Cytiva

IN Cell Analyzer Version 7.4

Release Notes

Introduction

Version 7.4 of the IN Cell Analyzer software provides new features and bug fixes for instrument models 2500, 6500.

The release notes below describe the primary changes between versions 7.3 and 7.4. The major improvement in version 7.4 is the addition of a chromatic correction feature to co-register multichannel images. Additional information can be found in the release notes from previous version of software, which are located on the IN Cell downloads webpage. http://incelldownload.gehealthcare.com/download_data/incell/incell_docs/incell_docs.htm

New Features in 7.4

Chromatic Correction (2751)

Chromatic correction is now available on any 4X, 10X, 20X, 40X, and 60X lenses currently supported on the IN Cell 2500 and 6500 instruments. The feature consists of 1) an algorithm to register chromatic images into the same color space and generate the transformation filter, 2) an algorithm to apply the filter to an new image and transform it to a reference color space, 3) protocols and configuration parameters defining how the algorithms should be applied, 4) a wizard-style dialog to allow the user to manage the workflow to generate the chromatic filters and 5) UI elements to indicate chromatic filters should be applied to images collected during a scan and 6) a fluorescent reference slide that is used for generating the chromatic transform (sold separately).

The Algorithms

The underlying algorithms to register images acquired with different emission filters is supplied to INCell from an external source. The algorithm was originally written in Matlab and packaged via the Matlab Code Generator into a Java jar file. The jar file is included with INCell. The source code is external to INCell.

Generation Method: A method is exposed that generates the chromatic shift between two images acquired with different emission filters and returns a set of parameters defining the transform between the images of different emissions as shown in

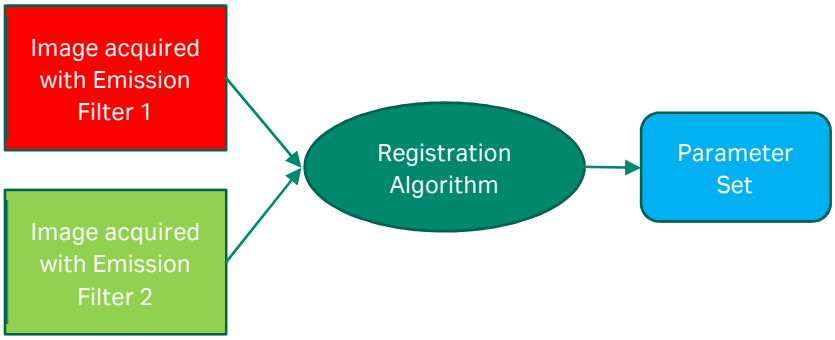

Figure 1 Generation Algorithm

Apply Method: A second method is exposed to use the parameter set generated to correct an image acquired with a known emission filter back to the reference color space as shown in Figure 2.

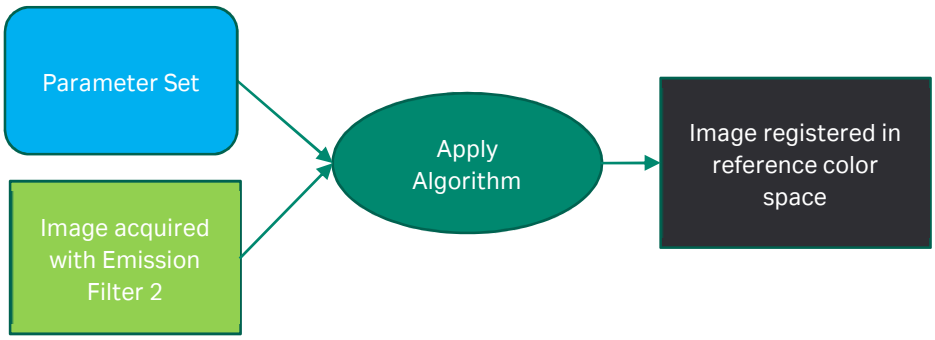

Figure 2 Apply Algorithm

Chromatic Correction Generation Protocols

To fully register to a single-color space, INCell must generate chromatic correction filters using the Generation Algorithm for each emission filter pair available on a system. In addition, the correction filter is a function of the objective lens, and the polychroic. In order to simplify the generation of correction filters across the various emission filter combinations, INCell provides a chromatic registration protocol called *ChromaticCorrectionGeneration*. There is a protocol for each supported instrument. The chromatic registration protocol defines a set of conditions and channels that can be used to generate the chromatic filters for an objective lens. The protocol is stored in the special ChromaticCorrectionData folder. This protocol is used by the chromatic correction workflow launched by the Chromatic Correction Generation dialog described in the next section.

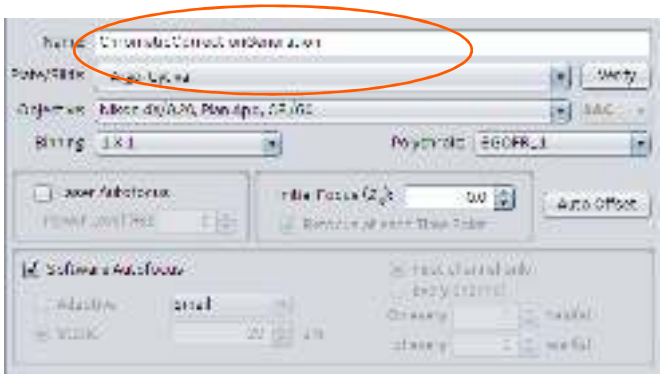

Figure 3 Chromatic Correction Generation Protocol

Chromatic Correction Generation Wizard

To generate chromatic correction the user uses the Chromatic Correction Wizard accessed from the Application→Hardware→Measure Chromatic Correction menu item in INCell, as shown in figure 4 (left). When opened, the Chromatic Correction Wizard displays an interface that walks the user through the generation and management of the chromatic correction, as shown in figure 4 (right).

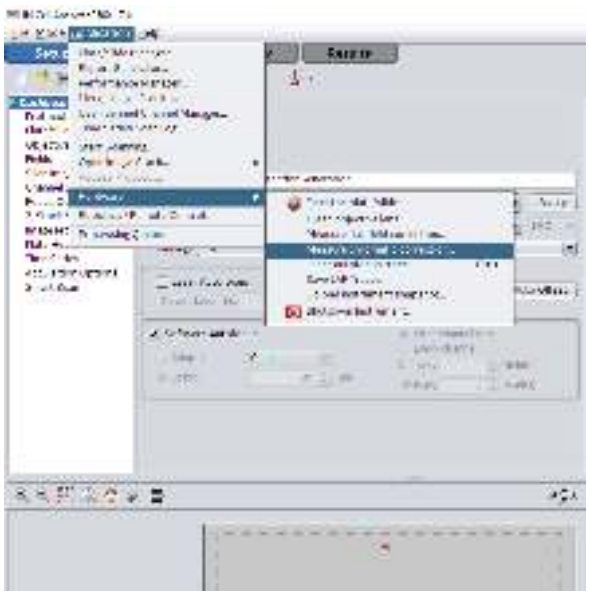

Figure 4 Measure Chromatic Correction (left). Chromatic Correction Wizard (right).

Applying the Correction Filters During a Scan

To use chromatic correction during a scan, the user selects the “Apply Chromatic Correction” box on the Channel Settings page of the protocol editor. When the Apply checkbox is selected, the rightmost column of the dialog displays which chromatic filters are available for the current objective lens and other protocol settings. When the scan is run, the chromatic correction will be applied to each image for which a filter is available, The saved TIF images will be chromatically corrected.

Figure 5 Channel Settings Page with Chromatic Correction Checkbox

Other Applications of the Correction Filter

If the Apply Chromatic Correction checkbox is selected on the Microscopy page, the chromatic correction will be performed when the user clicks the Mini-scan button on the Dashboard. This allows for a quick check of the correction mechanism. Single color images, auto focus images, focus finder images and other image collection paths are unaffected by the chromatic correction mechanism.

Significant Fixes and Changes

Nanomotion Firmware 7.0010 (2757)

A new version of the Nanomotinon firmware is released. This firmware is necessary to use on the latest revision of the Nano3 PCBA. When installing IN Cell 7.4, the software will prompt an update of the firmware if it is necessary

Nano3 Firmware Versions	
6.0028	The minimum version for 2200/6000 systems
6.0030	The minimum version for 2500/6500 systems
6.0031	Contains improvements to LHY and LHZ necessary for Water Immersion. Released with Analyzer 7.3; any users with Liquid Handling were prompted to upgrade. Exhibits a bug on a small number of systems that results in the system hanging either during initialization or on the first move of the objective or polychroic turret. Replaced by 7.0010
6.0032	Do NOT use. Replaced by 7.0010.
7.0010	Necessary for the latest revision Nano3 PCBA. Fixes the problem some systems experienced with 6.0031. Compatible with all systems. Shipping on all new systems and FRUs.

After installing IN Analyzer 7.4, the following systems will be prompted to upgrade to firmware 7.0010:

- any system with Liquid Handling
- any system with 6.0031 or 6.0032 installed

When installing Liquid Handling, upgrade to 7.0010. It is acceptable, but not necessary, to upgrade any other system to 7.0010. It is not necessary to downgrade the firmware in any scenario except troubleshooting.

Known Issues

Orange channel does not capture image on first attempt (2638)

On the IN Cell 6500, the first attempt to image the Orange channel after a long period of inactivity will lead to the orange channel to show blank image. Taking a second snapshot in the Orange channel will resolve the problem and the issue will not occur during a scan.

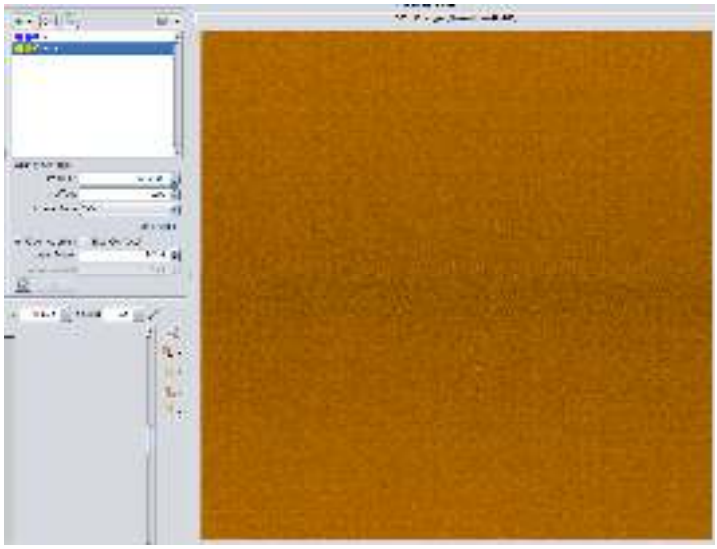

Figure 6. Blank image in the Orange channel on first image.

List of Changes Between 7.3-17026 and 7.4.17241

Items listed in this table have been fixed in version 7.4, unless otherwise discussed in the comments.

ID	Brief Description	Comments
1832	Provide method(s) of viewing the time-stamps in HOUR:MIN:SEC format.	In Review mode, annotations of timelapse experiment timestamp now display in HR:MIN:SEC format instead of only in seconds.
2017	Autocontrast settings for 3D stacks should be the same for all Z sections	In Review mode, Auto contrast is set for all Z sections instead of one Z section.
2178	Interactive point acquisition: click on point in list -> acquire at location	In Setup mode, Fields, Point List, double clicking on a saved point will now move to the XY position of the point.
2576	Don't report errors when the client disconnects.	“Connection reset by peer” and “bad file descriptor” are no longer logged as errors but as ‘info’, to not crowd the ics_errors log file.
2629	Unable to delete row in point list	In Setup mode, Fields, fixed bug with deleting point list.
2632	Diagnostics tool does not show up in the 'Choose Display Type' menu with 3D Imaging	In Review mode, ‘Choose Display Type’ now shows Diagnostics for 3D Imaging with Autofocus.
2633	Incorrect Title for Report Generator in Start Menu	Not Fixed.
2648	Unable to measure Flat Field Correction	Fixes a multi-thread racing issue when loading Plate files that causes an error with measuring flat field correction.
2661	Add Protocol Creation extension to remote control	Updated commands to the Remote Control Interface.
2667	Scan Time status bar is not in sync with the actual scan time.	Fixes scan time remaining in a water immersion experiment. The remaining time is only an estimate.
2696	Strange behavior with Report Generation Toggle buttons in GUI	In Setup mode, Acquisition Options, a bug with report generation was fixed.
2697	Unable to Re-order Point List table	In Setup mode, Fields tab, Point Selection mode, a bug with re-ordering the table was fixed.
2698	Unable to delete a row in Custom Fields table	In Setup mode, Fields tab, Custom Placement, a bug with deleting rows in the field was fixed.
2704	rx command in service command area sends commands twice	In Service mode, a bug with sending the rx command twice was fixed.
2705	scanner snapshot should overwrite, not append to scanner_info	Scanner snapshot now overwrites scanner_info in the log files instead of appending to previous values.
2712	Present a warning to unload the plate before proceeding with the wi_setup.py script	A warning was added to unload the plate before proceeding with wi_setup.py
2713	Laser Power of the Blue Channel seems to change after the plate is Ejected and Reloaded	A bug was fixed that caused 405 excitation to lose intensity settings after ejecting and loading a plate.

2714	Edge confocal width is reset when loading a protocol	A bug was fixed that caused EDGE confocal to lose confocal settings after loading a protocol.
2719	Help menu doesn't do anything	The help menu now points to the incelldownload website.
2724	Channel Settings not updated correctly in the .xaqp file on Incell 2500/2200	Fixed bug with channel settings not updating after opening saved protocols in 2500/2200.
2733	Issues with channel manager dialog	Fixed bug with channel manager not immediately saving to disk.
2740	Line intensity profile drops off at right side	Fixed bug on the linestat.py on the 6500 that caused the intensity to be low on the right side.
2748	Don't disable LH just because a WI lens is installed on the system	Disables Liquid handling when WI protocol is selected.
2749	Enable Capability to choose either or between LH and WI	A parameter in configuration file was added to enable between LH and WI.
2750	Add a command to power-off the instrument	A shutdown command was added to turn off the ICS.
2751	Implement chromatic magnification correction (channel registration)	New feature to add functionality to chromatically register and correct multi-channel images.
2757	Nano3 Firmware update for 7.4	A new version of nanomotion firmware 7.0010 was released to support new nanomotion boards and fixes problems with full-step motors on some boards.
2758	XYZ stage can walk away during continuous acquire	Fixed a bug in service mode when XYZ stage will move during continuous acquire when an objective is moved.
2760	lh_offset.py fails: list index out of range	Fixed a bug where lh_offset.py fails because it was dependent on a LHZ offset.
2762	Aperture calibration fails when using Simulator	Fixed a bug where aperture calibration fails when using the simulator.
2763	Aperture calibration fails when host name is configured but not available.	Fixed a bug where aperture calibration can fail if the scanner name is not available in scanner_name.txt.
2766	Chromatic shift measurement doesn't work in integration	Fixed a bug with the chromatic shift measurement tool not working in production.
2767	error quitting lh_offset.py	Fixed a bug with the lh_offset.py closing error.
2769	Water Immersion Application Pop-up message showing twice	Fixed a bug with water immersion application pop-up message showing up twice.
2770	Instrument Control software Installer error	Fixed an installer problem.
2775	" Service " icon is missing from GUI	Fixed a bug where the service icon disappeared from GUI
2793	Reduce Focus Finder Default exposure on 6500 to 40 ms instead of 35 ms	The default exposure on the IN Cell 6500 is reduced from 35ms to 40ms to address image artifacts in focus finder at 35ms.
2797	ics hangs or crashes during 2d deconvolution	Fixed an issue with 2D deconvolution crashing with non-square images.
2800	Water is applied to WI objectives during a miniscan when Apply water checkbox is selected	Fixed a bug to not apply water during a mini-scan when the apply-water checkbox in the liquid handling card is not selected.
2809	special character got messed up	Corrected a display error with hovering display.
2811	Filter Leak.xaqp	Fixed an error where Filter Leak.xaqp does not include High Speed Filters.