at the study level. The study instance UID and associated DICOM tags are logged. If only a subset of a study is viewed -- for example one series in a study, a single image, or only key images in a study -- the HIPAA log simply indicates that the specified user viewed the study as a whole. The details of exactly which images/series were viewed are not logged.

After a log file reaches a certain size, a new file will be started for new log entries and the previous log file will be automatically compacted. The number of log files a system can support is limited by the disk space. It is the user's responsibility to backup the log files and delete them from the system.

- **Warn if Disk Usage is Nearing High Water Mark**

There is a new option to warn a user if they are approaching the high water mark so they can clean up their disk before eFilm does it for them. The user can control this behaviour via the Preferences dialog under the Properties menu.



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- **HIS/RIS SDK Enhancements**

- eFilm 2.1 will provide the means to query by StudyInstanceUID directly.
- An interface has been provided to allow the Automation Client to provide a list of related studies. If this interface is invoked, the Right Click menu and Thumbnails will display only information associated with these studies. This permits a workflow application to use its own relevancy rules to control which related studies the user will be presented with (e.g. the workflow client may provide only the most recent 3 related studies from a particular modality)

- **Keyboard Shortcuts for Sub-menus**

In eFilm 2.1 it will be possible to assign keyboard shortcuts to submenu items such as a particular zoom mode or window level mode, or stack order.

- **Automatically Restart Essential Services After a Rebuild is Complete**

eFilm services that were running before a rebuild was started (and only those services) will be automatically restarted once the rebuild is complete.

- **Support for JPEG 2000**

Both Lossy and Lossless transfer syntaxes are supported.

## Fusion eFilm Updates in Version 2.1

Users of Fusion eFilm (customers with a Fusion solution such as Fusion PACS, Fusion RIS, Fusion RIS/PACS) will enjoy all of the new features listed above and in addition the following improvements.

- **Hanging Protocol Builder**

The user can configure the screen and capture the view as a Layout in a Hanging Protocol. They may either save the results as a new Hanging Protocol or if there was a Hanging Protocol in effect when the Builder was started, the changes can be applied to this Protocol.

For each of an arbitrary number of layouts the Hanging Protocol Builder allows the user to specify:

- Screen and Viewport configuration
- Viewing parameters: zoom, orientation, window level, invert, etc.
- Which studies, series and images go in which viewport

The Builder allows the user to update an existing protocol (if they created it) or create a new protocol, and save it in the database.

- **Other Hanging Protocol Enhancements**

- **Alias File**

A text file called the Alias file now exists on the machine where the Visualization services are installed. This file may be read and changed only by a system administrator on the server. The file will be read by the Hanging Protocol server when it starts up. The contents of the file would be a set of aliases for study description, series description or other string-type tags that might occur in a hanging protocol when the EQUAL operator is used. The Alias file will be used by eFilm to



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map multiple such inputs found in images into a single output that would be specified in the Hanging Protocol. It provides a way of avoiding creating multiple Hanging Protocols.

- **New Operators**

New operators have been added to allow more flexibility in selecting studies and images for display via a Hanging Protocols.

- **Improved performance via Image Channel**

If a site is configured with Merge eMed's Image Channel, users should notice improved performance in display speed via the Image Channel.

- **Quicker Time to First Image**

This item was first featured in eFilm 2.0.3. In earlier versions, eFilm would query for related studies prior to displaying the first image in a selected study. Unless a Hanging Protocol has been requested, eFilm now displays the first image immediately and then makes the query for related studies. The user may not immediately see related studies in the right click menu or Thumbnail panel, but they will be able to start looking at the primary study right away.

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## eFilm Workstation 2.0.3

eFilm 2.0.3 is a service pack, based on the functionality of 2.0.1 with a number of defects fixed, as listed below

<b>Tracking Number</b>	<b>Abstract</b>
1-2MSF9	Performing MPR on a series created by eFilm's Save MPR operation results in incorrect orientation
1-2HLEN	Require a secondary sort key for stack tool
1-2IFST	Study Manager is unable to retain custom Study List positions
1-2IUWT	For some studies, initial W/L display values are set to 0/0 when auto calculated
1-2JBAO	Non-HFS scans 3D direction can be labeled incorrectly for Simgram/MIP
1-2K51X	Add logging events to eFilm log
1-2NM4P	Unnecessary disk storage when saving MPR images.
1-2PFPT	efilm ver 2.0.1 does not print reference lines on some images
1-2PHN9	Import or open of files with blank PatientID adds 'fake' ID from database to DICOM Header of file.
1-2POFP	Siemens CR causes eFilm 2.0.1 to crash on open
1-2PTZS	Secra Images cannot be imported into eFilm
1-2Q91E	Fake Patient ID is shown in StudyManager
1-2QCFL	Out of Memory error by displaying Explicit VR Big Endian
1-2R8VF	Too long time to first image when Image Channel configured
1-2R8VO	Delay when starting eFilm on Windows 2000
1-2RM6T	Crash triggered on Study Manager after performing Series level retrieves
1-2RSQY	MRA series result in MPRs with distinct empty "bands" for some studies
1-2TK6J	Give the user feedback when querying the Image Channel for related studies
1-2U4P5	eFilm cannot display a CT image overlay properly resulting in a blank viewport



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<b>Tracking Number</b>	<b>Abstract</b>
1-2UKWZ	Require 3rd sort key for Multiframe images
1-2UWV1	Creation of volume MPR series results in duplicate entry in RCCM
1-2V2Q5	MPR on Gantry tilted study results in skewed image
1-2WJ4W	Change Status button from Study Manager doesn't bring up dialog

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## eFilm Workstation 2.0.1

### What's New in eFilm 2.0.1

eFilm 2.0.1 is a service pack, based on the functionality of 2.0.0 with a number of defects fixed, as listed below. Note in particular that the following 2 safety defects fixed in 2.0.0 Hotfix 1 are included in eFilm 2.0.1:

#### CD Burning Improvements

This service pack also incorporates a new release of the CD burning libraries so that more recent devices will be supported. Of note is a new feature of the CD burning libraries that will allow a file to be updated at run time with devices that are not on the list of supported devices. If a device's id appears in this file, eFilm will attempt to burn using this device. eFilm will not necessarily succeed in doing so, or it may succeed in using the device but not be able to utilize all of the device's features (such as maximum writing speed). More information on this is available in a white paper which will be available in the eFilm Knowledge Base.

#### Auditing

This service pack also has additional event logging to the eFilm log files that records information about user access to images for the purpose of supporting a site in achieving HIPAA compliance. The following information is logged to the file \*\_AUDIT.log in the install log directory:

<PatientID> <PatientName> <StudyDate> <Accession> <UserName>  
<StudyInstanceUID>

#### Defects Fixed

**MPR:** there is a bug in our MPR software, which will manifest itself if you perform an oblique MPR on a data set which was itself acquired at an oblique angle to the patient's principle axes. The effect of the bug is that the MPR image will be compressed by up to about 30% (the error depends on the oblique angle



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of the data set) and length measurements on the MPR will be reduced by the same factor.

**3D:** there is a bug in our 3D code which will manifest itself if you perform a 3D rendering of a data set acquired in the sagittal plane using the hardware-accelerated version of the 3D software. You will see that the orientation labels on the 3D cube at the bottom right hand side of the screen reverse the left and right sides. It can be difficult to tell whether you are using the accelerated version of the software, but to be on the safe side, you should assume you have this version. To be certain, here is how you can tell: When you invoke the 3D software and the data set is being interpolated, in the OLD version of the software (that does not have the problem) there will be a spinning cube beside the progress bar. The spinning cube was removed from the newer version of the software. Please go to the Merge eFilm website and download the patch that we have created to fix these problems.

The following list contains the defects fixed in this release:

- When data LUT is applied users cannot quickly toggle to linear W/L
- Unable to View from Remote Exams tab in 2.0.
- Gantry Tilt is not handled for studies where Patient Position is not HFS
- Studies with 64 char (or close to 64 chars) in Study Instance UID cannot be packaged
- Unable to view images in eFilm 2.0 if the Patient ID tag in the dicom header is blank
- Multiframe images and hanging protocols do not work.
- when trying to run eFilm 2.0, user gets "unable to modify toolbar settings" error
- Custom installation on "eFilm Workstation" branded eFilm contains entry for Hanging Protocols
- Series laterality column being populated for images that don't have it.
- Samples of Acuson YBR\_FULL image always contain at least one green-tinted image
- Unable to burn CDs in eFilm version 2 with supported CD burner
- Request to display the Series Desc on status bar when in HP mode
- oleOpenStudy3 with Patient ID and Accession Number will report that it failed if it succeeded
- Image Channel, images keep refining in the background.
- CR image errors out during "packaging" process with create Cd function in ver 2.0
- DICOM Print & film size setting



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- Set the residual display set names to the original series descriptions so that the RCCM will show
  - Memory error occurs when you create MPR image and click Clear Measurement Tool
  - Study/Root level DICOM Query to eFilm 2.0 using Study Instance UID returns no results
  - Upgrade over 2.0.0 cannot be installed to default install dir
  - On upgrade user is presented with a screen regarding clean up of old files - shouldn't be there
  - Fusion eFilm failed to install into the default directory when installing over eFilm Workstation 2.0
  - Add logging events to eFilm log
  - Fusion eFilm custom installation has a checkbox labeled "NewFeature1"
  - Choosing "Custom Installation" results in various errors when upgrading from an older eFilm install
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## eFilm 2.0

There are now two products in the eFilm family: This version log only explains what is in eFilm Workstation 2.0. An additional version log will be available for FUSION eFilm 2.0 which is available for FUSION PACS and FUSION RIS/PACS customers.

**eFilm Workstation:** eFilm Workstation 2.0 is a separate product that is available as downloadable desktop software from [www.merge-efilm.com](http://www.merge-efilm.com). eFilm Workstation and FUSION eFilm both have the following new features: thumbnail images, which simplify the task of choosing images and display layouts; PET/CT Fusion, a process whereby separate studies from PET and CT are fused for ease of viewing; and enhanced user and login authentication, supportive of HIPAA requirements. Additionally, for the many orthopaedic users of FUSION eFilm and eFilm Workstation, the new versions also support true size printing, which allows an orthopaedic surgeon to specify a scale factor that will result in true-sized DICOM printing, which is needed for orthopedic templating when using acetate templates.



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## 1 New Features in eFilm Workstation 2.0

### 1.1 Thumbnail Panel

eFilm 2.0 introduces a Thumbnail panel which can be toggled on and off via a new Toolbar icon. The thumbnail panel will consist of a number of tabbed views, where each tab corresponds to a study that the user has selected for the current window. Changing Windows will cause the Thumbnail panel to change to the study/ies associated with that window. Each tabbed view has a number of images. For CR, DX and MG modalities, there will be one Thumbnail image per image in the study. For other modalities there will be one thumbnail image per series in the study, and the image chosen for display will be the one in the middle of the series.

A user can drag and drop a Thumbnail image into any viewport and eFilm will load the corresponding image or series into that viewport.

Thumbnails can be displayed for all Study Manager tabs. If a thumbnail is being displayed for a study that is in the process of being transferred, the user can select a Refresh button to update the thumbnail as the transfer progresses, and new series and images are obtained.

The thumbnail panel is re-sizeable and the shape and position of the panel will be remember for each user between invocations of eFilm.

### 1.2 CT/PET Fusion

For studies that include both CT and PET data, eFilm will provide the ability to display Fused images. A Fused image blends two image to produce the result. The blending factor, which determines the relative contribution of each input image to the output, can be adjusted interactively. The user can choose different color maps with which to display the Fused images.

eFilm 2.0 will not provide the ability to align, or register data sets. The Fusion operation assumes that the two input data sets are already aligned – they must occupy the same x-y locations. (eFilm will choose the correct z-location for the two images to ensure they are aligned in the z-direction). In general, data sets from CT/PET scanners will be well aligned, but if the data sets are not accurately aligned due to patient movement or other factors, this feature will not produce good results.



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### **1.3 True-sized DICOM image printing**

True-sized DICOM image printing allows a user to specify that an image will be printed at a particular size. The user can also scale the image if necessary to ensure that the image can be matched to an orthopedic template.

### **1.4 Other Enhancements and Features**

#### **1.4.1 Drag and Drop JPEG images**

You can now drag and drop JPEG or DICOM images into eFilm from the desktop (note that eFilm must already be running for this to work, due to the need to login to eFilm). You can also associate eFilm with JPEG and DICOM images and double click on an image on your desktop to open it. (For this to work, eFilm must already be running, due to the need to login – see below).

#### **1.4.2 Option to view un-split Multi-echo MR series**

Add an option to not split multi-echo MR series (previously eFilm would automatically split multi-echo series into two “virtual” series).

#### **1.4.3 Suppress display of Scroll Bars by Modality**

eFilm now has a Properties option to disable vertical scroll bars (by modality) in series windows. This is useful for projection modalities such as CR or MG, if you wish to regain the screen space used by the scroll bars or reduce the amount of brightness coming from the monitor (since the scroll bar is usually a fairly bright gray).

#### **1.4.4 Display Image Laterality on Overlay**

Add Laterality to overlay display (when it is present in the image data). This ensures that the user knows which side of the patient has been imaged.

#### **1.4.5 License Nag Screen Control**

Change the behaviour of the limited-time license “nag screen” that appears if the user has a time-limited license so that it first appears one month from the expiry date, and thereafter will re-appear at a time of the user’s choice.

#### **1.4.6 Hide Image Scale Marker**



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Change the behaviour of the image scale marker that is displayed on an image so that it will not be displayed if the Image Overlay is toggled Off. This ensures that if the scale marker overlays image data, it can be removed.

### 1.4.7 Export of Images via HIS/RIS SDK

Enable export of images in jpeg, tiff or bmp format via the HIS/RIS automation interface. This will allow eFilm partners to export these to other applications without having to involve the user in browsing on the file system to find the images.

### 1.4.8 1-1 Pixel Display

eFilm Workstation 2.0 provides a zoom option (1-to-1) to display images with no zoom and no interpolation. When this option is chosen, each pixel on the image corresponds to one pixel on the screen. (In previous versions of eFilm even if the image had a zoom factor of 1, it was possible that there was some interpolation being performed on the image). This feature is required in various EC countries.

### 1.4.9 DICOM and IHE PDI compliant CD burning

There is now an option in eFilm that will permit fully DICOM compliant CD's to be generated. All data (with the exception of RLE compressed images) will be written to the CD in ESE format, as required by DICOM. To be fully compliant, the user must not specify the eFilm Lite option since it includes file names longer than 8 characters. eFilm is also an IHE PDI compliant display, and will properly notify the user about any objects on a CD that eFilm is not capable of handling (such as Structured Reports).

### 1.4.10 Scrapbook Image Sorting

Images selected from multiple series and/or studies for scrapbooking will be shown in the resulting scrapbook with a new image order based on order of selection; unlike previous versions the original image numbers will not be retained.

## 1.5 eFilm Lite 2.0

eFilm Lite 2.0 will not have support for:

- Hanging Protocols
- Key Images
- Thumbnails



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- ❑ Login / Authentication
- ❑ Roaming Profiles

## 2 Defects from Earlier Releases Resolved in eFilm 2.0

Defect Number	Abstract
1-1FM9Y	Order Voxgram - Crashes during file creation
1-1H1EX	Usrwrdir.exe fails to execute during installation
1-1N3F5	Cannot encrypt while sending studies with long patient names
1-1QNPL	Overlay reports completed refinement but is apparent that image not fully refined
1-1QSL1	Currently cannot save user profiles
1-1QSL9	Cannot create CD packages
1-1QSLP	efLogin.dll included in installer causes a crash when launching eFilm
1-1QW1L	Crash when calling Apparent Diffusion Coefficient series up with RCCM
1-1R2B1	Send or Retrieve a study with a Volume MPR series and it's entirely snowy
1-1R38M	Require directional markers for PET images
1-1R38V	Auto MPR fails to throw up MPR series
1-1R39R	Database corrupt in install (only seen in XP)
1-1R3AO	Repeated Click of Auto MPR button causes eFilm to crash
1-1RG4M	Difficulties viewing Ultrasound Multi Frame Images
1-1RNOP	3D are displayed on the same display set in different Presentation Group.
1-1RR7L	Crash when authenticating with Fusion Server
1-1RXGT	Adjusting W/L prior to scrapbook also changes pixel values of resulting image
1-1SHJ1	First & Last Image of series not interpolated
1-1SHJK	Cannot perform Scrapbook on 3D images
1-1SJ2M	Query by Modality is broken over Image Channel tab
1-1TH41	eFilm sending fails in modalities MR, US, and NM
1-1TPLP	Attached Philips CT image causes crash
1-1U97L	eFilmLite doesn't support YBR_FULL422 while eFilm does
1-1U995	"Required resource was unavailable" errors seen generated by Queue when retrieving studies
1-1W91G	Scrapbook of an echo series results in the scrapbook desc being "echo x"
1-1WPDP	Cannot read particular DICOMDIRs
1-1X21A	Over OLE if multiple Default IC Servers specified only queries 1st



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Defect Number	Abstract
	server
1-1YJFV	Unable to create CD Packages after using File/Open
1-1ZKML	Series # not visible on overlay, HPs that filter on Series# are incorrect.
1-20RAH	eFilm crashes when trying to import DICOM Images (Win2K only)
1-20SAM	Scrapbook image's aspect ratio problem!
1-20ZVJ	PET images attached are limited to W/L max of 38/38 after being stacked through
1-21D1T	Scrapbook one image, Show two series in RCCM
1-21EFT	Scrapbook wrong image after stack a series!
1-21S6R	efRebuildDB doesn't update PixelSpacing column in Image table rendering MPR inoperable after rebuild
1-21S7S	Retrieve & View - crash related to copynodes not being updated as new images come in.
1-22359	MPR crashes if you move the MPR tool around.
1-225RN	View Key Image Series while retrieving a study through Remote Devices causes a fatal crash to eFilm.
1-233E9	Viewing studies via Image Channel causes the app to crash
1-233F0	Search fields in the Local, Remote and Remote (IC) tabs are uneditable
1-23H6X	Unable to create eFilm Lite CD Packages/burn eFilm Lite CDs
1-1A1F0	Selecting layout greater than 4 Rows and 8 Columns results in crash when opening studies
1-1FERT	Annotation - Unable to move from initial location after flip or rotate
1-1RR6L	Single quote in the Patient ID causes SQL error.
1-1RZ8X	If no printer configured & File/DICOM Print/Print selected, app crashes

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### eFilm Workstation™ New Features and Enhancements for 1.9

eFilm Workstation 1.9 is not only more powerful...it's more efficient and easier to use. This robust new version provides increased performance and functional capabilities that enhance productivity and deliver superior clinical performance.

- **MPR**

MPR (multiplanar reconstruction) in version 1.9 enhances the clinical information available to the user and allows faster, more clinically in-depth viewing. MPR has truly been enabled by the progress in CT and MRI that now routinely provides very thin sections of the body. The MPR feature allows the clinician to reconstruct a cross sectional image in any plane, from any cross-sectional data.



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It is an interactive tool that allows real-time reconstruction in any orthogonal or oblique plane of the data with superior image quality. The added ability to create a MIP slab directly from the MPR allows viewing multiple slices at a time, aids in visualization of blood vessels, arteries, pulmonary emboli and more.

- **Customizable Toolbars**

Flexibility and ease of use makes using the powerful eFilm Workstation toolbars even easier. Customizable toolbars allow users to display only the tools needed when viewing various types of studies such as CR or MR, providing fast access to needed tools for increased efficiency while reading studies. Users can change the size of the icons on their screen and invoke the auto-hide feature to hide tools when not actively using them, maximizing the use of diagnostic screen space. The user can also set up keystroke combinations to perform toolbar functions.

- **User Profiles**

eFilm Workstation 1.9 allows users to create unique user profiles based on Windows OS user name and logon. These profiles are stored locally and automatically launched when the user logs into their Workstation. This time-saving feature allows multiple users to save their profiles on a given workstation and easily launch their preferred toolbar configurations, window and level presets, layout presets and more.

- **Integrated CD Creation**

This feature allows users to burn CD's directly from the eFilm Workstation application, eliminating the need for a separate CD burning software program, saving time and the cost of additional software. The CD burning feature includes integrated DICOMDIR support and allows the user to burn a "lite" version of EFWS onto the CD to use as a portable viewer.

NOTE: we are reliant on GoldenHawk's ability to provide support for new CD-R/RW models. GoldenHawk offers updates on their website to update the ASPI Drivers as support for new CD-R/RW drives is added. See [www.goldenhawk.com](http://www.goldenhawk.com) for details.

- **Enhanced 3D**

Bringing added power to eFilm Workstation's current 3D features is advanced volume rendering, with an array of new capabilities. Enhanced 3D functionality allows users to preview slices and select particular images for inclusion (or exclusion) from volume reconstruction. New features also include the ability to adjust interpolation levels to suit processor speeds, color mapping, and opacity setting options. These improvements allow users to view structures or organs as a whole (as opposed to slices) and can aid in preparation for surgery.



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IMPORTANT: eFilm workstation has been designed to support optimal clinical visualization. To realize these improvements, the user must deploy one of the correct graphics cards in the workstation. Volume Rendering enhancements in version 1.9 require a video card that fully supports Microsoft DirectX 8.1 or greater. In the absence of the DirectX 8.1 video card, Volume Rendering functionality and performance will be the same as in EFWS 1.8.3.

- **Enhanced GUI**

In EFWS 1.9, the toolbars are customizable per modality, with user settings that can be saved in a user profile. Improvements have also been made to the measurement tool, with dynamic distance display, mouse-over recognition and an alternating color scheme that make measurement lines much easier to manipulate. These interface improvements make for a more intuitive and efficient workspace.

- **Mouse Support**

Productivity can be accelerated with the advanced mouse support that goes beyond standard mouse configuration, allowing users to use a variety of mouse hardware. Users can now assign the current right and left mouse click functions to different mouse or trackball buttons to suit their individual preferences (e.g. if they are left handed). There is an option to “lock” a mouse or trackball button for common operations such as stacking and windowing. Once the button is locked, the operation can be performed without the need to hold down the button, resulting in a more relaxed and ergonomic experience.

- **Orthopedic Template**

Enhanced multiple attachment points allow users to quickly and accurately apply and connect templates to ensure proper prosthetic fit.

- **DICOM Printing**

DICOM printing in version 1.9 allows users to print to a larger variety of printers. There is a field in the DICOM print configuration that allows users to send a manufacturer-specific string to the printer. This is used, by convention, for specifying a particular Look Up Table at the printer.

- **Internationalization / Localization**

EFWS 1.9 is available in a Japanese language version which utilizes the conversion of multi-byte input to DICOM tags for accurate display.

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### What's New in eFilm Workstation 1.8.3



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1. Two HIS/RIS SDK related problems have been resolved. Calling **oleShowMainWindow** with the **SW\_HIDE** parameter now properly hides the eFilm Workstation window. Efilm Workstation accelerator keys no longer override certain keystrokes targeted at modeless dialog boxes created in the HIS/RIS DLL.
  2. eFilm Workstation now properly handles the YBR\_FULL photometric interpretation when viewing images using Image Channel.
  3. A defect, which caused eFilm Workstation to crash when rotating images, has been corrected.
  4. eFilm Workstation now properly displays images with a window center (i.e. level) of 0.
  5. A defect that caused eFilm Workstation to crash when attempting to MIP a series that contained a scout as its first image has been corrected.
- 

### Bugs Fixed in eFilm Workstation 1.8.1

1. The MPR tool can now accommodate multiple views of the same location within the same series. For example, in the case of single series dynamic acquisition images, where there are multiple images at the same location within a series, the MPR tool now creates a separate view for each duplicate set of images.
  2. A problem that caused error messages to display when sending large volumes of images has been fixed. eFilm now creates one association per series instead of one association per image.
  3. A problem that prevented viewing of eFilmLite CD's on Windows 2000 or XP has been fixed.
  4. The method of reading DICOMDIR's has been re-designed to accommodate different DICOMDIR structures and image formats.
  5. When changing the film orientation prior to DICOM printing, the layout format now stays selected.
  6. A problem which caused the eFilm toolbar to display improperly when using a static grayscale palette on DOME® monitors, has been fixed.
  7. A problem that prevented users from moving the template label on Windows 95 and 98 has been fixed.
- 

### New Features in eFilm Workstation 1.8.0

- **Multi-Planar Reformatting (MPR)**

eFilm Workstation now supports the MPR volume rendering technique. This allows the clinician to reconstruct a cross sectional image in any plane, from any cross-sectional data. MPR has truly been enabled by the progress in CT and MRI that now routinely provides very thin sections of the body. The eFilm MPR application is an interactive tool that allows real-time reconstruction in an orthogonal or oblique plan of the data with exquisite image quality.



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You can create MPR views of an existing data set from either 2D images or 3D volumes. eFilm Workstation can automatically divide your image by orthogonal lines or you can draw your own dissecting planes. Create as many dissections as you want; each image is created in a different series and added to the study. You can even stack through the dissection as you would any other image, or check the slice™s relative position on the source image.

- **2. Improved 3D Functionality**

An Advanced Loading Dialog has been provided to allow the user to specify and alter volume loading parameters that would normally be hidden or automatically chosen by the software. For example, users can now select to load only a subset of a series.

The volume-loading algorithm has also been improved in order to handle series with irregular slice spacing or gantry tilt. Users can now export, print, or scrapbook a 3D image.

- **3. eFilm Ortho**

Without film, orthopaedic surgeons are unable to size prosthetic implants in the manner they are used to with acetate overlays. eFilm Ortho is an add-in module for eFilm Workstation designed for orthopaedic surgeons that solves this problem. eFilm Ortho gives orthopaedic surgeons the ability to interactively position and size digital prosthetic templates. Featured tools include automatic scaling, rotation, mechanical linking of prosthetic components, measurement, printing and support for template libraries from most prosthetic manufacturers. Only sample template files are included with the evaluation version. Support for a specific manufacturer's templates can be purchased as an add-in module to eFilm Workstation.

- **4. Re-design of the Search List Dialog**

The Search List Dialog (re-named the Study Manager) has been re-designed to provide additional functionality. For example, users can now query by modality and study description on all tabs, preserve the size and position of the Study Manager window, preserve the order and size of the columns, and expand the study list to the series level to retrieve or send only a selected series from a study.

- **5. DICOM Print Enhancements**

Improvements have been made to DICOM Print including better error handling, the ability to get a printer's status, and the ability to perform DICOM verification using C-Echo ("ping") on a printer.



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- **6. Improved Measurement Tools and Overlay**

The Measurement tool caption now updates dynamically as the user re-sizes or moves the tool. Drop shadows have been added to both the tools and overlay text to improve their visibility.

- **7. Non-Linear Window Levelling Support**

eFilm Workstation now supports non-linear window leveling.

- **8. New PET Support**

eFilm Workstation now supports the PET SOP Class.

- **9. New Scrapbook Creation Type**

When creating a scrapbook, you can now choose to preserve the original image dimensions and pixel spacing information.

### **Bugs Fixed in eFilm Workstation 1.8.0**

1. A problem that caused complex patient names to display in reverse order has been fixed.
  2. A problem with printing images that caused annotations and measurement captions to appear small and in the wrong location has been fixed.
  3. A problem which resulted in discrepancies in the slice location overlay labeling has been corrected.
  4. When creating a scrapbook as an additional series in a multi-echo MR, the 'even' and 'odd' images from the scrapbook series are now displayed in separate series viewports.
  5. Defects occurring as a result of selecting Allow Window Levelling of Individual Images in the Advanced Properties dialog have been fixed. Users can now use the scrapbook and use the Magnification tool on these images.
  6. Performance and robustness improvements were made to the database compaction process.
  7. The inconsistent toolbar positioning that occurred when maximizing/minimizing the window has been corrected.
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### **Bugs Fixed in eFilm Workstation 1.7.1**



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1. When selecting 'View' to retrieve and view a study from Remote, all images in each series are now visible when you change the screen layout.
  2. A problem with DICOM printing that resulted in either an "Invalid Argument 0x115" error or an "Invalid Argument 0x112" error has been corrected.
  3. Performance and robustness improvements were made to eFilm Workstation services.
  4. eFilm Workstation now supports the display of colour 3D reconstructions from GE's ADW.
  5. A problem with duplicate entries appearing in the Patient table has been fixed.
  6. A problem with printing images occurred in cases where zoom and pan preferences were utilized, and caused the printed image to be different than what was shown on the monitor. This defect has been repaired.
  7. A toolbar problem that occurred when maximizing or minimizing windows has been fixed. Your customized toolbar options are maintained when maximizing and minimizing the main screen.
  8. eFilm Workstation's C-Store-RSP had incorrect Presentation ID Context set. This error prevented eFilm Workstation from receiving complete US studies from the AcusonŽ Sequoia. The C-Store-RSP problem has now been fixed.
  9. DICOM JPEG images saved by eFilm Workstation can now be loaded by other viewers.
  10. Slice location on all reformatted CT or MR images is now reported with reference to the center of the image.
- 

### New Features in eFilm Workstation 1.7.0

- **MIP**

eFilm Workstation now supports the MIP volume rendering technique. At the click of a button, CT and MR DICOM images can now be viewed in MIP mode. Also included are an orientation guide, and rotate and crop tools.

- **Simgram Image**

eFilm Workstation supports Voxel's Simvision renderer, which simulates on a 2D screen the appearance of a three-dimensional Voxgram® image. The user can



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rotate, crop, and locate the Simgram image prior to sending the data to Voxel to order a holographic film.

- **AVI Creator**

eFilm Workstation supports the creation of .avi files. Users may now display cine loops in real time.

- **Angle Measurement Tool**

eFilm Workstation can now display the angles between intersecting lines.

- **Arrow Tool**

Arrows can now be drawn to point to areas of interest on an image.

- **Movable Measurement Captions**

Linear and elliptical measurement captions can now be moved independently of the line or ellipse.

- **Magnification Tool**

The magnification tool has been re-designed such that the magnifying window moves in conjunction with the cursor as it magnifies the area of interest.

- **DICOM Importer (efDcmlm.exe)**

eFilm Workstation is capable of importing external DICOM images to the database. These images may be imported either individually, or as entire directories including subdirectories.

- **DICOM Dump Tool**

The DICOM Dump tool allows the user to view and edit the DICOM tags in a DICOM file. When accessed, the tool opens a selected image.

- **DICOM Verification**

eFilm Workstation is capable of DICOM verification using C-Echo ("ping").

- **New US Multiframe Support**

eFilm Workstation now supports the new Ultrasound Multiframe SOP Class.

- **Sending Compressed Images**

- **Lossy Compression Indicator**

### Bugs Fixed in eFilm Workstation 1.7.0



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1. eFilm Workstation now supports the proper querying of GE Pathspeed PACS.
  2. The time displayed on the overlay for a given image will be prefixed by a three letter acronym to indicate which time is being used: Acquisition Time (ACQ), Image Time (IMG), or Study Time (STY). To determine which time to display, eFilm Workstation will check first if there is an acquisition time, than an image time, and finally a study time.
  3. A problem with the reference lines displaying on the key image when you switch the screen layout has been fixed.
  4. DSA tool was re-designed such that subtraction is now only performed if the DSA tool is activated.
  5. The eFilm Workstation database has been re-designed to accommodate the case in which a Patient ID corresponds to more than one patient.
- 

### **Bugs Fixed in eFilm Workstation 1.5.3 Service Pack 2**

1. On dual monitor Windows 2000 systems, window maximization was implemented in a non- standard way. This inconsistency has been corrected.
2. A window re-painting problem when maximizing the main window on Windows NT systems has been fixed.
3. The window width and level settings are now preserved when the bone slider is moved in the Digital Subtraction Angiography feature. The bone value is now also set to 0 by default.
4. A problem with the **Toggle Survey/Explode Mode** tool has been corrected so that reverting to survey mode now preserves the series/image selection.
5. Images which are already calibrated may now be re-calibrated as necessary.
6. A problem that was causing certain registry settings to be re-set has been rectified.
7. An image repainting problem associated with the 3D Cursor tool has been eliminated.



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8. Multiframe RF images are now properly recognized and displayed as multiframe.
9. A bug that was causing the GE PACS software to crash when queried by eFilm Workstation has been fixed. As a result, querying for modality information at the study level is now supported.
10. The new DICOM Monitor tool performs regular C-Echo requests to the DICOM Server to verify that it is still active. If no response is provided, the DICOM Monitor restarts the DICOM Server.
11. The Elliptical ROI tool now properly reports mean values for images with signed pixel representation
12. A bug which prevented some of the DICOM Print settings from being sent in the print request (e.g., film type and resolution) has been corrected.
13. The group length tag in the DICOM file meta header is now no longer 4 bytes too short.

### **New Features in eFilm Workstation 1.5.3**

1. Support for eFilm HIS/RIS Connectivity SDK v.0.2  
eFilm Workstation supports HIS/RIS Interface DLLs created using the eFilm HIS/RIS Connectivity SDK v.0.2. This feature provides third-party developers the ability to write plug-ins that will allow seamless viewing and creation of HIS/RIS reports from eFilm Workstation.
2. Improved Mouse Wheel Support
3. Improved Responsiveness when Window/Levelling

### **Bugs Fixed in eFilm Workstation 1.5.3**

1. A problem that occurs when the 3-D cursor is used in conjunction with rotated volumes has been rectified.
2. DR and DS images now load correctly again.



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3. A palette problem that occurs when eFilm is used with Dome cards has been corrected.

### New Features in eFilm Workstation 1.5.1

#### 1. Enterprise-wide Device Updating

The new eFilm Enterprise Management feature automatically updates the network device list each time a search is performed. The addition of this feature means that each time a new device is added or an old one is removed from the network, the device lists of all workstations on the network are updated simultaneously. The eFilm Enterprise Management feature will be available as an add-on service purchased through eFilm Medical Inc.

#### 2. Digital Image Markers for Mammography

eFilm Workstation can display the electronic image markers which are attached to DICOM images taken by digital mammography scanners. Users can position the markers to suit their own preferences.

### Bugs Fixed in eFilm Workstation 1.5.1

1. Multiple image export to TIFF format now functions correctly.

2. Toolbar now visible on greyscale monitors with DOME cards set to **Dynamic Palette**.

3. Facility added to limit the number of incoming DICOM associations. This feature prevents the workstation from being overloaded.

4. eFilmLiteŽ now loads lossy 8-bit DICOM JPEG files properly.

5. Periodic crashing of efUpM.exe has been eliminated.

6. "Simple" window/level algorithm has now been applied properly.

7. Occasional crashes when using the 3D cursor have been eliminated.

8. eFilm Workstation now connects properly to HIS/RIS dlls written using the eFilm Connectivity SDK.



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### New Features in eFilm Workstation 1.5.0

#### 1. Advanced Image Manipulation Ability

External image effects may now be programmed to be used with eFilm Workstation, thereby greatly extending eFilm Workstation's image manipulation capabilities. If you would like information on how to program custom image effects, please have a look at our website [www.efilm.ca](http://www.efilm.ca) or contact us and we will gladly assist you. A sample filter is included with this version of eFilm Workstation.

#### 2. Customized User Settings

Users may now customize their settings.

#### 3. Customized Automatic Screen Layout

You may pre-define how you would like to layout the main window according to series and images.

#### 4. Automatic Selection of Reference Lines

You may now select to automatically display reference lines when viewing CT or MR studies.

#### 5. Support for Bicubic Interpolation

Previously only bilinear interpolation was available. You may set your interpolation mode to be either None (fastest, lowest quality), Bilinear, or Bicubic (slowest, highest).

#### 6. Automatic Series Synchronization

You may select for all series to be automatically synchronized whenever you view a new study.

#### 7. Pan and Zoom Combination Functions

You may select for the **Pan** and **Zoom** functions to be automatically and/or simultaneously selected when viewing images.

#### 8. Automatic Window and Level Algorithm

Window levelling may now be set for optimal estimations.

#### 9. Customized Local/Remote Exam Lists

Local and Remote Exam lists may now be customized. You may select which headings you would like displayed and how the list should be sorted.

#### 10. DICOM Printing



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You are now able to print to a DICOM enabled printer, printing to film or other media.

#### 11. DSA Control

Digital Subtraction Angiography now supports integration of images as well as positive (opaque) and negative (CO<sub>2</sub>) contrast. The DSA control is also updated.

#### 12. Toggle Survey/Explode Mode

An "explode" mode has been added that allows series to be expanded to full screen easily. You may also quickly toggle back to the survey mode. This is useful for studies with several series, such as CR skeletal surveys.

#### 13. Windows Installer Support

When installing eFilm Workstation 1.5, previous versions (down to version 1.320) are detected. Old registry entries are no longer deleted. Installations/upgrades should be considerably more robust and reliable.

#### 14. DICOM JPEG Read

DICOM JPEG read now works with all modalities.

#### 15. MS SQL Server Support

An SQL server database may be swapped in via ODBC to replace the Access database that comes with eFilm Workstation.