IN Cell Analyzer

Acquisition Software, Version 7.2

Release Notes - Patch 2

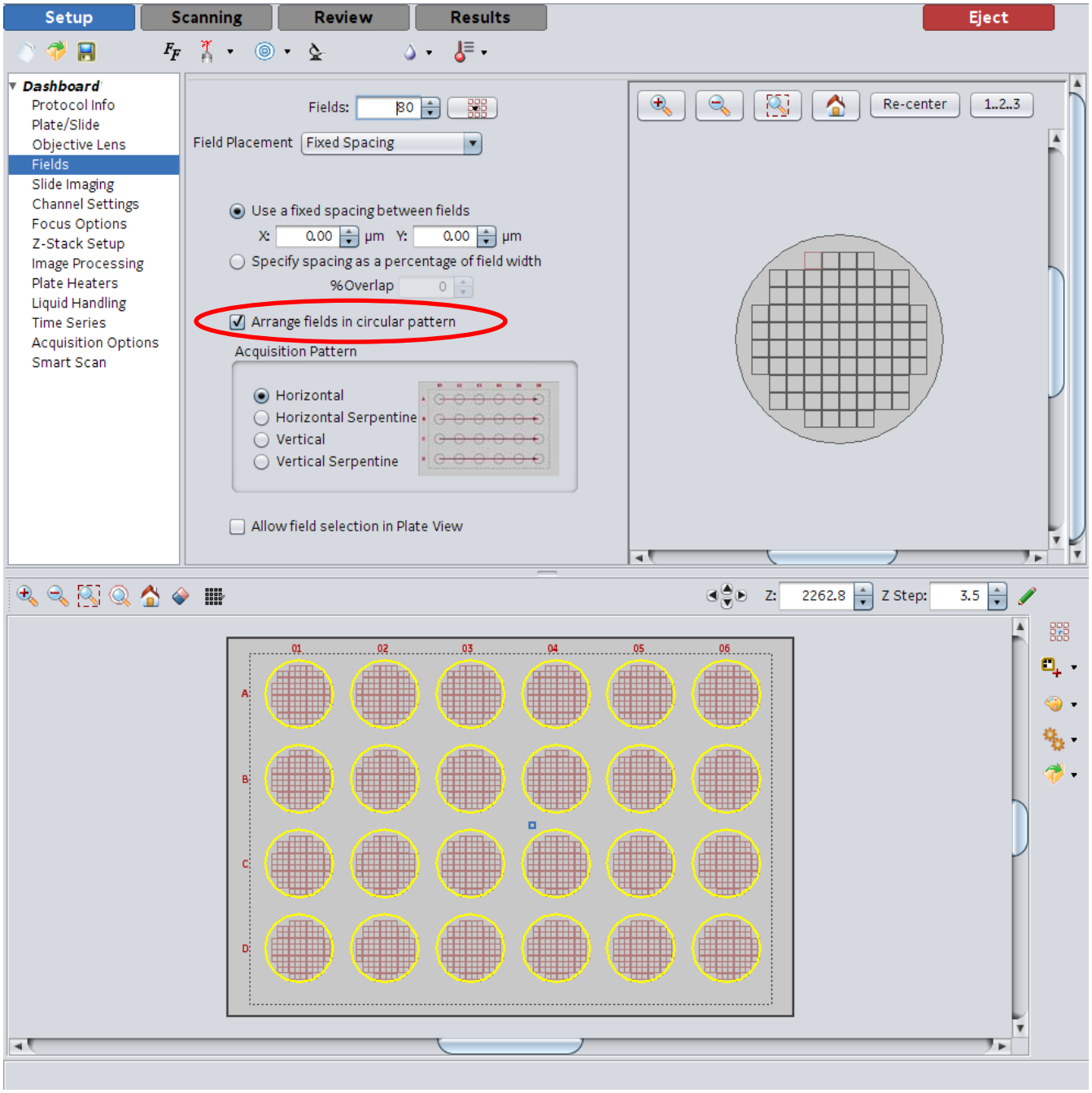
Introduction

Version 7.2 of the INCell Analyzer software provides new features and bug fixes for instrument models 2500, 6500, 2200, and 6000.

The release notes describe the primary changes between versions 7.1 and 7.2. Additional information can be found in the release notes from previous versions of software, which are included within the installation packages and located in "C:\Program Files\GE Healthcare\IN Cell Analyzer XX00\manual".

New Features

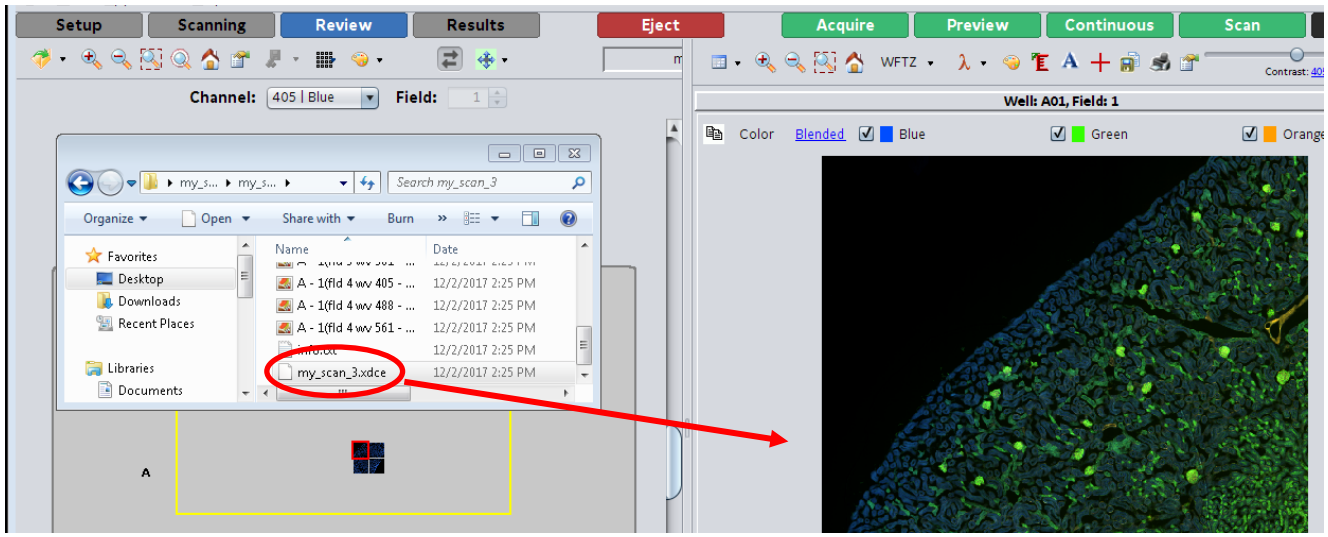
Circular Field Placement (2394)
An option has been added for arranging fields in a circular pattern. Circular field patterns are especially useful for scanning petri dishes and plates with large wells (e.g. six well plates).



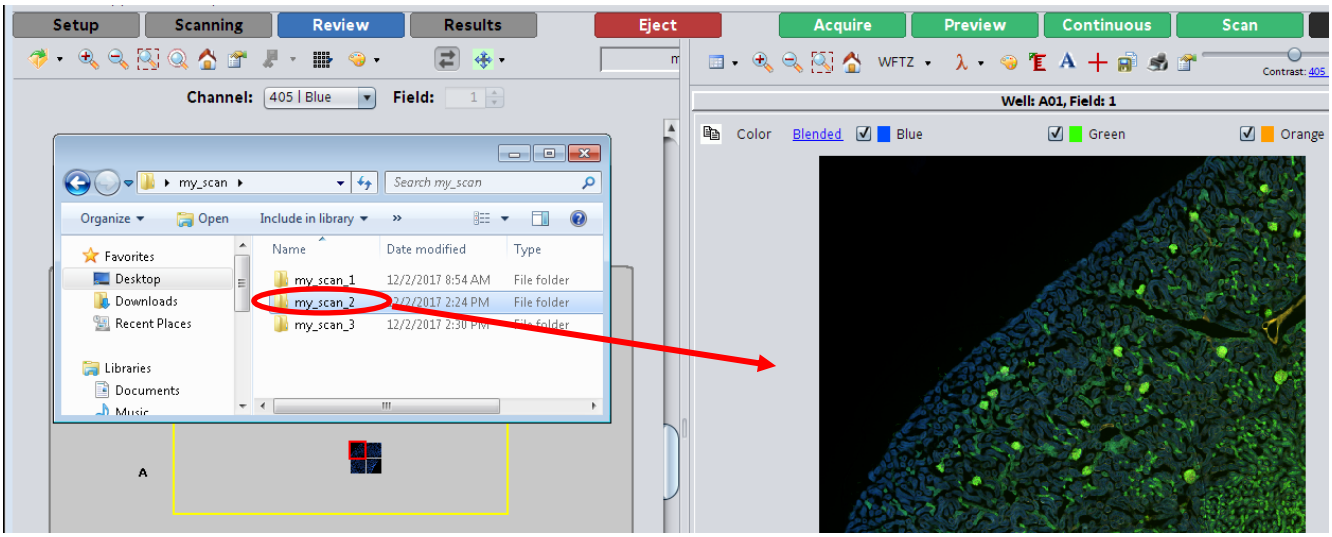
Circular Field Pattern - Automatically Generated

Drag and Drop into Review Mode (2415)

Results folders and/or XDCE files can now be dropped into the Review mode display area. Windows File Explorer can be used to find scans that need to be reviewed.



XDCE File - Drag and Drop

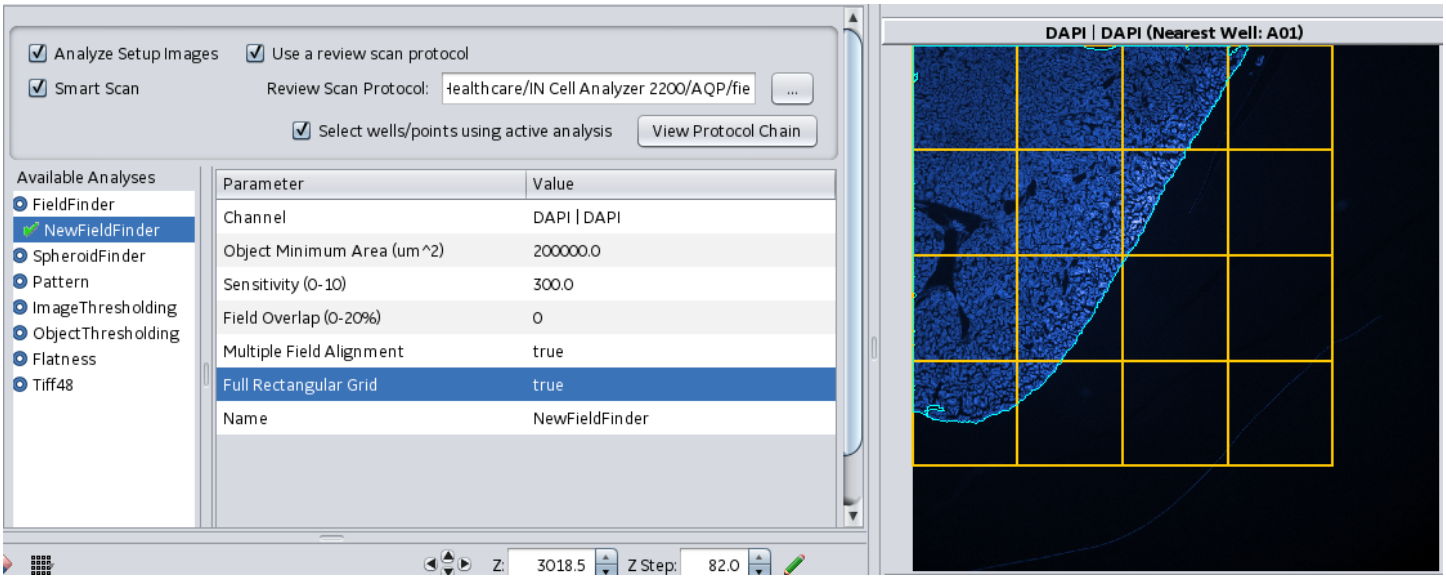


Results Folder Containing an XDCE File - Drag and Drop

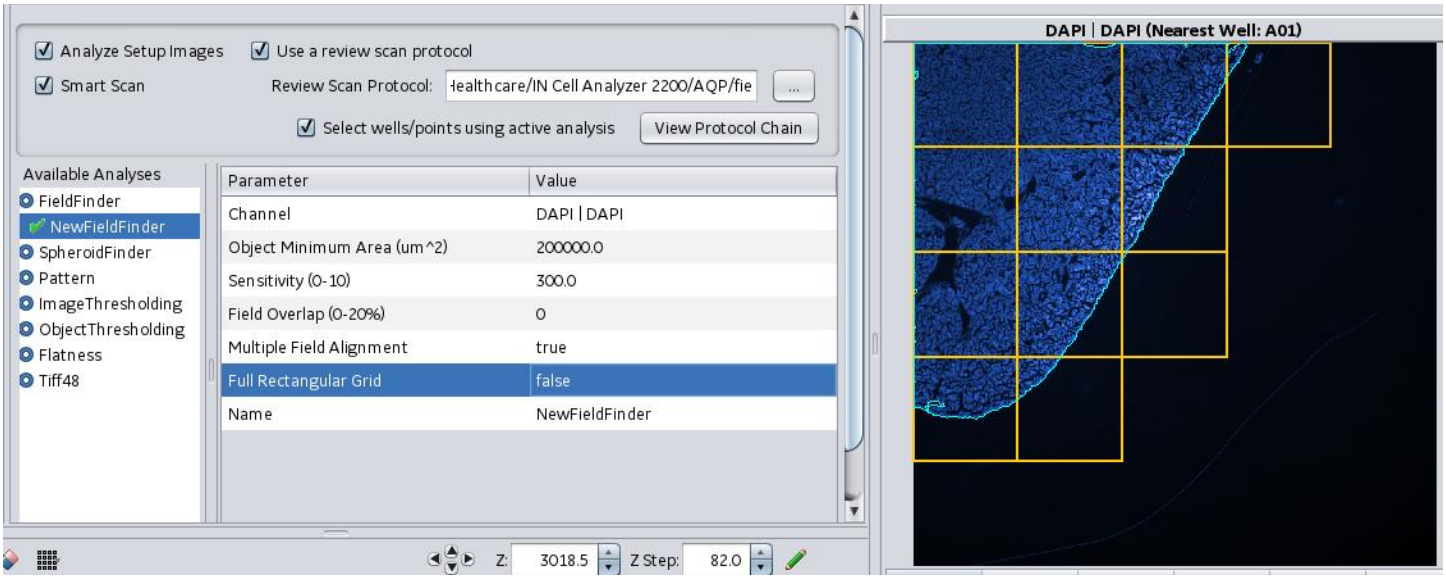
FieldFinder Improvements for Stitching (2302)

Two options have been added to the *FieldFinder* algorithm. The new options may be useful when using external programs to stitch the resulting images into larger images.

1. Enable "Full Rectangular Grid" to find a complete set of fields to fit within a rectangular area over the object (without gaps). Some image stitching programs require an MxN grid of fields.

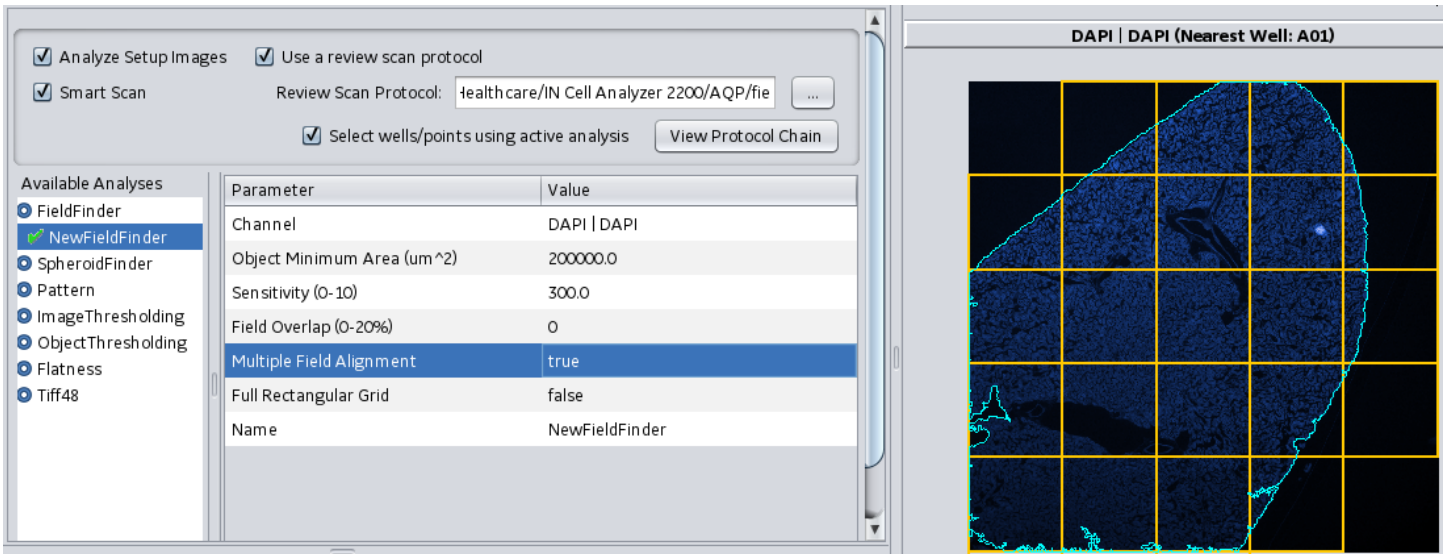


Full Rectangular Grid Enabled - No Missing Fields

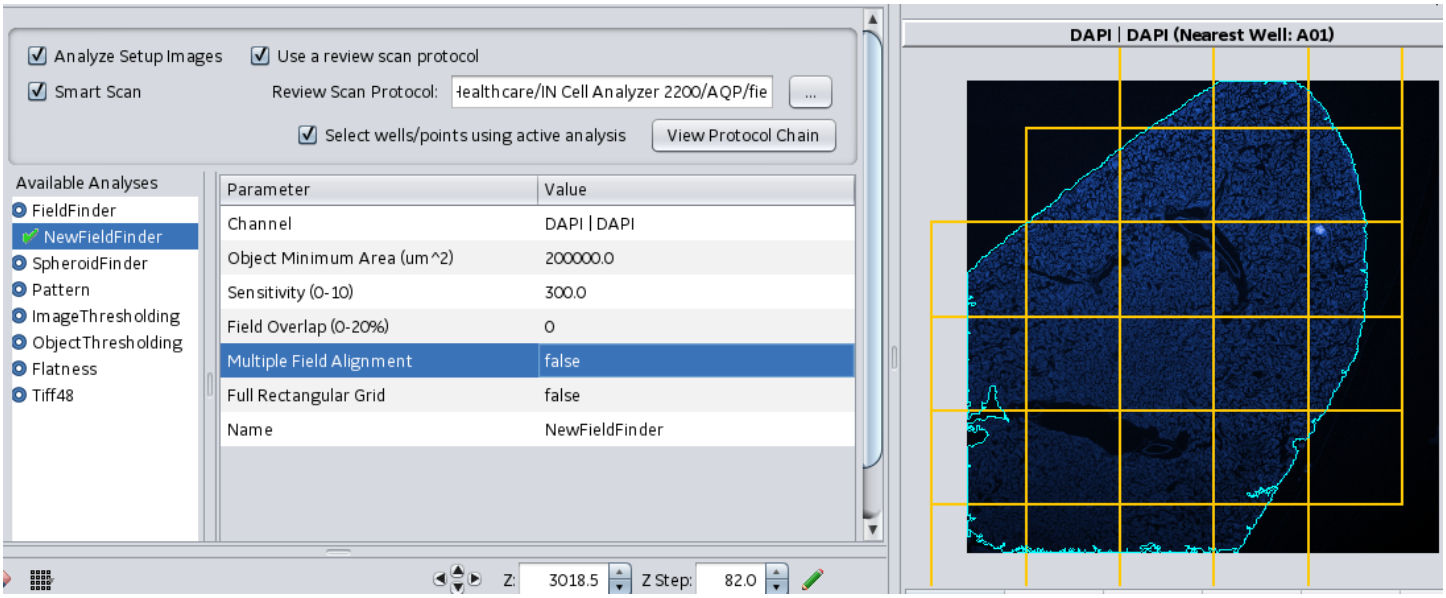


Full Rectangular Grid Disabled - Minimum Number of Fields

2. Enable "Multiple Field Alignment" to use a consistent spacing within each field-of-view. Adjacent fields-of-view will use the same spacing for better uniformity across the entire scan.



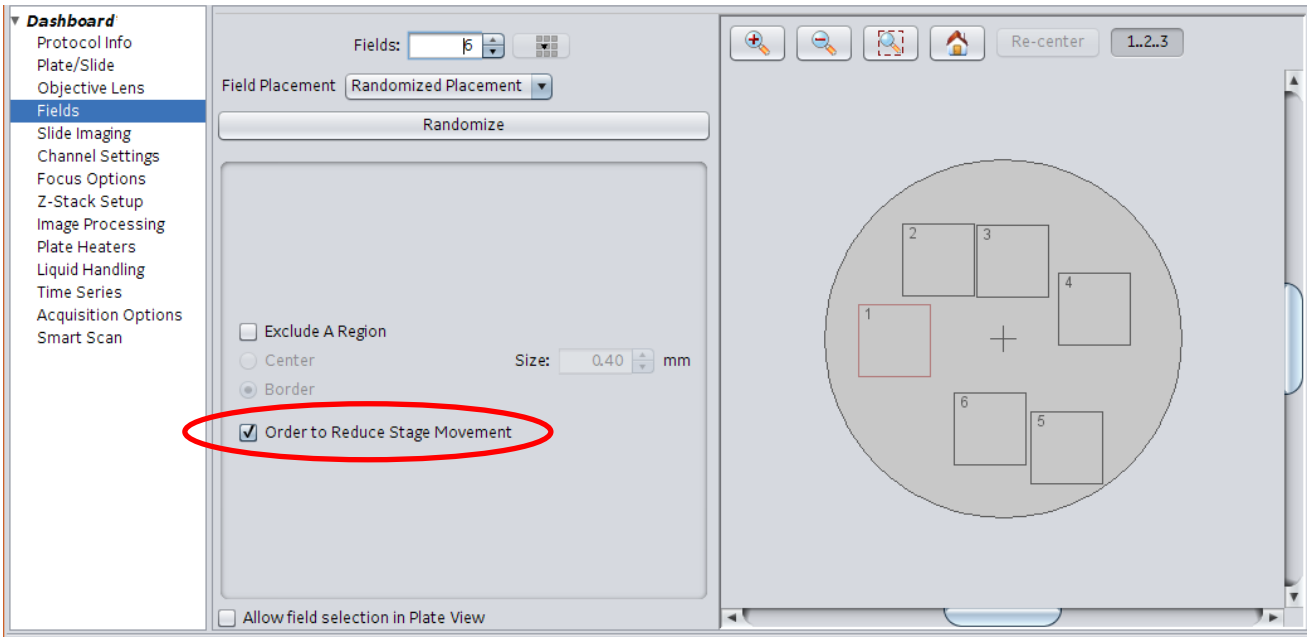
Multiple Field Alignment Enabled - Fields Locations Evenly Spaced to Fit



Multiple Field Alignment Disabled - Field Locations Match Object Location

Field Scanning Optimizations (2309, 2311)

The field acquisition sequence has been improved to minimize XY stage motion. INCell will follow a serpentine path along horizontal bands within the well. In a related improvement, randomized field locations will not be allowed to overlap unless space is limited.



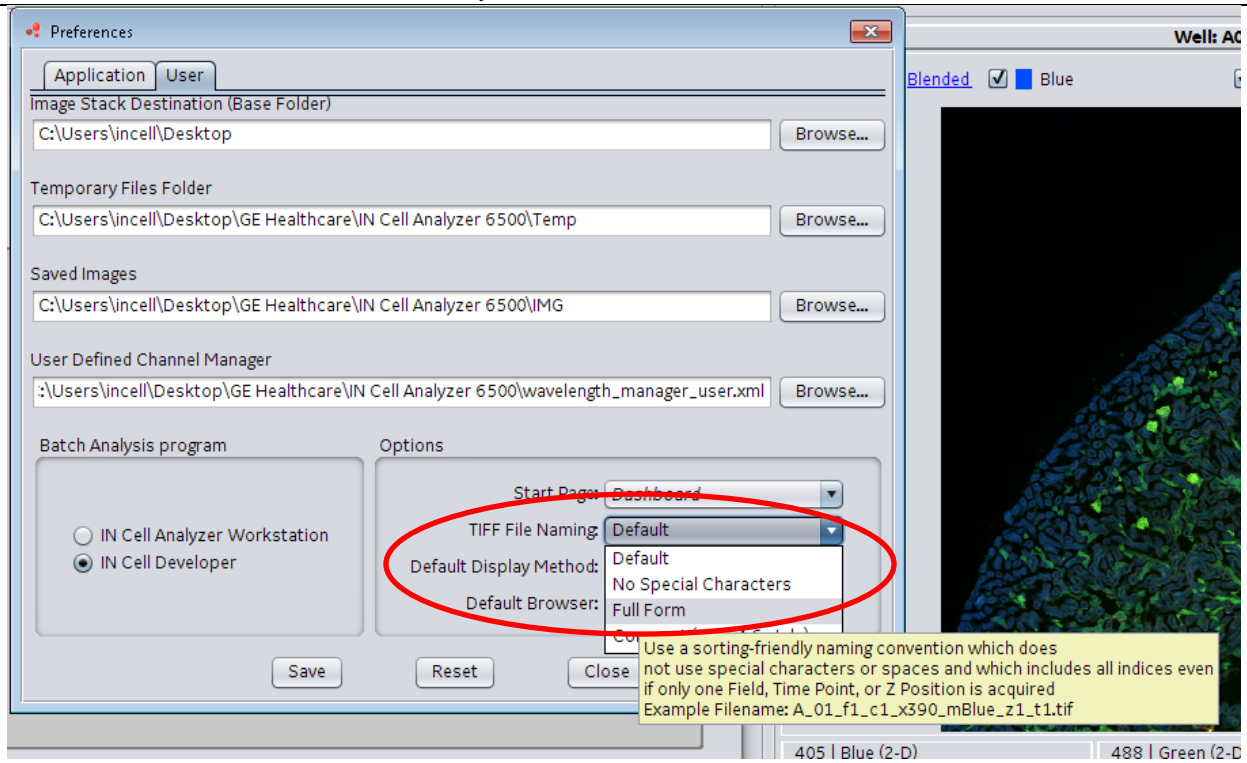
Ordered, Non-overlapping Fields

"Full Form" TIFF Image File Naming Preference (2369)

"Full Form" names include information about all possible dimensions of an acquisition pattern. A regular pattern is used to facilitate parsing and sorting. All components are separated by an underscore character ("_"), the names do not contain any spaces or special characters, and all indices are 1 based (not 0 based). The following table summarizes the naming style:

	Component	Sample
1	Well name	A_01
2	Field index	f1
3	Channel index	c1
4	Excitation name	x390
5	Emission name	mBlue
6	Z index	z1
7	Time point index	t1

Choose the TIFF naming method from the list of options in the Preferences dialog box, as shown below.



"Full Form" TIFF Naming Preference

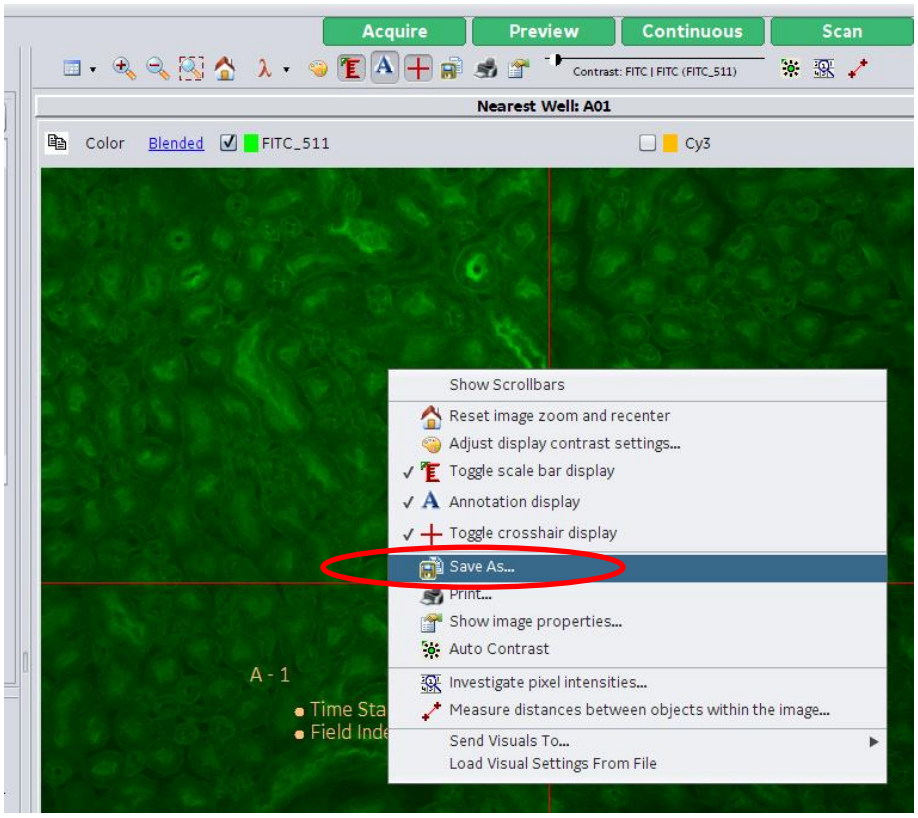
Sample of Full Form File Names:

```
A_01_f1_c1_x405_mBlue_z1_t1.tif
A_01_f1_c2_x488_mGreen_z1_t1.tif
A_01_f1_c3_x561_mOrange_z1_t1.tif
A_01_f2_c1_x405_mBlue_z1_t1.tif
A_01_f2_c2_x488_mGreen_z1_t1.tif
A_01_f2_c3_x561_mOrange_z1_t1.tif
A_02_f1_c1_x405_mBlue_z1_t1.tif
A_02_f1_c2_x488_mGreen_z1_t1.tif
A_02_f1_c3_x561_mOrange_z1_t1.tif
A_02_f2_c1_x405_mBlue_z1_t1.tif
A_02_f2_c2_x488_mGreen_z1_t1.tif
A_02_f2_c3_x561_mOrange_z1_t1.tif
```

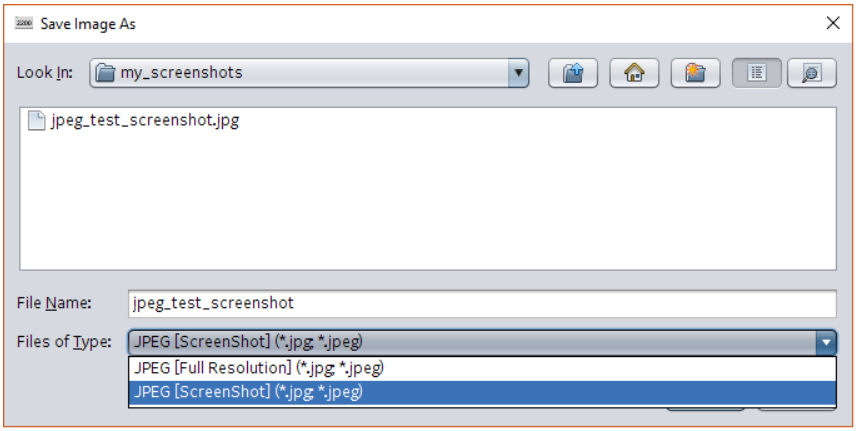
Option to Include Annotations when Saving JPEG Images (2291)

The original style of saving JPEG images was intended for saving high resolution screenshots with minimal JPEG compression. All pixels from the original image are included with the "Full Resolution" JPEGs.

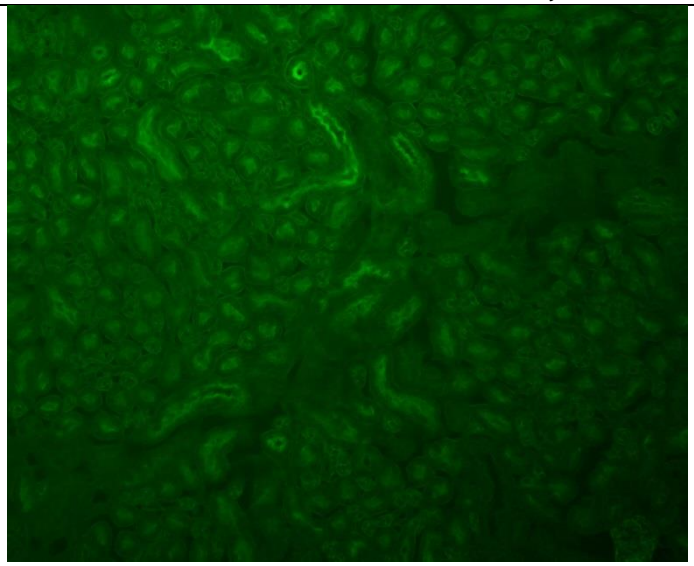
The new style saves annotations such as the scale bar, cross-hairs, and overlaid text. In this case, only the pixels shown on the screen are recorded within the JPEG image file.



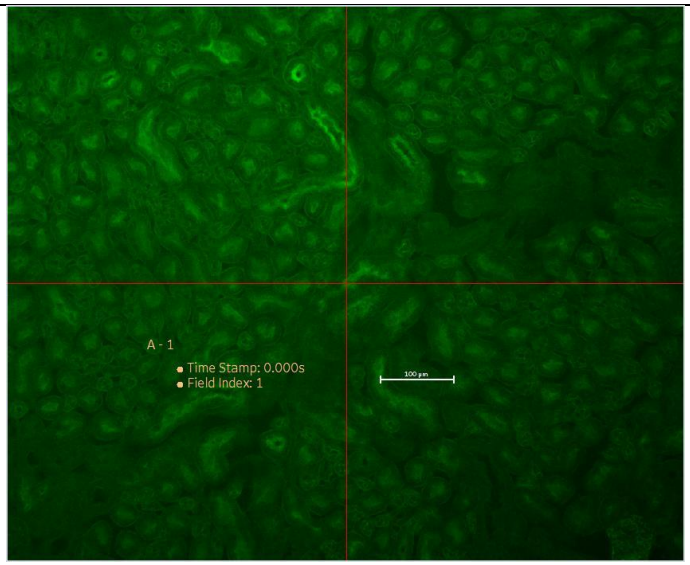
JPEG "Save As..." - Right Mouse Button Menu



JPEG Options



Full Resolution JPEG - Original Method



Screenshot with Annotations - New Option

Focus Improvements

Laser Autofocus After Brightfield Imaging on the 6500 (2389)
Brightfield imaging mode on the 6500 created a condition that caused invalid peak locations within the laser autofocus trace. Acquisition protocols that contained a brightfield channel as the last channel (before laser autofocus) were susceptible to this problem. Only the 6500 was affected and only in the case where the instrument was previously configured for brightfield imaging. Fluorescence mode imaging was not affected.

To avoid the problem with previous versions of software, set the last channel within the protocol to fluorescence rather than brightfield.

3D Deconvolution Improvements

Updated Optical Transfer Function (OTF) Files (1748)
OTF files provide information needed by 3D deconvolution to reverse optical blurring, also known as the "Point Spread". The new files contain a better representation of the optical point spread within the INCell.

To check whether the deconvolution is using a new OTF file, look for the following lines within the deconvolution log file:

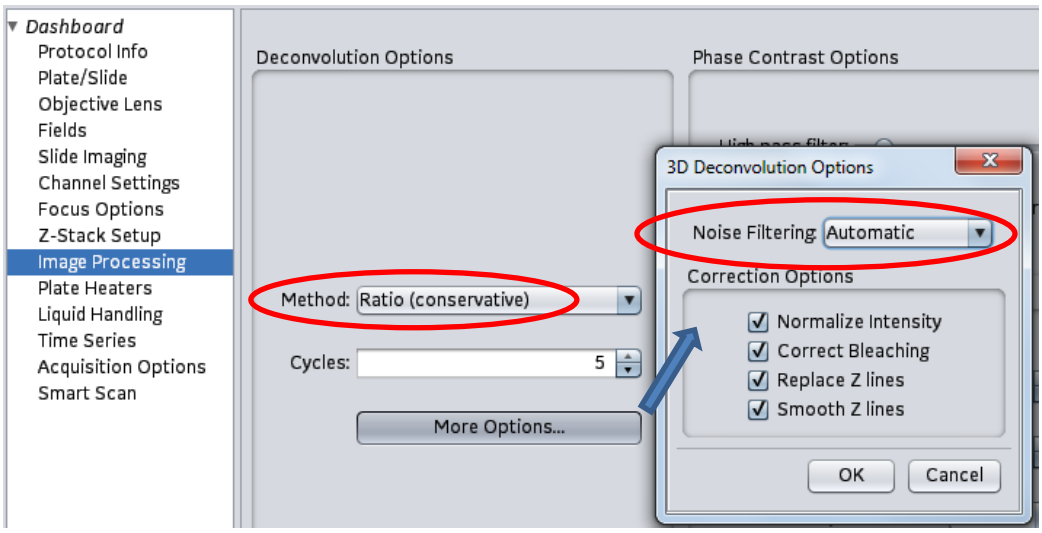
```
Titles.............................
Theoretical OTF calculation. Gen2. January 2018.
```

3D Deconvolution Disk IO Streamlined (2370)
Unnecessary disk IO was removed from the queuing procedure that deconvolves Z stacks after scans. Most of the benefit will be observed with the scan times, although 3D deconvolutions should also finish more rapidly. The amount of improvement depends on many parameters, and is therefore difficult to predict.

XDCE File Copy After Multichannel Deconvolution with Multiple Processors (2435)
On rare occasions, multichannel XDCE files were copied from the temporary location to the final location before the last deconvolution was finished. The final XDCE file was then incomplete. The problem only occurred with multichannel deconvolutions involving more than one processor.

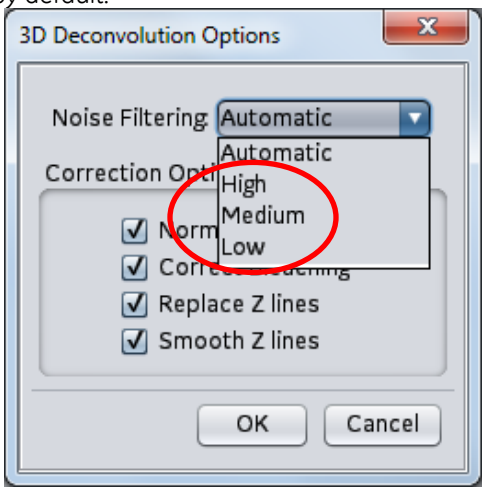
Updated Default Settings: Ratio Method, Automatic Noise Filter (2453)
"Ratio (conservative)" is now the default deconvolution method, rather than "Enhanced Ratio (aggressive)". INCell images are acquired under a large range of conditions. The conservative method works better in more situations than the aggressive method.

The default level of noise filtering has been changed from "High" to "Automatic". The automatic method accounts for both the optical magnification and the optical resolution of the images. "Automatic" is new for V7.2. The previous default was "High" (but see 2453).



Noise Filter Settings Reversed (2453)

"Low" noise filtering was actually "High", and vice-versa. Prior to V7.2, the default value was set to "High", which means that the deconvolution program really used "Low" by default.



Basic Improvements

Plate Sensor Checked in More Places (2400)

INCell will check whether a plate is loaded within the instrument before proceeding with certain operations. For example, the following warning will be presented before running "Verify LAF".

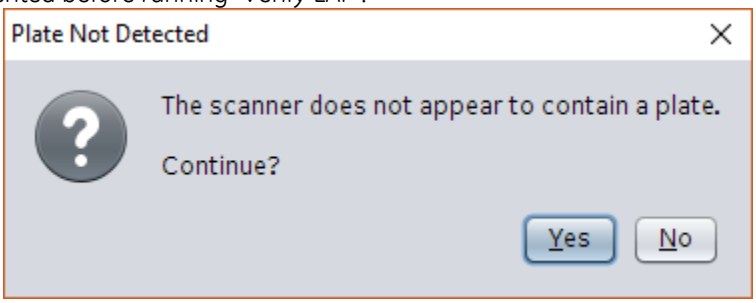


Plate Not Detected - Warning Message Prior to Verify LAF

Verify LAF Procedure Checks Plate Location (2400)

In addition to checking whether a plate is detected before running "Verify LAF", INCell will also check whether the present XY location is reasonable. LAF verification should only be attempted in appropriate locations, naturally.

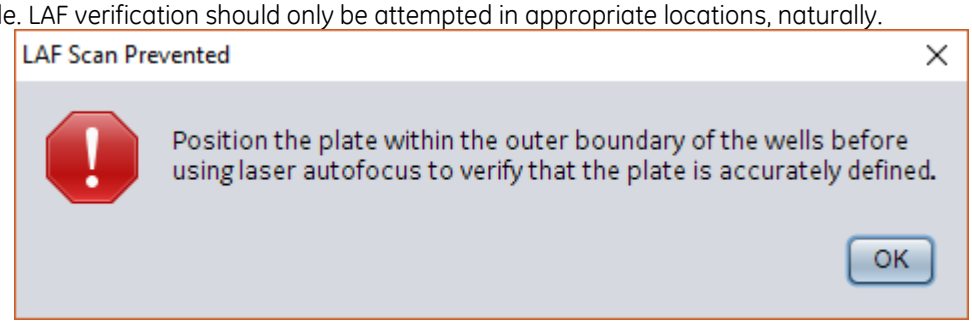
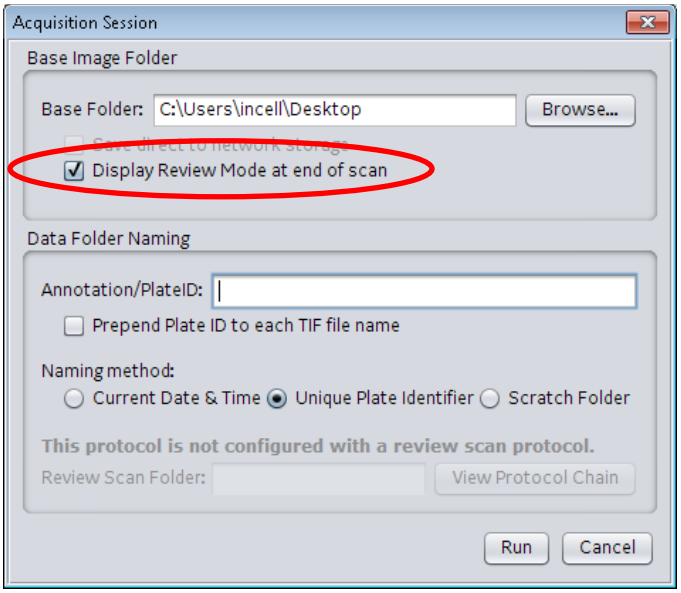


Plate Outside Well Boundary - Warning Message Prior to Verify LAF

User Control of Transition to Review Mode at End of Scans (2212)

The operator may wish to return to *Setup* mode or start another scan without waiting for *Review mode* to load thumbnails and generate displays.



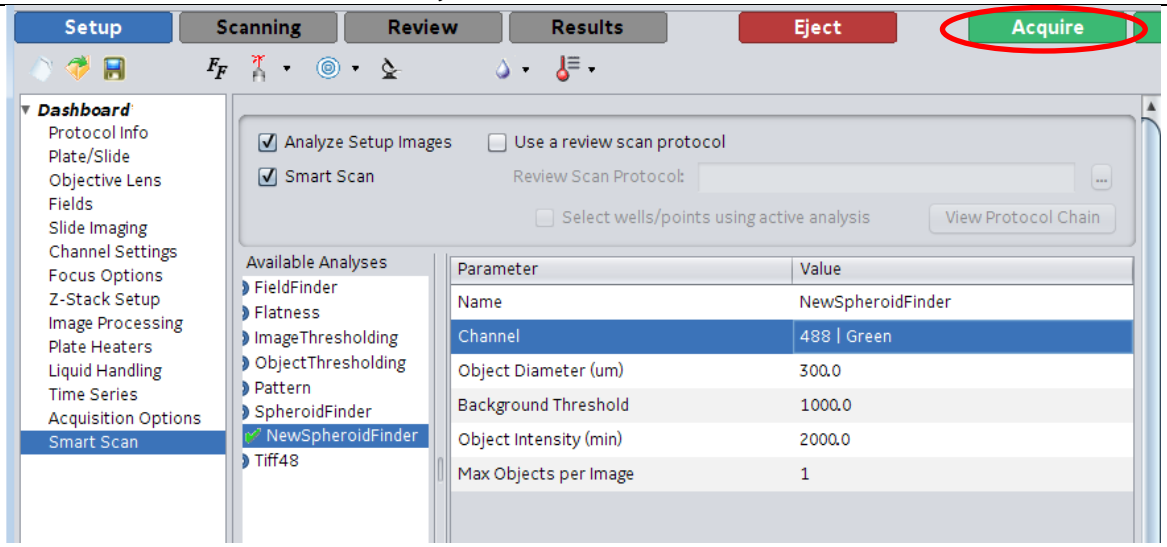
***Review* Mode Option - Run Dialog**

Once selected, the toggle will remain enabled until disabled by the user.

As part of this new feature, INCell will automatically display images whenever it proceeds to *Review* mode after scanning. The logic that skipped image display when saving to network drives has been disabled, now that the user has control over the transition to *Review* mode.

New "Acquire" Button Available in Main Toolbar (2264)

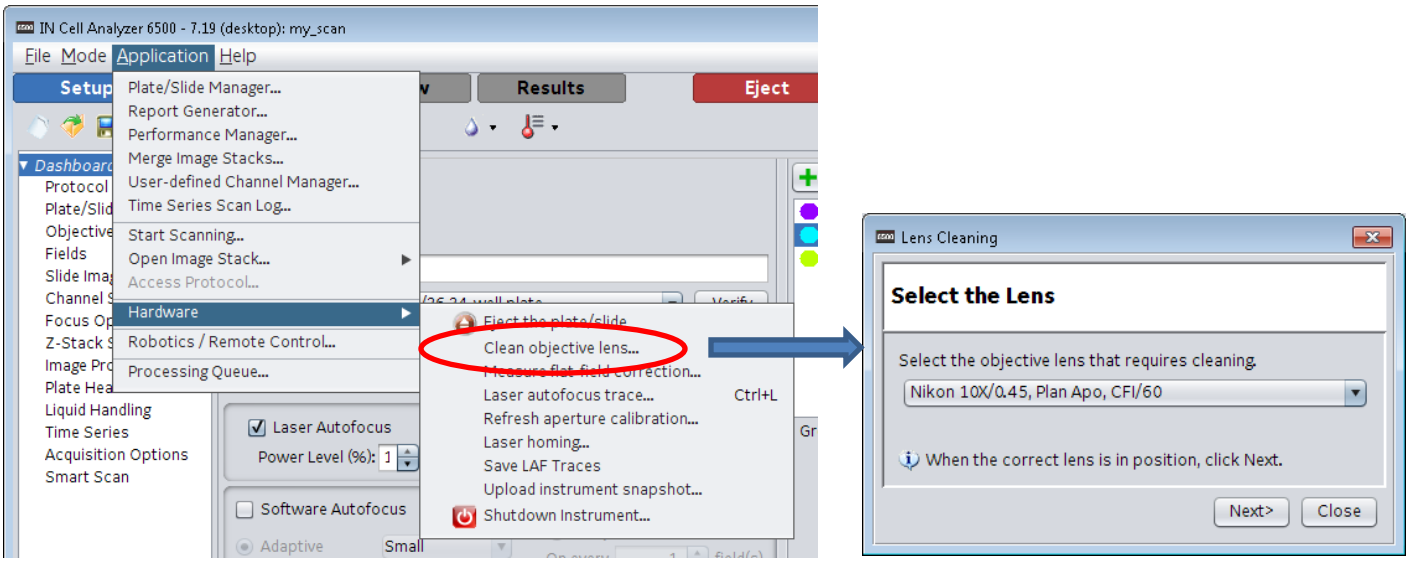
The new button is accessible from all parts of the protocol setup procedure. Images can be acquired when adjusting protocol settings like Phase/DIC parameters and *SmartScan* analysis parameters.



Acquire Button in Main Toolbar

Objective Lens Cleaning Workflow (2339)

A simple workflow for cleaning objective lenses has been added. The procedure exposes the top element of the lens accessible through the access door on the front, left side of the instrument. Refer to manufacturer (Nikon) recommendations, or other online sources, for cleaning the front element of the objective lens.



Menu Selection - First Step of Cleaning Procedure

Objective Lens as Viewed Through Access Door

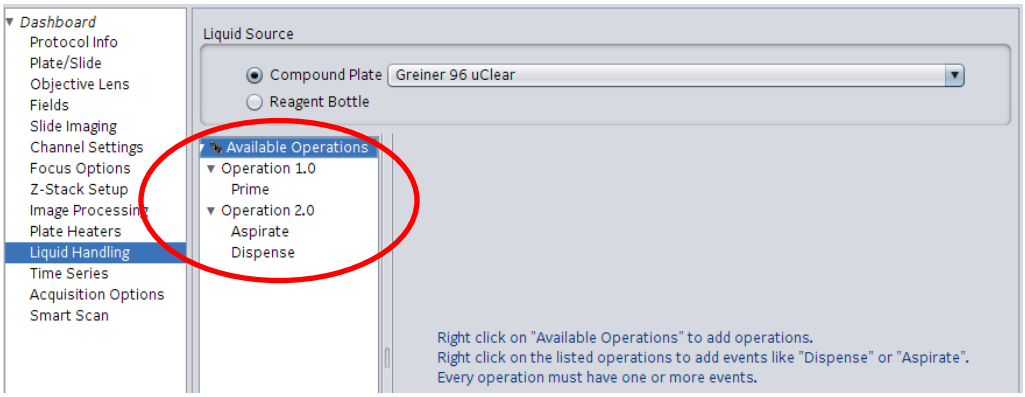
When the access door is open, all lasers and XY stage motors are disabled with a safety interlock. The lasers and motors cannot be re-energized until the door is closed. Do not use the cleaning procedure to access empty turret positions that do not contain an objective lens. In the event that your instrument has an empty, unblocked turret position, contact GE service.

Edge Confocal Settings Now Recorded in Acquisition Protocol (2340)

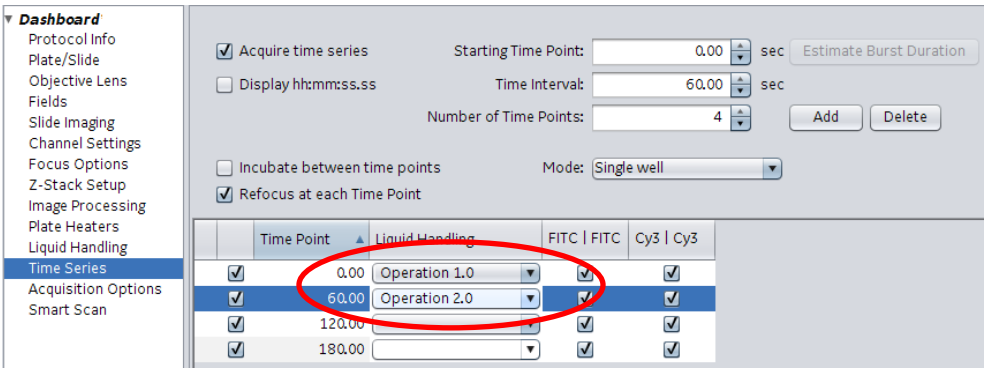
The Edge Confocal settings are now remembered within the acquisition protocol. It is no longer necessary to readjust the parameters at the start of every session.

Default Names for Liquid Handling Operations (2396)

Prior versions of software used the same default name ("New Operation") for every new operation. Selecting operations for time lapse imaging was difficult, because the names were all the same. As of V7.2, a different name will be created for every new operation. Customization of the names is still possible and is still advised.



Default Operation Names Are Unique



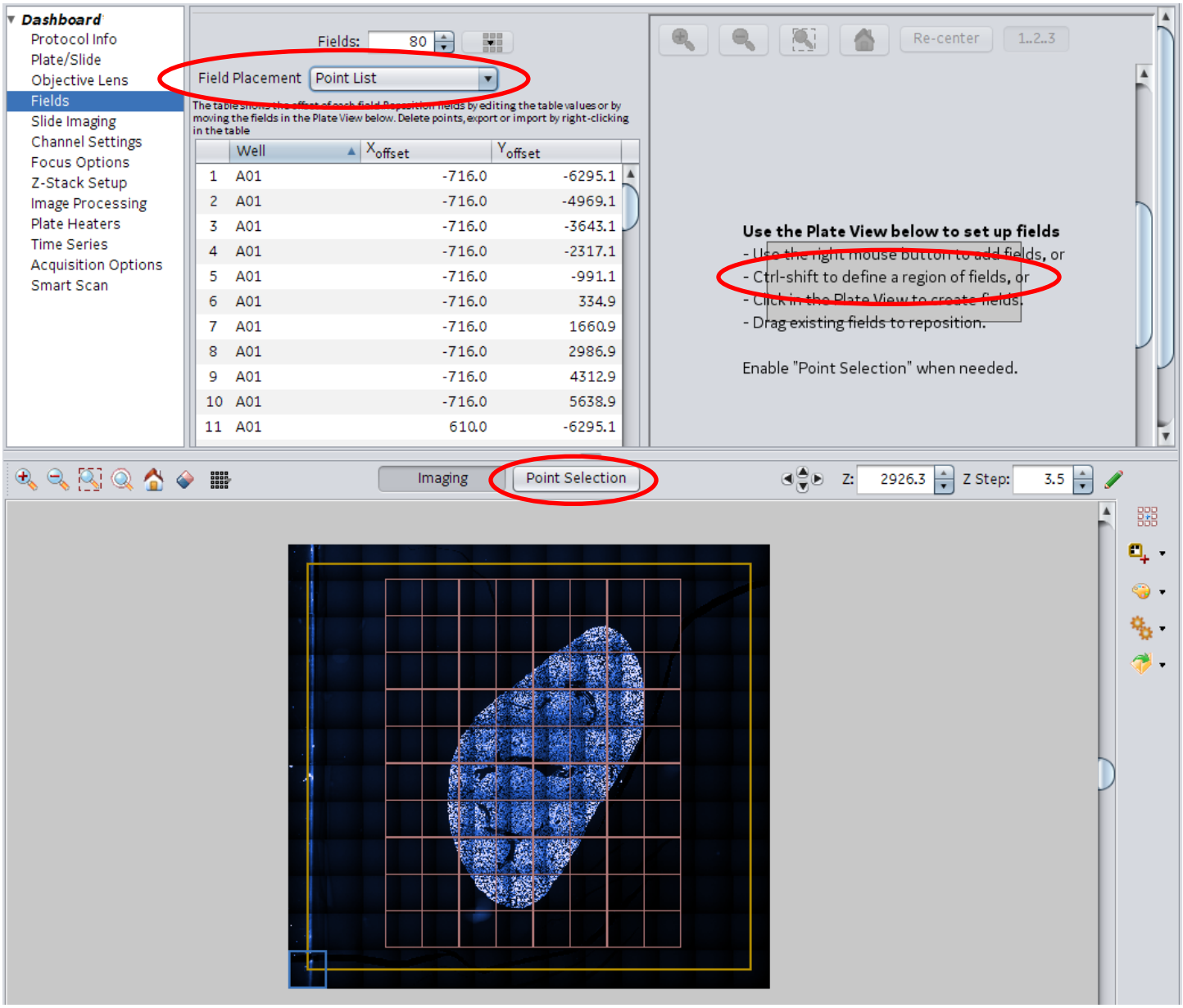
Operations Selected During Time Lapse

VolumeViewer and AVI Movies (2488)

The tilt angle has been changed from 10 to 5 degrees, and the total number of views has been increased from 36 to 72. In addition, AVI movies will contain views from 0-360 degrees (formerly 0-180 degrees).

Point List Definition Using Preview Scan (2261)

Fields can now be placed by drawing a box around thumbnails within the preview area. An example is shown below.



Fields Defined Using Preview Scan Thumbnails

Preview based field setup method:

- set the field placement method to "Point List"
- run preview scans until the object is found
- enable "Point Selection" mode
- define the desired scan area(s) using CTRL-SHIFT. INCell will determine the Points needed to cover the selected area.
- run a full scan!

Note that more than one area can be selected.

Remote Control Improvements

The following changes relate to the INCell remote control interface. Refer to "*INCell_Remote_Control_Interface.pdf*" for details.

New Command for Disabling Unsolicited Messages from INCell (2308)
Synchronization messages that originate from INCell can now be disabled using a command designed to control the RC protocol configuration settings. GE recommends that third party scheduling software use the new command to disable unsolicited messages from INCell. Polling for status is a more effective method of synchronization with INCell's RC protocol.

"SCRATCH" Folder Naming Deprecated (2410)
INCell removes temporary files before the start of every run, which may cause synchronization problems with third party software. No actual code changes were involved with deprecating "SCRATCH" folder naming. Only the RC protocol document was changed. GE does not recommend using temporary folders/files with automation.

Extra Protection Against Missing Files (2413)
Under some circumstances, INCell's remote control mode could stall if the scan results were removed too quickly from the INCell workstation. This could happen when using an external, unsychronized mechanism of copying/removing files from the INCell workstation's disk drive. (Limagito is one such program.)

INCell is now more tolerant of the situation where TIFF images are removed from the workstation before the scan is complete. Nevertheless, GE does not recommend removing files before scans are complete and before all files are stored at their final destination.

New Command for Checking Plate Sensor Status (2385)
A command called "GetPlateSensorStatus" has been added for checking the sensors used to detect the presence of plates (source and compound) within the INCell plate carrier.

Handle the Situation where the Instrument is Turned Off (2384)
Remote control will now be disabled if the instrument is off or otherwise disconnected. INCell will jump to state zero ("Idle") if the instrument fails to respond. The previous behavior was not as well defined.

Report Unrecognized Commands (2518)
Unrecognized commands that are received from the remote control program will be reported to the INCell log file. The additional logging can be useful during the development of new control software. Prior to V7.2, unrecognized communication was quietly ignored.

Significant Fixes and Changes

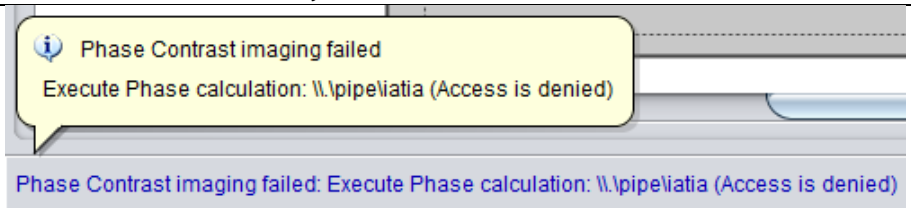
AVI Movie Generation of Screen Areas Larger than 1200x1200 Pixels (2414)
The original AVI generator contained an internal limit of 1200x1200 pixels for each frame of the movie. The limitation became very noticeable when using the 2560x1440 monitors included with the 2500 and 6500 scanners. Older workstations with 1920x1280 monitors could also experience this bug when the display area (within *Review mode*) was expanded beyond 1200x1200 pixels.

AVI Movie Generation Before Frames are Ready - VolumeViewer (2437, 2501)
The *VolumeViewer*'s AVI export tool was frequently active before the movie frames were actually ready and available. The resulting AVI movies were invalid. The files were either empty, or contained blank frames.

Similarly, the *VolumeViewer*'s view angle slider could sometimes cause invalid frames if adjusted while frames were being generated.

Field Scanning Optimization for Point Lists (2356)
Point list scans will no longer visit hidden/disabled fields before acquiring images at the requested locations. Scan times for certain kinds of point list scans will be greatly reduced.

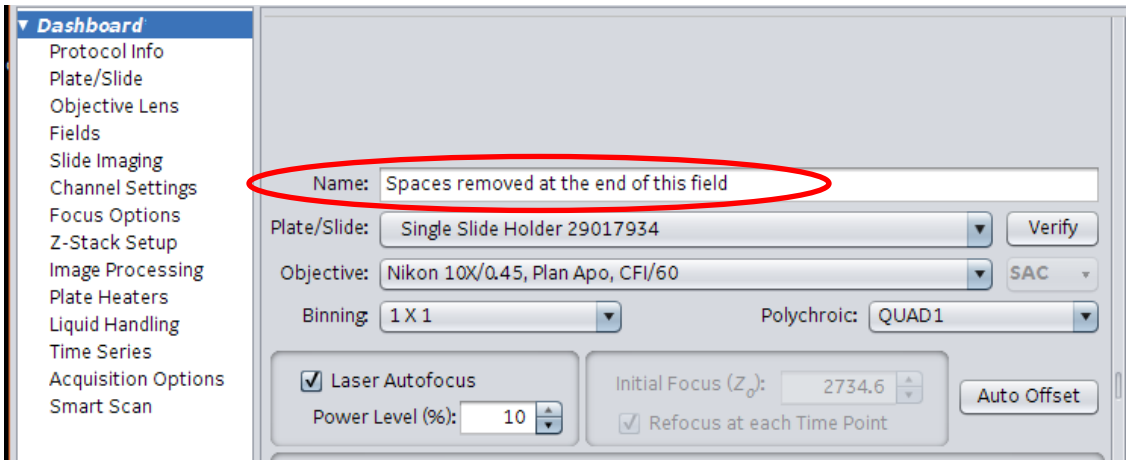
Phase/DIC Acquisition Problem in Multiuser Environment (2230)
The original method of generating Phase and DIC images required Administrator access privileges. Acquisition from an account without Administrator privileges resulted in the error message below, and no images were generated.



The new method does not require administrator access. Desktop installations can be used for Phase/DIC imaging at sites that wish to use separate installations for more than one login account.

Spaces Prevented at the End and Beginning of Protocol Names (2441)
Similar to the changes made in V7.1, INCell will now remove spaces at the end and beginning of protocol names. Spaces cause problems, because the protocol name is used to generate output folder names. Operating systems like MS Windows do not allow spaces at the end of folder names or file names. Describing the full nature of the problem is difficult, because most of the INCell software was already tolerant of spaces. For example, saving images to the local drive was not affected by spaces.

Saving images to local storage before copying to the network storage was affected by spaces, however, because that part of the software did not trim spaces. As a result, the remote folder name was invalid and was not created. The file was never copied from local to remote storage.



Protocol Name - Leading and Trailing Spaces Always Trimmed

Preview Thumbnail Display Problems (2423, 2424, 2485, 2486, 2487, 2350)
A series of improvements was made to the preview thumbnails within *Setup* mode. Dark and/or saturated thumbnails were often a result of the intensity mismatch between images obtained from preview scans and the acquisition protocol. (In most cases, the preview exposure time is different than the normal exposure time.) Preview images are now scaled to match the intensity of the images acquired with the acquisition protocol settings.

Related fixes:
- Preview thumbnails are now visible for all channels, not just the first channel. Preview scanning can be used for all channels.
- Thumbnails will remain visible when the number of fields is changed.
- Thumbnails will be restored after the Z position is changed by the *FocusFinder*.
- Enabling the autocontrast toggle button will also update the existing thumbnails on the display.
- Resetting the preview boundary with the "Clear" button will not remove existing thumbnails. Only the boundary box will be removed.

List of Changes Between 7.1-16402 ("Patch 2") and 7.2-16735 ("Patch 2")

Items listed in this table have been fixed in version 7.2, unless otherwise discussed in the comments.

ID	Brief Description	Comments

1748	Update the OTF files used for 3D deconvolution	The optical transfer function (OTF) describes the blurring properties of the objective lens. OTF files provide information needed by 3D deconvolution to reverse optical blurring.
		
		To check whether the deconvolution is using a new OTF file, look for the following within the deconvolution log file:
		
		`Titles.....`
		`Theoretical OTF calculation. Gen2. January 2018.`

2187	*FocusFinder* binning should not be less than the acquisition protocol binning.	*FocusFinder* will perform better with protocols that use binning levels greater than 4x4. See 2188 for details.
2188	Software/Image autofocus binning should not be less than the acquisition protocol binning.	Acquisition protocols that use binning levels greater than 4x4 combined with software autofocus will run faster for two reasons: 1. software autofocus will be performed at the binning level of the protocol. 2. the exposure time used during software autofocus will not be longer than the exposure time used during the protocol. Similar changes were made for the *FocusFinder*. See #2187. Warnings about "PS_IMAGE_AF_EXPOSURE...out of range..." should also go away.
2212	Operator needs a way to disable transition to *Review mode* at end of scan.	An option has been added to the dialog box used to start scans. Also see #2474.
2221	Confocal aperture field inconsistent about checking manually entered values.	The callback processing mechanisms were inconsistent.
2230	Phase & DIC calculation fails due to pipe access limits in multiuser environments.	Communication pipes require administrator access. It is currently unknown when/how the access limitations came into effect. Security updates from Microsoft are a possible explanation.
2261	Improved methods of defining fields, based on the preview scan image.	Point lists can now be defined by selecting the scan area with ctrl-shift.
2264	Need an image snapshot accessible when in the "Image Processing" page	An "Acquire" button has been added to the main toolbar.
2291	Annotations and scale bars do not get captured into JPEGs saved from *Review mode*.	A new method of recording JPEG images has been added. The original, high resolution method is still the default.
2302	*FieldFinder* improvements: add field finding options	The new field finding options will facilitate image stitching in third party software like ImageJ/FIJI.
2308	Add *RemoteControl* command for disabling status messages that originate from INCell	See the RC protocol document for a description of the new command. GE recommends that new scheduling programs be developed with "SuppressUnsolicited" set to TRUE. Synchronization between INCell and the remote client is much simpler when spontaneous messages from INCell is disabled.
2309	Avoid field overlap when using the randomize button.	Fields will not overlap, unless the area within the well is limited.
2311	Sort field order to minimize stage motion.	The field numbers are sorted into a serpentine pattern.

2331	Review software that responds to objective lens changes.	The INCell GUI should now do a better job of updating items related to changing the objective lens. For example, the magnification affects the field-of-view and the NA affects the depth-of-field. Repeated messages about resetting the AF offsets should also go away.
2339	Develop workflow for cleaning objective lenses.	A simple wizard allows access to the top surface of the objective lens.
2340	Add protocol parameters for the Edge confocal settings.	Edge confocal parameters are now stored within the acquisition protocol. The settings will be restored whenever protocols are reloaded.
2341	Checking boxes "Open Aperture" and "Edge Confocal" should not change aperture settings (6500/6000).	Aperture settings are no longer affected by the "Open Aperture" and "Edge Confocal" toggles. Only applies to the 6500 and 6000.
2348	Cell counting min/max area limits not used correctly.	The requested area was being used incorrectly by the cell counting algorithm. The magnitude of the error depended on the binning level within the image. Normal images with 1x1 binning were affected by a factor of 16X. To correct the problem, new size tags have been added to the acquisition protocol. Size values represented by the older tags will be corrected whenever an acquisition protocol is loaded from storage. A warning will be presented to the user during the correction. The area value will be quietly fixed if in RC mode.
2349	Add application name and software revision to XAQP files	New XML tags have been added to the XAQP files.
2350	Preview thumbnail contrast is affected by *FocusFinder*	The thumbnails within the preview display will be restored after adjusting the Z position using the *FocusFinder*.
2352	Update the bottom height of the standard plate types.	A small refinement has been made to the default bottom height of the "standard" plate types.
2356	Pointlist acquisition bug. XY stage moves to hidden/disabled fields.	Unnecessary XY positioning has been eliminated. Scan times should improve.
2358	*Review mode* field selection when dragging from left to right.	Dragging the cursor from an undefined area (outside an actual field) caused undefined results.
2359	*MiniScan* XDCE listed in *Review mode*'s list of Most Recently Used files	MiniScan results are not very useful for *Review* mode.
2360	Z Movement after software autofocus crashes INCell	A rare condition that only affected the Simulator (not real instruments). The crash occurred when the software autofocus was used at the edge of Z travel.
2365	Make it easier to extract Remote Control communication info from log file	The keyword "RECO" has been added to log messages involving remote control mode.
2369	Add a TIFF naming style - "Full Form"	Full form names contain consistent fields and are therefore easier to parse.
2370	Streamline disk IO during 3D deconvolution	Unnecessary write/read operations have been removed from the deconvolution pipeline. Scans involving 3D and Adv2D deconvolution will finish faster, because the time between wells has been shortened.
2372	Remove "dvlenses.tab" and "heat_map_config.xml" from the list of files stored by "*CaptureLog*".	The files were not a useful part of the log file packages.
2384	RC mode should handle the case where the instrument is turned off.	INCell will now disconnect the remote control socket if the instrument does not respond.
2385	RC command needed for checking plate sensors	The new RC command is called "GetPlateSensorStatus". The return message is "PlateSensors". See RC protocol document for details.
2387	LHZ aspirate position is always offset by an extra 1mm	The offset is still 1mm (1000 um), but the value is now

		configurable within the GUI configuration files, as shown below. <liquid_handling_aspirate_extra_zoffset_um>1000</liquid_handling_aspirate_extra_zoffset_um>
2388	Don't put temporary XDCE in *Review* mode's list of most recently used files.	Temporary files should not be offered within the list of recently used XDCE files.
2389	LAF focus peak location problem after Brightfield acquisition (6500 only)	Brightfield imaging mode caused a problem with the peak locations within the LAF trace.
2390	Add use of the immersion index in calculation of the optical bottom thickness.	Previous versions of the software assumed an immersion index of "1.0". In some cases, the value was implicit, in other cases the value was hard-coded to "1.0".
2392	Add "Signal to Bkg Ratio" to the list of choices for the *Review mode* heatmap	Signal to background is estimated from the image histogram. The value is potentially useful when reviewing plate scans.
2394	New field placement option: "Circular "	The new placement option provides a convenient way to fully scan the area within circular wells.
2396	Improve the default names used for LH events. Replace "New Operator".	The new names are easier to use.
2400	"Verify LAF" and "LAF Trace" procedures should check for reasonable conditions before proceeding.	LAF procedures require a properly positioned plate.
2403	Display pixel size and LAF method in *Setup* mode	
2404	Report situations where the requested imaging mode is not being used in *Setup* mode.	Certain imaging modes are not practical within *Setup* mode. For example, Z scans and 3D deconvolution do not make sense when acquiring preview images. A warning message will now be displayed whenever the imaging mode is automatically switched to a basic, 2D snapshot.
2405	CO2 off icon should be removed from INCell GUI if new EC GUI is installed	The New EC software controls the CO2. INCell should not present a misleading icon. Applies to the 2500 and 6500.
2409	Modify the IC INI archive file names to fix sorting problem.	Archived INI file names will contain Year->Month->Day rather than Year->Day->Month.
2410	Deprecate "SCRATCH" folder naming for RC mode operation.	Scratch folders are mostly incompatible with remote control mode operation. Permanent storage methods should be used for RC mode.
2411	User defined wavelength error when changing TIFF naming preference.	User defined channel names are no longer affected by the TIFF naming preference. The dependence between user defined wavelengths and TIFF naming preferences was caused by some unusual software.
2412	Rework tooltips involving the LH dispense depth.	Basic clarifications have been added to the LH tooltips.
2413	Missing TIFF images can cause remote control mode to fail.	A very rare condition that could only occur if an external program (e.g. Limagito) actively copied/removed TIFF images during scanning. GE recommends waiting until scans are complete before removing results files (TIFF images and XDCE files) from the acquisition workstation.
2414	AVI movie creation does not work with screen areas larger than 1200x1200.	The AVI movie generator used a memory buffer consisting of 1200x1200 pixels. Attempts to use more memory caused the tool to fail.
2415	Drag-and-drop XDCE files and folders into *Review mode*.	Drag-and-drop is a useful way of systematically reviewing results from previous scans.
2416	Fix channel & power settings within the 6500 orthogonality test protocol	For GE manufacturing only. Does not affect normal users.
2417	LAF problem when using low NA objectives combined with thin bottom plates	Also fixed in V7.1-16402, Patch 2.
2422	Relax the working-distance check that happens at the start of scans.	The check is now more tolerant by a factor of 2X.
2423	Preview thumbnails disappear when adjusting the number of fields	The thumbnails will not be cleared when the number of fields is increased or decreased. Also see #2424, #2485,

		#2486, and #2487.
2424	Preview scan thumbnails only visible with first channel	All channels can now be used for preview scans. Also see #2423, #2485, #2486, #2487.
2425	Trajectory downloads from the Nanomotion electronics are garbled.	The problem affected diagnostic files only.
2430	Instrument control software installer should check for valid instrument	The instrument's serial number is used to determine whether the appropriate type of instrument control software is being installed. For example, instrument control software for the 2500 will not be installed on the 2200. Cross-installation of the workstation software is still allowed.
2432	Repeated double click on *Dashboard* channel causes queued acquisitions	Double-clicking also activates the autofocus settings specified by the acquisition protocol. The feature is now more usable, because lengthy acquisitions cannot be queued up accidentally. Also see #2433.
2433	Phase/DIC "calculation problem (a): invalid argument failure" (error 25)	Similar to #2432, but for the case where Phase and DIC acquisitions were overlapped. The changes for #2432 fixed this issue.
2435	Problem saving XDCE from multi channel scan with 3D deconvolution	In some cases, the XDCE file was copied from the temporary location to the final location before the final deconvolution was complete.
2437	AVI movie tool active while loading images and while calculating views in the *VolumeViewer*.	The movie tool within the *VolumeViewer* has been disabled while views are being calculated.
2438	Redirect menu selection "Upload instrument snapshot..." to "*CaptureLog*"	*CaptureLog* is more comprehensive and is now the preferred tool.
2439	Warning message when loading XDCE file from a different instrument.	Not all software features will work when loading XDCE files from different instrument types. For example, the channel names within the XDCE file will not match the instrument's channel names.
2441	INCell needs to prevent spaces at the end of protocol names	Spaces are prevented at the end of protocol names (not just the middle).
2442	*CaptureLog* toggle "Latest log file from scanner" does not work	The toggle button did not work, because the underlying method of retrieving the instrument number was broken. It is not known when/how this got broken.
2449	Review default settings used for 3D deconvolution.	The default settings have been optimized for images acquired with the 2200 and 2500. For example, the default method is now "Ratio" rather than "Enhanced Ratio. Ratio method iteration is more robust and will often work better in a screening environment with microtiter plates.
2453	3D deconvolution noise filtering settings are reversed.	The "High" and "Low" settings were reversed. Low noise filtering was actually high noise filtering, and vice versa.
2454	Object centering should not attempt to load a plate into the scanner.	The software will now ignore object centering requests if a plate it not loaded within the instrument.
2461	Liquid handling Z axis distance/revolution setting is incorrect by 0.16%.	The configuration setting used for the LHZ distance per revolution did not contain enough numerical precision. The error is small (0.16%) and does not affect normal operation of existing instruments that already have the liquid handling option. Instruments manufactured with V7.2 will contain the correct value. No changes are required for existing instruments.
2465	*VolumeViewer* display contrast controls	Contrast slider bar resolution increased by 10X. Default min/max contrast settings improved.
2468	Software autofocus method "focus on every channel" is not retrieved from protocol.	The autofocus method called "focus on every channel" was reset to the method called "first channel" when loading acquisition protocols from disk. The bug was caused by changes made for #2050 in V7.0.
2474	Return to *Setup* or *Review* mode when finished scanning. Do not stay in *Scanning* mode.	*Scanning* mode is not very useful after the scan is complete. Under most conditions, the software will

		proceed from *Scanning* mode to *Review* mode. Scans that involve additional activities (e.g. 3D deconvolution, Adv 2D deconvolution, and *ReviewScan* post-processing), will return to *Setup* mode. Likewise, the operator has the option to return to *Setup* mode rather than continuing to *Review* mode (see #2212).
2476	Review mode Sync button state is difficult to recognize.	The enabled state is now highlighted in green. Disabled is highlighted in red.
2477	XAQP file Z step size is sometimes zero, even though Z-Stack Setup indicates otherwise.	The exact origin of this problem is unclear. The Z-stack setup procedure will correct the condition whenever the start and end positions are adjusted.
2478	Report when the lid heater has an electrical short.	The changes apply to the 2200 and 6000 only. The 2500 and 6500 use a different program to control the lid heater.
2480	*VolumeViewer* region setup display problem with multi-channel images.	All of the channels were effectively combined into a single, maximum intensity projection. The resulting setup image contained similar information in all colors (RGB), and was somewhat white in appearance.
2481	*CaptureLog* does not always show the current acquisition protocol.	The protocol name displayed within *CaptureLog* needs to be updated whenever the user changes the protocol name.
2484	*VolumeViewer* Z clipping slider behaves inconsistently.	The slider was jumpy and responded inconsistently to the positive and negative control points.
2485	Preview thumbnails disappear when the preview area is cleared.	Pressing the preview area "Clear" button caused the thumbnails to disappear. Also see #2423, #2424, #2486, #2487.
2486	Preview thumbnail intensity does not match snapshot thumbnail intensity.	Preview images are acquired with a different exposure time than snapshot images. The resulting thumbnails will not have matching intensity levels, which often results in dark or saturated thumbnails. Preview thumbnails are now adjusted to match snapshot thumbnails. Also see #2423, #2424, #2485, #2487.
2487	Thumbnail autocontrast toggle does not reenable autocontrast in *Setup* mode.	*Setup* mode thumbnails do not update immediately when the "Autocontrast" button is enabled. Also see #2423, #2424, #2485, #2486.
2488	*VolumeViewer* and AVI movie generator improvements.	Changes: - tilt angle changed from 10 to 5 degrees. Number of views has been increased from 36 to 72. - AVI movies will contain views from 0-360 degrees (formerly 0-180 degrees)
2491	*Review mode* display method reverts to original settings when dragging fields left to right.	When the instrument is scanning plates, the *Review mode* display settings are reset after every image acquisition. Only a partial fix is possible. Part of this behavior is unavoidable.
2494	Z-Stack setup page is active during scanning.	Acquisition controls should be disabled during scanning.
2501	*VolumeViewer* can generate invalid image frames	Adjusting the viewing angle during frame generation can result in invalid frames.
2504	Measure distance tool does not reset the cursor when finished.	The tool uses a cross shaped cursor that persists throughout the remainder of the session. The cursor should only be displayed while the distance tool is being used and only over the image display area.
2507	Review mod WZTF dialog closes unexpectedly.	The dialog needs to stay visible, because it provides a good way to navigate through fields, Z sections, and time-points.
2512	Movie generator tool improvements	Small improvements have been made to the UI, for consistency with the rest of the software.
2518	Report unrecognized RC commands to the INCell log file.	Unrecognized commands should be reported to facilitate software development.
2520	Add RC command GetImagerStatus (same as GetStatus)	The original command name is misleading, because the

		response is "ImagerStatus". The new command name is more intuitive. Both commands will exist in V7.2 and future versions.
2522	Add RC sample programs to the installation packages.	The sample programs (Python scripts) are useful for learning about the remote control communication protocol.
2540	Field positioning issue when loading protocols that use "Random" or "Custom" field locations.	The graphics used to display the field locations were not being rescaled according to the plate map requested by the acquisition protocol. The problem was only noticeable when switching to a plate map with different geometry than the previously active plate map.
----	Patch 1	
2554	Point list location problem after scanning.	Following a point list scan, the field locations were improperly updated. The fields were then displayed in the wrong locations. In addition, the fields locations of a second scan (using the same protocol) were similarly affected. The incorrect locations were temporary. Invalid values were never recorded in the XAQP file stored on disk. To work around the problem, reload the acquisition protocol. The issue is unique to V7.2. Prior versions of software do not exhibit this problem.
----	Patch 2	
2557	Investigator cannot retrieve channel information from V7.2 XDCE files.	Investigator expects version number formats like "d.d" for the AutoLeadAcquisitionProtocol section of the XDCE file. The initial versions of V7.2 used just "d", for example version="16732". Work around for affected XDCE files: append ".0" to the version number within the AutoLeadAcquisitionProtocol section of the XDCE file.

Notice to purchaser
IN Cell instruments are intended for research use only. The instruments are not for use in diagnostic procedures.

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