EPU

Versions 1.12 - 3.7
Release Notes

PN 103048

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Contents

1 Introduction

1.1 Purpose

This document describes the Thermo Scientific EPU software releases.

1.2 Audience and scope

These release notes are intended for users of the Thermo Scientific EPU software and those who manage the installation of Thermo Scientific EPU software on the microscope computer.

This document describes the content of the most recent and few historic EPU releases.

1.3 Hardware Requirements

The EPU software can be used on the Microscope PC of Thermo Scientific and FEI TEM systems that are equipped with a compatible camera. See the release specific chapters below for a specification of the supported TEM Server software versions and cameras.

1.4   System, software and configuration compatibility

The following tables show the compatible microscope software versions, the preferred EPU software versions per microscope software version, and the system configuration compatibility.

Although the EPU software is backward compatible with a limited range of microscope software versions, some of the new features and improvements may be available only for the most recent supported microscope software version(s).

1.4.1 Preferred EPU version per microscope software version

Titan	Talos	Tecnai	EPU	Remarks
3.14 – 3.19	2.14 – 2.19	—	3.7	
3.13	2.13	—	3.6	Falcon C support added
3.12	2.12	—	3.5	
3.11	2.11	—	3.4	
3.10	2.10	—	3.3	
3.9	2.9	—	3.2	
3.8	2.8	—	3.1	
3.7	2.7	—	3.0	
3.11	2.11	—	2.14	
3.5	2.5	—	2.13	
3.4	2.4	—	2.12.1	
3.3	2.3	—	2.11	
3.2	2.2	—	2.10	
3.0 – 3.1	2.0 – 2.1	—	2.9	
2.15	1.15	—	2.12.1	
2.14	1.14	—	2.8.1	
2.13	1.13	—	2.7	
2.12	1.12	—	2.6.1	
2.6 – 2.11	1.6 – 1.11	5.6 – 5.7	1.12	Last release for Falcon II
2.0 – 2.5	1.1 – 1.5	—	1.7	
1.6	—	4.6.4	1.6	Last release for Windows XP

1.4.2   Compatible microscope software versions per EPU version

EPU	Titan	Talos	Remarks
3.7	3.14 – 3.19	2.14 – 2.19	
3.6	3.13 – 3.18	2.13 – 2.18	Falcon C support added
3.5	3.12 – 3.17	2.12 - 2.17	
3.4	3.11 – 3.16	2.11 – 2.16	
3.3	3.10 – 3.15	2.10 – 2.15	
3.2	3.9 – 3.14	2.9 – 2.14	
3.1	3.8 – 3.13	2.8 – 2.13	
3.0	3.7 – 3.12	2.7 – 2.12	
2.14	3.6 – 3.11	2.6 – 2.11	
2.13	3.5 – 3.10	2.5 – 2.10	
2.12.1	2.15 3.4 – 3.9	1.15 2.4 – 2.9	● Preferred over EPU 2.12.0 ● Most recent release that supports Windows 7
2.12.0	2.15 3.4 – 3.9	1.15 2.4 – 2.9	
2.11	2.15 3.3 – 3.8	1.15 2.3 – 2.8	
2.10	2.15 3.2 – 3.7	1.15 2.2 – 2.7	
2.9	2.15 – 3.6	1.15 – 2.6	
2.8.1	2.14 – 3.5	1.14 – 2.5	Replaces EPU 2.8.0
2.8.0	2.14 – 3.5	1.14 – 2.5	**EPU 2.8.0 is withdrawn.** **Do not install EPU 2.8.0**
2.7	2.13 – 3.4	1.13 – 2.4	
2.6.1	2.12 – 3.3	1.12 – 2.3	Preferred over EPU 2.6.0
2.6.0	2.12 – 3.3	1.12 – 2.3	
2.5	2.12 – 3.2	1.12 – 2.2	

EPU	Titan	Talos	Remarks
2.4	2.12 – 3.1	1.12 – 2.1	First release for Windows 10
2.3	2.12 – 2.15	1.12 – 1.15	
2.2	2.12 – 2.14	1.12 – 1.14	
2.1	2.12 – 2.13	1.12 – 1.13	
2.0	2.12	1.12	Released only to Beta customers

1.4.3 Compatible Athena and EQM versions per EPU version

EPU	Athena	EQM	Remarks
3.7	1.23	1.16	
3.6	1.22	1.15	Falcon C support added
3.5	1.21	1.14	
3.4	1.20	1.13	
3.3	1.19	1.12	
3.2	1.18	1.11	
3.1	1.17	1.10	
3.0	1.16	1.9	
2.14	1.15	1.8	
2.13	1.14	1.7	
2.12	1.13	1.6	
2.11	1.12	1.5	
2.10	1.10	1.4	
2.9	1.9.2	1.3	
2.8	1.8.2	1.2	
2.7	1.8	1.1	First EPU release with DMP integration for: ● Falcon 3EC and Falcon 4

EPU	Athena	EQM	Remarks
			● Gatan filters with Gatan K2 or K3 camera
2.6.1 and earlier	—	—	Not supported

1.4.4 Compatible cameras for EPU

Camera	Supported	Remarks
Ceta	Yes	● All Ceta Sensor Packages: 16M / -D / -S / -M / -F ● With and without Speed Enhancement (Ceta-2).
Ceta-F	Yes	EPU 2.14 and later.
Falcon 4	Yes	EPU 2.6 and later.
Falcon 4i	Yes	EPU 2.14 and later.
Falcon 3EC	Yes	
Falcon I / II	**No**	EPU 1.12 and earlier.
Gatan Orius SC200 / SC1000	Yes	
Gatan OneView	Yes	
Gatan US1000 / 1000XP / 4000	Yes	

Note The compatible cameras may not all be supported by the compatible microscope software versions. See the TEM Server Release Notes for a definitive list of supported cameras.

1.4.5 Compatible cameras and energy filters for EPU

Camera	Supported	Remarks
Selectris / Selectris X	Yes	Requires Titan 3.6 / Talos 2.6 or later.
Gatan Enfinium SE / ER with US1000XP camera	Yes	
Gatan Quantum 963 / 964 / 965 / 966	Yes	
Gatan Quantum 967 with K2 camera	Yes	

Gatan BioQuantum 1967 with K3 camera	Yes	• EPU 2.3 and earlier: only in stand-alone configuration.
		 • EPU 2.4 and later:
		   • embedded configuration is supported with Titan 2.15.2/3 or 3.2 and later and with Talos 1.15.2/3 or 2.2 and later:
		   • all other Titan and Talos versions: only in stand-alone configuration.

Gatan BioContinuum 1069 with K3 camera	Yes	EPU 2.8 and later on systems with Titan 3.5 / Talos 2.5 or later.

Note   The compatible energy filters may not all be supported by the compatible microscope software versions. See the TEM Server Release Notes for a definitive list of supported energy filters.

2   EPU 3.7

EPU 3.7 focuses on easy transition from manual sample screening to data collection by allowing you to mark grid squares as unusable and enabling easy transition from screening to high resolution data collection for tricky samples. Furthermore it intends to automate the step of grid square selection by allowing AI based grid square selection which allows you to select the desired number of suitable squares automatically.

2.1   New features

- **Easy transition from manual sample screening to data collection**: You can mark by Grid Squares as 'unusable' in the EPU square selection or hole selection / area selection task, improving the efficiency of manual screening for high-resolution data collections and enable easy transition from screening to high-resolution data collections on tricky samples.
- **Smart grid square selection for screening**: The AI-based Smart Selection functionality in the Square Selection task has been extended with a feature allowing you to choose the desired total number of automatically selected grid squares for screening. The selected squares are distributed across categories representing varying ice conditions. For more fine-grained control, you can change the number of squares per category.

   This feature is intended to automate the step of grid square selection for screening while retaining control over the selection for advanced users.

2.2   Improvements

- **Advised Preferences for Glacios equipped with E-CFEG and Falcon4i** are available on the EPU landing page.

2.3   Known Issues

The following table lists the known issues that have emerged in this most recent release of EPU. For a comprehensive list, see Known Issues on page 63.

ID	Issue Description and Workaround
EPUAPI-2930	When re-acquiring an atlas and resuming an existing session made with that atlas, smart grid square selection fails to select any square.
	Create a new session after re-acquiring the atlas.

2.4   Solved issues

Besides the Solved Issues that are listed below, numerous smaller issues have been solved that were not listed as Known Issues for preceding releases.

ID	Issue Description and Workaround
TOMO-6116	**Athena login is still "green", but the user was logged out:** The issue is resolved from Athena version 1.23 onwards.

3   EPU 3.6

EPU 3.6 introduces significant improvements for the EPU multigrid workflow by providing the option to automatically place the autofocus area at a suitable position on-the-fly during automated data collections. This removes the need to reload each grid of a multigrid queue to generate the optimal template, saving users valuable set-up time and enhancing tool productivity.

Furthermore, a new direct electron detector, optimized for 100 kV (Tundra), the Falcon C is introduced and supported by EPU.

3.1   New features

- **Automatic placement of the autofocus area**: EPU can automatically place the autofocus area at a suitable position for sample carriers with a foil hole pattern with square or hexagonal geometry. During data collections with session type "automated", the autofocus area will be placed on-the-fly. This removes the need to reload each grid of a multigrid queue to generate the optimal template. During data collection with session type "manual", the autofocus area will be placed when the user performs "template definition" task. Users could adjust the position manually, which automatically deactivates the feature.

- **Smart Filter for Grid Squares**: An AI-based filter to automatically deselect the grid squares that are not appropriate for data collection is available in the "Square Selection" task in the "EPU" tab. This feature flattens the learning curve for novice users and further streamlines the data collection setup.

Note	Requires Smart EPU with EQM or Smart EPU with eCL license.

- **Falcon C support**: A new direct electron detector, optimized for 100 kV (Tundra) is released and available in EPU. Users can perform image acquisitions using either counting (best image quality, preferred for high-resolution reconstructions) or linear (shortest acquisition times, preferred for sample screening) mode. Advised preferences for the Falcon C camera are available on the EPU landing page.

- **Grouping by Image Beam shift**: Data generated during automated data collection using Acquisition mode "Faster" (AFIS) now contain information about the image beam shift group in the filename (FoilHole_20007835_Data_20008808_**nnn**_20210420_154730), enabling easy state-of-the-art aberration correction.

- **Creating Athena folders and workflows:** It is possible to create Athena folders and workflows in EPU.

3.2   Improvements

- **Improvement of the Smart EPU robustness**: The robustness of the Smart EPU solution is improved to optimize the tool productivity. In case of an error in the connection between EPU and Athena, several mitigations are attempted in the background. If unsuccessful, EPU data collections continue without Athena functionality, so that the automated data acquisition will not stop unexpectedly.

- **Dynamic timeout to Smart Filter:** The Timeout threshold for the Smart Foil Hole Selection is now dynamically calculated, improving the user experiences.

- **Grid geometry in the EPU session setup**: The session setup dialogue was enhanced to let the user provide the specific grid type used for the data collection. This ensures the optimal procedures and smart algorithms are applied based on the used sample carrier type.

4   EPU 3.5.1

EPU 3.5.1, fixed crash of EPU when canceling the Athena login dialog.

5 EPU 3.5

EPU 3.5 introduces significant enhancements to the User Alignments and a new guided task for the Image Shift Calibration. These improvements are designed to streamline your workflow and make the calibration process more intuitive, even for users with less experience.

Moreover, this release reintroduces the anticipated Compression feature for Data Acquisition TIFF images for Falcon 4i Systems, significantly reducing data file sizes.

5.1 New features

- **Compression for Data Acquisition Images**:
  - On Falcon 4i Systems, you can enable LZW Compression for Data Acquisition images at *Preparation > Exposure Settings > Compression*. The compression is applied on Data Acquisition images stored in TIFF at native 4k x 4k resolution.
  - This feature uses non-gain-normalized compression.
  - To activate this feature, set **Fractions** to **manual** or **max**, specify the number of fractions desired, and set **Compression** to **Yes**.

Note | *Requires TEM Server 7.17 (Titan 3.17 / Talos 2.17)*

- **Gain Reference Copy for EER or TIFF Output**: When using a Falcon4(i) camera and EER or TIFF as output for the data acquisition preset, a copy of the gain reference is now supplied in the folder containing the movies.

- **Guided Image Shift Calibration**: We've introduced a visual guide that walks you through the calibration process step by step. This guide simplifies the process and reduces the need for extensive user experience. Additionally, it includes the option to perform Auto Eucentric during the calibration, ensuring valid results and saving you time.

- **Stored Image Shift Calibration for New Sessions**: EPU now saves the results of your image shift calibrations, allowing you to reuse them in new sessions. This reduces the time needed for recalibration and ensures that the settings are appropriate for each specific session. Here's how it works:
  - When creating a session from advised preferences, if there are saved calibrations associated with these preferences, they will be automatically applied.
  - If you're creating a session from a favorite preference and no calibration data is available, the calibration will start from the default position.
  - After a successful calibration, the new calibration data is saved and can be reused in future sessions. This is especially beneficial when using favorite preferences, since the saved calibration data is automatically updated.

- **Enhancements to User Alignments**: Among several efficiency and user-friendliness enhancements, we highlight the following:
  - **Improved Pop-up Dialogue for User Alignments**: The pop-up dialogue for User Alignments on Tundra systems has been improved to display the alignments to be performed, the estimated time of the sequence, and a stop button for long alignments. It also provides success and failure indicators for the recovery procedure.
  - **Automatic Closure of Column Valves**: After User Alignments are recovered using the recovery button, column valves will now close automatically, saving you an extra step.

- **Enhanced Traffic Light**: The Traffic Light now displays a third state, *blue*, in addition to the existing *red* and *green* states. The blue state indicates a medium severity issue. This enhancement provides a clearer understanding of the system state.

Note	*Requires TEM Server 7.17 (Titan 3.17 / Talos 2.17)*

- **MiCo Link on EPU Landing Page**: A button with the Microscope Companion (MiCo) logo has been added to the EPU Landing Page. This button is enabled when MiCo is installed on the microscope PC and is available for entry level and midrange systems.

5.2   Improvements

- **New Icons in Template Definition Task**: The icons for adding an *Autofocus area*, *Acquisition area*, and *Drift measurement area* in the EPU Template Definition Task have been updated. They now contain a small "+" sign to indicate that their function is to add an area.
- **Optimize Optics is hidden when Gatan Camera is Present**: On Arctica systems with a Gatan camera, the *Autofunctions > Optimize Optics* task is not visible.
- **Smart Filter Robustness Increase**: The Smart Filter has been made more robust on samples with thicker ice, specifically when using Holey Carbon grids.
- **Smart Filter unavailable in certain settings**: The *EPU > Selection > Smart Filter* feature which automatically filter out unsuitable holes, has been adjusted for better compatibility with other settings.
  - When Smart Filter is enabled, *Allow Dark Foil Holes* is automatically deactivated.
  - Smart Filter is not available when selecting TIFF in the session setup.

6 EPU 3.4

EPU 3.4 brings long-awaited features and crucial improvements and bug fixes that enhance the user experience and the software's functionality. This update includes:

- Open API for custom plugin development.
- Extended functionality for automatic alignments.
- Improved Ice Filter performance on CFEG systems.

6.1 New features

- We introduce Open API, allowing you to develop custom plugins that interact with Smart EPU, utilizing AI/ML capabilities for evaluating microscope output and adjusting settings, while fostering collaboration within the Cryo-EM community.
- The Ice Filter feature on CFEG systems has been updated to compensate for beam-current fluctuations, ensuring consistent hole selection during EPU Multigrid runs and providing a more stable and efficient performance.
- The Center C2 aperture block in SA Microprobe (uP) mode on Tundra systems now centers the 150µm C2 aperture as well. For more details, refer to the MiCo (Microscope Companion) manual.
- The *Optimize Beam* function has been renamed to *Optimize Optics* and can now be found in the Autofunctions tab.
- *Alignments* has been renamed to *User Alignments* and is now accessible in the Traffic Lights section on Tundra systems. On Glacios systems, the User Alignments can be accessed via MiCo.

6.2 Improvements

- The Objective Aperture is no longer retracted after executing the Optimize Optics (formerly Optimize Beam) sequence.
- Traffic Lights have been updated to display more informative messages for warning states (blue) and error states (red).
- Template Definition task > Defocus List now uses the Defocus List of the previous acquisition area by default.
- The Smart Filter button is now a toggle button, with its function being applied after holes are found.
- The Hole Selection task > Fast Screening feature has been moved from the expandable panel of the Selection ribbon group to the main ribbon, in order to increase its visibility. The slider is replaced by a text field, and the maximum limit for the number of locations is increased from 10 to 50.

6.3 Solved issues

Besides the Solved Issues that are listed below, numerous smaller issues have been solved that were not listed as Known Issues for preceding releases.

7   EPU 3.3.1

EPU 3.3.1 provides two main improvements based on customer feedback:

1. Traffic lights on mid-range systems (Glacios/Arctica) are adjusted to exclude user alignments. User alignments can still be run from MiCo.
2. The user alignments are still present in the traffic lights on 100 kV systems, i.e., Tundra.

8 EPU 3.3

EPU 3.3 includes new features and improvements. Most notably:

- A new Athena addon, the Discovery Viewer, allows you to investigate the exact Gridsquare and Foil Hole where an image was acquired.
- Advised preferences are now provided for Glacios systems equipped with the Falcon 4i camera.

8.1 New features

- Smart Filter now works with hexagonal grids. To access this feature, select *Holey gold* as the grid type.
- We introduce the Discovery Viewer, an addon for the Athena portal that helps you investigate the exact location on the sample (Gridsquare and Foil Hole) where a particular image was acquired. *For more information on the Discovery Viewer, please refer to the Athena user manual.*

Note	This feature requires you to create a new Athena workflow under EPU 3.3 and Athena 1.19. Workflows (and Datasets within workflows) created under earlier versions are not supported.

- Advised preferences are now provided for Glacios systems equipped with the Falcon 4i camera.

8.2 Improvements

- **Auto Functions tab**: For each Auto Function task, EPU now selects the relevant preset automatically. For example, for the Autofocus task, the Focus preset is selected automatically.
- **Acquisition and Optics Settings task**: The ribbon is now much cleaner. Some parameters have been removed; others moved to the ribbon's expandable menu.
- You have the option to link the Optics settings of high SA presets to the Data Acquisition preset.
- When an incompatible version of Athena is used with EPU, a warning message shows on startup.
- The default path for data storage is drive D (if available).
- The file naming convention for Atlas data gives each Atlas a unique name.
- The Objective Aperture is now left inserted after the Optimize Beam (Optimize Optics) sequence.
- On Tundra systems: The Center C2 aperture block in SA uP mode now also centers 150 μm apertures. For more details please refer to the MiCo User Manual.

9   EPU 3.2

EPU 3.2 introduces major new features which:

● Automate and simplify the Multigrid workflow.
● Improve Smart Filter and enable it on Holey Gold grids.
● Support integration with eCL (Embedded CryoSPARC Live).

9.1   New features

EPU > Preparation > Hole Selection > Smart Filter

● An improved version of the Smart Filter functionality is available. Smart Filter (previously called Smart Hole Selection) automatically filters out obviously bad foil holes in a Gridsquare.
● Smart Filter now works with Holey Gold grids.
● Smart Filter works better with other filters such as the Remove Grid Holes Close to Grid Bar filter and the Ice Filter.
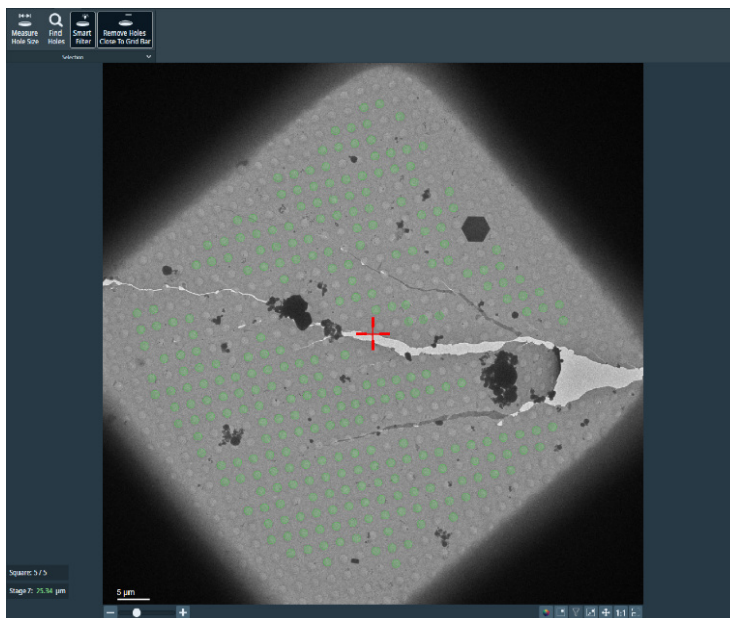
This feature remains in Beta.

Integration with eCL

● EPU supports integration with eCL (Embedded CryoSPARC Live).

The EPU Multigrid Queue
- Auto-create Sessions: Rather than manually creating individual sessions in the Multigrid queue, you can now use the **Auto-create Sessions** functionality. Once you have set up one session manually, click this button to create identical sessions automatically--one for each acquired Atlas--and add it to the Multigrid queue.
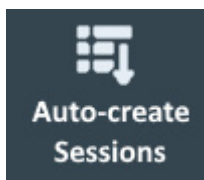
- Sessions with incomplete parameters are now clearly indicated. An icon shows on each session in the Multigrid queue to indicate whether all parameters are configured. Hover over the incomplete parameters icon to reveal a tooltip informing you of incomplete tasks.

Slot	Session Name	Status
–	20220623_135710_20	Planned

Session parameters are not configured
- No grid squares selected.
- No template defined
- Hole size and spacing were never measured.

- Upon automatically adding sessions to the MultiGrid queue, a pop-up informs you of those located on the C-drive.

- In the Multgrid queue, the Atlas of the selected session is shown at the bottom of the session's info.

- You can now create a Multigrid queue right from the Home tab. Tick **New Multigrid Queue** to create a Multigrid queue containing a single session based on the selected preference.
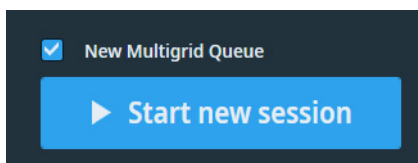
To have this tickbox enabled, select a session preference made for an *automatic* EPU session. You cannot create a Multigrid queue based on a manual EPU session.

EPU > Create session from preferences / Save session to preference
- The two buttons *Create session from preferences* and *Save session to preference* have been removed from the EPU tab. In order to import your `EpuSessionPreferences` files, use the **Home > Saved Preferences > Import** button. This will place your imported session in Saved Preferences. You can then create a session from Saved Preferences at any time.

- In order to save the current session to preferences, click the **Home > Saved Preferences >** button.

9.2   Improvements

- Improved instructions for running Optimize Beam.
- The image quality during preparation is now as high as a preview or an image acquired during an automated run.

10 EPU 3.1

EPU 3.1 brings new features and improvements that focus on increasing the efficiency of the workflow. These include:

- Support for hexagonal grids is added as a new grid type: Holey Gold.
  This feature is in Beta release.
- A number of smart features is released for all microscopes: Smart Focus, Stage Settling Time Prediction, Skip Grid Square, and Smart Hole Selection.
  These features are in Beta release.
- To save storage space with EPU fractions files, a new Compression option is available in the Data Acquisition preset when supported.

10.1 Mandatory and Breaking Changes

None Identified.

10.2 New features

EPU > Preparation > Session Setup

- EPU now has a dedicated grid type for Holey Gold grids. This grid type also supports Hexagonal layouts of foilholes. This feature is in Beta release.

EPU > Preparation > Hole Selection / Area Selection

- **Smart Filter** is a new functionality that automatically filters out and de-selects inappropriate holes during Hole Selection. The button is found in the Selection ribbon group. Smart Filter works with Prepare All Squares. It is executed for each gridsquare during the execution of an automatic recipe. This feature is in Beta release.

EPU > Preparation > Acquisition and Optics Settings > Data Acquisition Preset

- **Compression:** To save storage space with EPU fractions files, the Compression option is available in the Data Acquisition Preset when supported.
  Requires Falcon 4(i) camera and TEM 7.13 and higher.

Trial License

- EPU now allows users a trial period valid for three months after which one can buy a license in order to continue using EPU.

10.3 Improvements

- In the MultiGrid queue, It is now possible to delete individual EPU sessions.
- In EPU Template Definition and Area Selection, the visualized beam diameter now better represents the actual beam diameter on the system.
  Relevant systems are: Tundra, Talos and Glacios.
  Requires TEM 7.13 and above.

- Certain features (EQM, Smart features) are disabled when unusable or irrelevant to the selected settings.

11 EPU 3.0

EPU 3.0 brings major new features and improvements without breaking backward compatibility. These include:

● The new home page with saved preferences and shortcuts, available on all system configurations.

● Fast Screening: Allows easily specifying the desired number of holes to be acquired per gridsquare. EPU, then, automatically makes an efficient selection.

● An improved calibration procedure for better targeting accuracy.

● Improved Atlas alignment for Multigrid.

11.1 Mandatory and Breaking Changes

None Identified.

11.2 New features

EPU Home Page is now available on all system configurations (rather than only on Tundra).

EPU > Preparation > Hole Selection / Area Selection

● Ice filter highlighting: The ice filter value of a hole can be quickly seen by simply hovering the mouse cursor over the hole. More precisely, when hovering over a hole, the ice filter is highlighted and the ice filter data is displayed on the right side menu under Filter Ice Quality.

● Setting the lower and upper bounds of the ice filter is made more intuitive.

● Fast Screening: This feature allows easily specifying the desired number of holes to be acquired per gridsquare. EPU, then, automatically makes an efficient selection.

A more accurate Targeting accuracy

Calibration procedure for clusters is improved which results in higher accuracy of placement of acquisition areas (targeting).

Optimize Beam
Only on Tundra systems

● After Optimize Beam is executed, relevant presets are automatically updated, i.e., Autofocus, Drift Measurement and Thon Ring presets. The automatic update applies only to presets having the same Optics settings as the Data Acquisition preset before Optimize Beam starts. The purpose of this feature is to avoid breaking the workflow by having to go back and manually updating the presets.

11.3   Improvements

- When restarting an automatic run, a partially-finished gridsquare now uses the correct eucentric height.
- EPU now resets the Image beam shift to zero after Template Execution.
- In Multigrid queue, guiding text appears beneath the queue to inform the user of possible actions such as changing the order of executing sessions through a drag-and-drop.
- Ribbon cleanup: Two ribbon buttons, *Preset Ice Filter* and *Allow Dark Foil Holes*, along with the new Fast Screening feature, are now combined under the *Selection* ribbon group.
- In the Hole Selection task, when moving the stage, the Z-height is now also taken into account. This is only done when the eucentric height value (Stage Z) is *green* for the particular Gridsquare.
- Several performance improvements in Hole Selection.
- Atlas alignment is more robust and more accurate.
- Various improvements in Optimize Beam for Tundra.
- The pause button for Automated Acquisition is removed.
- More descriptive error messages for the dose protector.
- Some keyboard shortcuts are now displayed in context menus (right-click menus) next to their corresponding actions.
- EPU starts up faster.
- EPU startup splash screen now has a loading progress bar.

12   EPU 2.14

EPU 2.14 brings new features and improvements that mainly focus on the Tundra system. These include the Landing Page with shortcuts and Advised Preferences, as well as several alignments.

Other improvements include:

- Automatic Column Valve control.
- Higher throughput for the Falcon 4i camera.
  Requires TEM Server 7.11 or higher.
- General improvements in the User Interface.

12.1   Mandatory and Breaking Changes

None Identified.

12.2   New features

12.2.1   New features for all systems

General

- During startup:
  - EPU attempts to recover all issues reported by the Traffic Light, except for alignments.
  - The Camera Offload Service (COS) verifies that the Root Storage Path is accessible.
- The Column valves are fully controlled by EPU. Manual control is no longer necessary.
  Opening the valves requires no interaction from the user. However, in the case where pressure levels are above a certain threshold, then EPU will display a pop-up for confirmation. If the user wishes to open the valves anyway, then EPU will request the TEM Server to open the valves. If the TEM Server denies the request, then an error message appears.

12.2.2   New features for Tundra

General

- **Traffic Light** > **Daily Alignment**
  The Traffic Light is extended with an automated Daily Alignments procedure. The Daily Alignments procedure performs a selection of alignments to keep the system in optimum condition for high quality data acquisition. The Daily Alignments procedure typically takes 20 to 30 minutes, and can be aborted by the user at any time. For the Daily Alignments, it is not required that a sample is loaded on the stage.
- **Smart EPU**
  Smart EPU is an extension that runs on the Data Management Portal (DMP) Server. Smart EPU provides decisions to optimize the execution of an Automated Acquisition run. In EPU, the following Smart Plugins are available:
  - *Smart Focus*: requests an optimal focus value, so that the Autofocus auto-function does not have to be executed.

- *Stage Settling Time Prediction*: requests a stage settling time that overrides the Minimum Stage Settling Time value.
- *Skip Grid Square*: recommends to skip the current Grid Square if the quality of the acquired data is not good enough.

Home tab

The Home tab offers the following functionalities:

- A fast and easy way to start a new EPU session:
  - Based on generic 'best-practice' settings and values for various experiment types and commonly used grids.
  - Based on the saved settings and values of a preceding EPU Session.
- Direct links to:
  - The EPU User Manual.
  - The storage location on the Storage Server.
  - The Athena portal.

Atlas > **Screening**

The Prepare Exchange function closes the Column Valves in preparation of a sample exchange procedure. The sample exchange procedure on a Tundra system then proceeds as follows:

1. On the Cryo Loading Station (CLS), the user starts the exchange procedure.

   During the exchange procedure, EPU locks the column valves and the stage, and it is not possible to acquire images.

2. The user removes the Transfer Device from the CLS and inserts it into the Tundra.

3. In EPU on the Tundra, the user selects *Load sample*.

4. After the sample is transferred to the stage, the Transfer Device must be returned to the CLS to complete the exchange procedure and unlock EPU.

Auto Functions > **Optimize Beam**

The Optimize Beam task optimizes the beam, based on the Optics Settings of the Data Acquisition preset and the currently loaded specimen. The optimizations include among others: automated coma correction, automated stigmation, and an adjustment of the Intensity to ensure a parallel beam.

12.3   Improvements

General

- A Status Bar is visible when Athena and/or Traffic Light are available.
- The Auto Functions and the Atlas tabs have switched places. This order is more aligned with the normal order of usage.
- On Tundra systems, the stage tilt related features and functions are not available.

Atlas > **Session Setup**

The Session Setup task is revised and simplified.

EPU > **Session Setup**
- The Session Setup task is revised and simplified.
- The EQM checkbox is removed. EQM is now enabled by default. Additionally, the user can now use EQM by selecting the appropriate Workflow Type in Athena.

EPU > **Square Selection**

The *Add Grid Square here* function is improved:
- A manually added Grid Square always has the dimensions of a Mesh 300 square.
- If the manually added Grid Square overlaps with a selected Grid Square, then the selected Grid Square is no longer automatically removed from the selection.

EPU > **Automated Acquisition**

On systems with a Falcon 4i camera, the throughput is significantly improved.
Requires TEM Server 7.11 or later.

12.4   Solved issues

Besides the Solved Issues that are listed below, numerous smaller issues have been solved that were not listed as Known Issues for preceding releases.

ID	Description	Remarks
EPU-7451	EPU now shows the correct value for the number of EER frames for the Falcon 4/4i cameras.	—
EPU-8102	In some cases during screening, Grid Square categorization was not visible for an Atlas (slot/grid/sample).	—
EPU-8292	When exporting an image to MRC with the same filename, the exported image would be appended to the existing file. This is now fixed and the file is overwritten instead.	—
EPU-8560	The Auto Zero-Loss function sometimes fails with a 'Steepest gradient search' error. The algorithm is now more robust which significantly reduces the.frequency of this error.	—
EPU-8625	On Krios systems, Lens Normalization used to cause navigation inaccuracies. The inaccuracy has been reduced by improving Lens Normalization behavior.	—
EPU-8926	To prevent navigation inaccuracies, EPU now measures the actual attainable image beam shift range at the beginning of a 'faster acquisition' run.	—
EPU-8992	Manually-added Grid Squares would sometimes be positioned incorrectly if the grid was reloaded.	—
EPU-9012	In the Atlas screening tab, after grid exchange, EPU used to insert Incorrect objective aperture.	—

13   EPU 2.13

The EPU 2.13 release brings significant throughput improvement due to multiple optimizations in various functionalities, including an increased AFIS range from 6 μm to 12 μm. This increases the cluster size, which reduces the number of stage moves and centering steps.

13.1   Mandatory and Breaking Changes

Only for systems with TEM Server 7.10 (Titan 3.10 / Talos 2.10) or later, and a connection to Athena on a DMP server.

The Storage Server functionality on the DMP server that is released alongside TEM Server 7.10 introduces Linux-managed data storage. For EPU 2.13, this means that the `RootStoragePath` address that is specified in the `DMP.json` file is no longer valid for all installations.

For detailed information and instructions, see the EPU Software Installation Manual and the EPU Software Upgrade Manual.

13.2   New features

General

Significant throughput improvement due to multiple optimizations in various functionalities, including an increased AFIS range from 6 μm to 12 μm. This increases the cluster size, which reduces the number of stage moves and centering steps.

Additionally, TEM Server 7.10 software (Titan 3.10 / Talos 2.10) contains optimizations in the image acquisition functionalities, which increases the throughput even further.

13.3   Improvements

General

- As of TEM Server 7.10 (Titan 3.10 / Talos 2.10), the TEM User Interface no longer has to be open to start and use EPU. The TEM User Interface is still needed to perform some of the calibrations.
- Traffic Light:
  Depending on the TEM Server version, it is no longer necessary to use the TEM User Interface to revert HT changes and optics mode changes. These conditions can be recovered with the Traffic Light.

Preparation > Acquisition and Optics Presets

EPU now uses the dose that is reported by the camera, which is compensated for coincidence loss. This makes the dose that is displayed in EPU more accurate.

Atlas > **Screening**

- The TMP now only starts when a specimen exchange will take place.
- After the cassette is undocked, EPU now remembers the Slot Position from which the specimen was loaded that is currently on the stage. This makes it possible to continue the preparation of an automated acquisition run.

  This information is only available until EPU is closed, or until a cassette is docked.

Auto Functions

The Calibration tasks and Auto-Functions tasks have switched. Calibrations are now below the Auto-Functions. The Auto Function calibrations are only available when logged in as a Supervisor or as a Thermo Fisher Scientific engineer.

Auto Functions > **Auto-eucentric by stage tilt**

Minimum cross correlation quality is replaced by *Maximum Z-Height Deviation*.

EPU > **Automated Acquisition**

In a *Faster acquisition* run, the AFIS range is increased from 6 µm to 12 µm. Because the clusters are now larger, fewer stage moves and centering steps are needed.

13.4   Solved issues

Besides the Solved Issues that are listed below, numerous smaller issues have been solved that were not listed as Known Issues for preceding releases.

ID	Description	Remarks
EPU-7722	Autostigmate does not always stop after Stop is selected.	—
EPU-7795	The Objective aperture mechanism is not re-inserted after Atlas alignment.	—
EPU-7802	Atlas > Screening: after the specimen loading fails, EPU still executes the categorization routine.	
EPU-8176	Atlas > Screening: when a Slot Position Reset is cancelled, the image and checkmark still disappear.	

14 EPU 2.12.0 and EPU 2.12.1

The highlights of the EPU 2.12 release are:

- The Grid Square categorization and selection functionalities that are available for systems with an Autoloader also become available for Side Entry systems.
- Dark reference acquisition for the Gatan K3 camera is now configurable.

14.1 Mandatory and Breaking Changes

None Identified.

14.2 New features

General

The **Traffic Light** can now switch on the C-FEG.
Requires TEM Server 7.9 or later.

Atlas > **Screening**

- Single Atlas acquisition for Side Entry systems is revised. The Side Entry loader is now presented as a single specimen loader slot. All Grid Square categorization and selection functionalities that were only available for systems with an Autoloader are now also available for Side Entry systems.
- The Start Position can now be selected for the currently loaded specimen in a Screening acquisition, and for the Single Atlas acquisition.

EPU > **Automated Acquisition**:

Dark reference acquisition for the Gatan K3 camera is now configurable. A new ribbon bar is available with controls to enable/disable dark reference acquisition and to specify the acquisition interval (hrs).

14.3 Improvements

EPU > **Hole Selection** and **Area Selection**

The Remove Holes/Areas Close To Grid Bar filter is improved. The filter is faster and reliable.

EPU > **Automated Acquisition**

- The Auto Zero Loss (AZL) function for Thermo Scientific Selectris filters is now faster.
- If the EPU Session Type is Automatic and the Atlas is re-aligned after the specimen is reloaded, then EPU re-centers each Grid Square just before the Auto Eucentric Height function is executed during the Automated Acquisition run.

14.4   Solved issues

Besides the Solved Issues that are listed below, numerous smaller issues have been solved that were not listed as Known Issues for preceding releases.

Solved in EPU 2.12

ID	Description	Remarks
EPU-5540	Remove Close To Grid Bar filter fails for UltraAuFoils (gold grid).	—
EPU-7265	In some cases the *EPU* tab > *Area Selection* > *Spacing* entry field responds incorrectly to the entered value.	—
EPU-7509	Incorrect exposure rate after restarting EPU with an unfinished automated acquisition run.	—

Solved in EPU 2.12.1

ID	Description	Remarks
EPU-7370	Process keeps running when application is closed	—

15   EPU 2.11 and EPU 2.11.1

Among multiple other new features and improvements, the EPU 2.11 release introduces the *Single Atlas* functionality. The Single Atlas functionality allows the acquisition of an Atlas for the specimen that is currently loaded on the stage. The Single Atlas acquisition functionality allows to prepare and execute an EPU run when no cassette is docked in the Autoloader.

15.1   Mandatory and Breaking Changes

None Identified.

15.2   New features

General

EPU always uses the Pre-specimen shutter for Thermo Scientific cameras, regardless of the selected shutter settings in the TEM User Interface.

For Gatan cameras, the shutter settings must still be configured in GMS.

Atlas > Screening

When it is not known which specimen is currently loaded on the stage, then the *Single Atlas* functionality allows for the acquisition of an Atlas from the specimen that is currently loaded on the stage. The *Single Atlas > Acquire* button is only available when the status of the specimen on the stage is unknown, for example when there is no cassette in the Autoloader or when the Autoloader is not initialized yet.

EPU > Square Selection

- The new *Add new Grid Square here* function in the image display context menu creates a new Grid Square with its center at the mouse cursor coordinates. This allows users to add Grid Squares at locations that are interesting for acquisition, but that do not meet the selection criteria of the built-in Grid Square detection algorithm.
- Besides the X and Y position, the *Move to Grid Square* function now also sets the Z and A-tilt position.
- The Image Display shows an Atlas Alignment warning in the upper left corner if the specimen is reloaded after the Atlas has been acquired and the Atlas has been aligned.

EPU > Hole Selection

If the Column Valves are closed, then the Prepare All Squares function now requests to open the Column Valves before starting acquisition.

15.3   Improvements

General

- The User Interface styling is updated.
  In the User Manual, most screenshots are not updated yet.

- Resource usage is optimized. CPU and memory peaks are reduced to prevent (or at least further minimize) the impact of the EPU software on the performance of the system's TEM Server control software.
- The Traffic Light is now also available on Krios G3, Krios G3i and Krios G4 systems with TEM Server 7.8 (Titan 3.8) or later.
- Lens normalizations are optimized. After the optics settings have changed, only the changed lenses are normalized.

Atlas > Screening

EPU automatically starts the Autoloader TMP when screening acquisition starts. After the screening acquisition is completed, EPU returns the Autoloader TMP to its preceding state.

EPU > Square Selection

In the context menu, Add and Remove are replaced by Select and Unselect.

EPU > Hole Selection

After changing the Filter Ice Quality settings, the selected holes in the image display are updated much faster.

EPU > Area Selection

- To prevent overlapping Acquisition Areas, the minimum Spacing between Acquisition Areas is determined by the Illuminated Area (Titan) or Readout Area (Talos) in the Acquisition Preset.
- After changing the Filter Ice Quality settings, the selected areas in the image display are updated much faster.

EPU > Template Definition

The *Minimum stage settling time* replaces the *Delay after Stage Shift* timer. The difference between them is as follows:

- *Delay after Stage Shift*: the delay is applied always and in full. If the value was set to 10 seconds, then EPU would always insert a 10 second waiting time before acquiring an image.

  The countdown for the Delay after Stage Shift typically started a bit later than the actual completion of the stage move. Because the stage drift already decreased a bit when the countdown started, an optimized Delay after Stage Shift value would typically be slightly shorter than the actual stage settling time.
- *Minimum Stage Settling Time*: the countdown starts when the most recent stage move is completed. If the value is set to 10 seconds and the most recent stage move was completed 4 seconds ago, than EPU will insert only a 6 second waiting time before acquiring an image.

If the Minimum Stage Settling Time value is kept the same as the preceding Delay after Stage Shift value, then there may be a small amount of stage drift left at the end of the countdown. If some stage drift is noticed after the Minimum Stage Settling Time has ended, then slightly increase the value.

EPU > Automated Acquisition

The reference images for a Gatan K3 camera are now acquired once per hour instead of once per Grid Square.

15.4   Solved issues

Besides the Solved Issues that are listed below, numerous smaller issues have been solved that were not listed as Known Issues for preceding releases.

Solved in EPU 2.11

ID	Description	Remarks
EPU-5337	Image display shows black edges when rescaling the EPU window	—
EPU-6689	Memory and CPU usage peaks during screening	—
EPU-6818	Slow navigation after creating a new EPU session	—
EPU-7076	EPU crashed when moving mouse over scalebar	—

Solved in EPU 2.11.1

ID	Description	Remarks
EPU-7348	On systems with a Thermo Scientific Selectris (X) Energy Filter or a Gatan filter, the slit is not automatically retracted at the start of an Atlas acquisition.	—
EPU-7353	• Gatan K3 camera changes mode when EPU toggles between Acquisition and Optics Presets. • Gatan K3 camera changes dose calculation when EPU changes mode from Super Resolution to Counted mode.	—

16   EPU 2.10

The EPU 2.10 release introduces a *traffic light* that monitors the system readiness for successful data acquisition.

This release also introduces the *EPU Multigrid* option, which enables the preparation and consecutive execution of multiple EPU Sessions for a selection of specimens from the Autoloader.

Note   EPU Multigrid is a licensed option and may require a paid upgrade for your system.

• For Krios systems with Titan 3.X software (Windows 10), please contact your local service representative for a license key.

• For all other systems, please contact your sales representative.

• For all other questions, please contact UpdateEM@thermofisher.com for more information.

16.1   Mandatory and Breaking Changes

None Identified.

16.2   New features

General

●   The **Traffic Light** functionality reports the system readiness status for a successful high quality data acquisition. If this *traffic light* is not green for all monitored parameters, then the **Recover** function automatically adjusts the parameters that are out-of-range.

The traffic light and recovery functions are only available on Krios systems with TEM Server 7.7 or later, and a Falcon 4 camera in bottom-mounted or post-filter position.

●   The **EPU Multigrid** option enables the consecutive execution of multiple Automated Acquisition runs.

First, start and prepare individual EPU Sessions for multiple specimens that are present in the Autoloader. The prepared EPU Sessions must have *Session Type*: *Automated* and are automatically added to a queue.

Then start the execution of the queue, so that the Automated Acquisition runs for all queued EPU Sessions are executed in a single automated procedure.

The EPU Multigrid option is only available for systems with TEM Server 7.X that have an Autoloader.

Note   EPU Multigrid is a licensed option and may require a paid upgrade for your system.

• For Krios systems with Titan 3.X software (Windows 10), please contact your local service representative for a license key.

• For all other systems, please contact your sales representative.

• For all other questions, please contact UpdateEM@thermofisher.com for more information.

16.3   Improvements

General

- For systems with TEM Server 7.7 or later, TIA is no longer a prerequisite for EPU. On these systems, the Startup Check no longer verifies if TIA is running.
- The stability of the Athena connection is improved.

Atlas > **Load sample**

The Atlas Alignment function is more robust, faster and has better accuracy.

EPU > **Task Selection** panel

- The tasks are grouped in collapsible Start, Preparation and Execution categories.
- The creation of a new EPU Session is split off from the Session Setup task and is now a separate task: Session Creation.

EPU > **Hole Selection** and **Area Selection**

In an Automated Preparation procedure, the Selection Brush remains active when moving to the next or the previous Grid Square.

EPU > **Automated Acquisition**

- The FEI2 Extension 2 MRC Header fields for *Detector Commercial Name* and *CFEG Flash Timestamp* are now filled in.
- The Start and Stop functions, and the Pause and Resume functions are now status-sensitive buttons:
  - When started, Start becomes Stop.
  - When paused, Pause become Resume.

16.4 Solved issues

Besides the Solved Issues that are listed below, numerous smaller issues have been solved that were not listed as Known Issues for preceding releases.

Solved in EPU 2.10

ID	Description	Remarks
EPU-6024	In the Screening task, the automatic Atlas alignment that is executed after Load sample can be inaccurate in case the objective aperture is inserted.	—
EPU-6390	Low throughput with Gatan K2 camera.	—
EPU-6467	Failed to retrieve calibrated magnifications & insufficient memory.	—

17 EPU 2.9

Next to support for the *Thermo Scientific Selectris* and *Selectris X* energy filters, the EPU 2.9 release brings a variety of minor new features and improvements for a smoother user experience.

17.1 Mandatory and Breaking Changes

None Identified.

17.2 New features

General

The Thermo Scientific Selectris and Selectrix X energy filters are now supported.
Requires TEM Server 7.6 or later.

EPU > Hole Selection and Area Selection, and EPU > Automated Acquisition

In manual mode, the Alpha tilt angle at which each individual Grid Square is prepared is automatically applied again during the Automated Acquisition run.

EPU > Automated Acquisition

The *MRC2014 FEI2 Extended Header* image format is introduced.

Among other specification improvements, the FEI2 Extended Header specification contains more metadata fields that the FEI1 Extended Header. The FEI1 Extended Header format is now frozen, it will no longer be extended with new metadata.
Some of the new metadata fields in teh FEI Extended Header are not filled yet.

17.3 Improvements

Installation

The Athena Connection settings have moved from the `EPU.exe.config` file to a new `DMP.json` file. The new file is not replaced during software installation. After the connection settings are verified once, it is no longer necessary to specify these settings at every EPU re-install or upgrade.

EPU > Preparation > Acquisition and Optics Settings

The default preset definitions are revised, so that they are require less adjustment and tuning for most experiments.

EPU > **Session Setup**

- It is now possible to set up a new Session for the specimen on the stage after the cassette from which the specimen was loaded is undocked.
- For *Type*: *Automatic* sessions, the Use Phase Plate option is automatically cleared and disabled.
- The Athena Settings Dataset selection is redesigned:
    - It is now possible to create a new Athena Dataset in EPU.
    - The Athena Portal can be accessed straight from the Dataset selection dialog.
- The Dose fraction output format options for the Gatan K3 camera are now also available for the Gatan K2 camera.
  Requires TEM Server 7.6 or later.

EPU > **Template Definition**

- The Template Definition task always shows the most recent Foil Hole image, regardless of the current stage position and regardless of the currently applied Acquisition and Optics Preset. This allows for easier adjustment of the Foil Hole Template during session setup and during the Automated Acquisition run.
- For *Session Setup > Acquisition Mode*: *Faster acquisition* sessions,
  the default Autofocus Area > Recurrence is After Centering

EPU > **Automated Acquisition**

The throughput for the Gatan K2 camera is improved.
Requires TEM Server 7.6 or later.

17.4 Solved issues

Besides the Solved Issues that are listed below, numerous smaller issues have been solved that were not listed as Known Issues for preceding releases.

Solved in EPU 2.9.0

ID	Description	Remarks
EPU-5818	Falcon 4 in linear mode still acquires images in counted mode.	—
EPU-5683	I0 calibration warning popup during automatic execution of the Hole Selection / Area Selection task.	—
EPU-5865	Crosshair location on tilted samples is incorrect.	—

18   EPU 2.8.0 and EPU 2.8.1

The highlights for the EPU 2.8 release are:

- **Atlas** > **Screening**:
  Automatic **Atlas Alignment** of the existing Atlas after a specimen is loaded from the Autoloader.
- **EPU** > **Hole Selection** and **Area Selection**:
  The **Automated Preparation** functions automatically prepare all selected Grid Squares according to the same selection and filter settings as the current manually prepared Grid Square.

18.1   Mandatory and Breaking Changes

None Identified.

18.2   New features

General

EPU now supports the Gatan BioContinuum filter with K3 camera
Only on systems with TEM Server 7.5 or later (Titan 3.5 or later, Talos 2.5 or later).

Atlas > **Screening**

After Load Sample, the Automated Atlas Alignment functionality re-aligns a previously acquired Atlas with the physical position of the re-loaded specimen. This prevents the acquisition of a new Atlas after a specimen is (re-)loaded, while maintaining navigation accuracy.

EPU > **Session Setup**

The New Session function offers an option to create the new EPU Session with the same settings and parameter values as the current EPU Session. This is essentially a shortcut for saving the Preferences file for the current EPU Session, and then creating a new session from that Preferences file.

EPU > **Hole Selection** and **Area Selection**

The new Automated Preparation functions significantly decrease the time and effort that is needed to manually select the acquisition targets (Foil Holes or Acquisition Areas) for an Automated Acquisition run. After the suitable Grid Squares are selected and the first Grid Square is prepared, Automated Preparation offers the following functions:

- **Prepare All Squares**: EPU automatically performs the manual Hole Selection or Area Selection procedure in all selected Grid Squares:
  - Move to the next selected Grid Square.
  - Set the specimen to Eucentric height.
  - Acquire a Grid Square image.
  - Select Foil Holes or Acquisition Areas, using the selection parameters and filters of the current Grid Square.
    If a Grid Square already contains a selection of Holes or Areas, then that existing selection remains '*as is*'.

- **Stop**: Aborts the automated preparation. The Eucentric Height values, Grid Square images and Hole or Area selections that are completed so far remain available.

If *Prepare All Squares* has been executed at least once in the EPU session, then the following functions can be used:

- **Redo Preparation**:

  Use *Redo Preparation* after the parameters for Hole or Area selection have changed, for example after the Ice Filter or the Foil Hole diameter and interspacing is adjusted.

  - In already prepared Grid Squares, *Redo Preparation* clears the Hole or Area selection, then creates a new selection. The Grid Square image and Eucentric Height value are maintained.

  - For not yet prepared Grid Squares the *Redo Preparation* function performs the same actions as described above for the initial *Prepare All Squares* execution.

- Select **Prepare All Squares** again to prepare newly selected Grid Squares, or to complete an aborted preparation run. *Prepare All Squares* uses the current selection and filter values.

  - Already prepared Grid Squares remain as they are. If the selection and filter values have changed, then the existing selection is not adjusted.

  - For not yet prepared Grid Squares the *Prepare All Squares* function performs the same actions as described above for the initial execution.

EPU > **Automated Acquisition**

On systems with a CFEG, the tip is automatically flashed during the Automated Acquisition run to ensure a stable and optimal electron beam.
Only on systems with TEM Server 7.5 or later (Titan 3.5 or later).

18.3   Improvements

General

The Startup Check is extended with a Camera Offload Service (COS) version check. If Athena is available, then the Startup Check displays a warning if the COS software needs an update.

Preparation > **Acquisition and Optics Settings**

- The size of the Optics Settings > Get and Set buttons is increased to reduce the chance of unintentionally selecting the wrong function.

- In the Data Acquisition Preset for a Falcon 4 camera:

  - The Exposure Settings > Align option is now also available.
    Requires TEM Server 7.5 or later.

  - The Exposure Settings > Mode: Linear option is disabled to ensure that acquisitions are done in Counted or Electron Event Recording (EER) mode.

  - The limits for the *green area* in the **Dose Rate** are adjusted to better represent the capabilities of the Falcon 4 Sensor Package.

- On systems with a Gatan K3 camera, if CDS is enabled in Gatan GMS, then EPU will acquire images with CDS mode.
  Requires TEM Server 6.15.4, or TEM Server 7.5 or later.

Auto Functions > **Auto Zero-Loss**

The robustness of the Auto Zero-Loss function is improved.

Atlas > **Screening** and **Atlas** > **Atlas Acquisition**

- If the system does *not* have an Autoloader, then the Screening task is not available. This is the same as preceding EPU releases.
- If the system has an Autoloader, then the Atlas Acquisition task is no longer available. All Atlases are acquired in the *Screening* task. EPU automatically selects and aligns the Atlas for the specimen that is currently loaded on the Stage.
- The image display in the Screening task and in the Atlas Acquisition task now also offers the Color Enhancement option.

EPU > **Session Setup**

If the Storage folder is on the `C:` drive, then EPU shows a warning. The `C:` drive typically has not enough free disk space for the data volume that is generated in an Automated Acquisition run.

EPU > **Hole Selection** and **Area Selection**

If the Grid Square is set to Eucentric Height, then the Stage Z position in the lower left corner of the image display is green. If the Grid Square is not set to Eucentric Height, then the Stage Z value is white.

EPU > **Automated Acquisition**

For Faster Acquisition mode, the area in which the Foil Holes are collectively centered is reverted from 12 μm back to a 6 μm radius.

18.4   Solved issues

Besides the Solved Issues that are listed below, numerous smaller issues have been solved that were not listed as Known Issues for preceding releases.

Solved in EPU 2.8.0

ID	Description	Remarks
EPU-3914	In the Hole Selection / Area Selection task, the warning for outdated I0 calibrations does not appear stay on top of the EPU main user interface.	—
EPU-4460 TT44759	If the user does not have administrator privileges, then the Auto Functions calibrations cannot be stored.	The Auto Functions calibrations are no longer available for regular users.

Solved in EPU 2.8.1

ID	Description	Remarks
EPU-5795	Move stage to gridsquare sometimes inaccurate.	Introduced in EPU 2.8.0.
EPU-5776	LZW compression generates incorrect output file format.	Introduced in EPU 2.8.0.

19   EPU 2.7

The highlights for the EPU 2.7 release are:
● Introduction of the **EPU Data Management Platform powered by Athena**.
● Support for **Falcon 4 Electron Event Registration (EER)** acquisition.
● Multiple major and minor ease-of-use optimizations,
  including **better streamlinedSquare Selection and Hole Selection tasks**.

19.1   Mandatory and Breaking Changes

None Identified.

19.2   New features

General
EPU now supports the following Data Management Platform (DMP) functionalities:
● Athena for acquisition data management.
● EPU Quality Monitor (EQM) for live quality assessment of the acquired data.

Note	EPU Quality Monitor (EQM) is a license-protected commercial option.

Preparation > **Acquisition and Optics Settings** > **Camera Settings**
For Falcon 4, EPU now supports the Electron Event Registration (EER) mode.
In EER mode, the camera records the individual electrons that hit the Sensor Package. The acquired data consists of an `*.eer` file with a Gain Reference image, and an integrated image. The EER data requires special software for processing.

Preparation > **Auto Functions** > **Auto Functions (TEM)**
The new Auto Zero Loss function automatically maintains the proper alignment of the energy slit in the filter with the Zero Loss Peak.

EPU > **Session Setup**
The Athena Settings section is added to:
● Select a Dataset, Sample and Grid.
● Enable EPU Quality Monitor (EQM).

EPU > **Square Selection** and **Hole Selection**
Multiple new features and functions are added to significantly improve the ease-of-use of the Square and Hole Selection tasks. See the EPU User Manual for a detailed explanation of the streamlined workflow.

EPU > **Template Definition**
The **Defocus List** values can now be copied to all Acquisition Areas in the Template Definition at any time.

EPU > **Automated Acquisition**

- At the start of an Automated Acquisition run, EPU displays a notification if the Autoloader TMP is running.
- For Gatan K3 cameras, the Dark Reference image is automatically refreshed at the start of each Grid Square.
  Requires TEM Server 7.4 or later.

19.3 Improvements

Preparation: > **Acquisitions and Optics Presets**
The Image Display > Slider for the Falcon Electron Counting preview images is now cyclic.

Preparation > **Atlas Optics Alignment**
It is no longer mandatory to complete an ongoing Atlas Optics Alignment procedure.
Select Stop to abort the alignment and revert to the current alignment.

Atlas > **Screening**
The Slot Positions user interface is simplified.

EPU > **Square Selection**
The Grid Square Detection algorithm is improved for Grid Squares with lower transparancy that have a smaller intensity contrast with the surrounding Grid Bars.

EPU > **Hole Selection**

- The Hole Detection algorithm and the Remove Holes Close to Grid Bar are improved for Gold Grid specimens (also known as UltrAuFoil™).
- The Remove Holes Close To Grid Bar filter is now a toggle that hides or shows the holes that meet the filter criteria.
  - It is no longer necessary to select Find Holes to undo the Remove Holes Close To The Grid Bar filter. If the result of the filter is not satisfactory, then select Remove Holes Close To Grid Bar again to revert the filter and automatically run the Find Holes function. The Ice Filter is automatically applied, but any manual selections are discarded.
  - Adjusting the Ice Filter values no longer clears the Remove Holes Close to Grid Bar filter.
- The responsiveness of the **Selection Brush** is improved.
- The **Calibrate I0** function is removed from the ribbon bar in the Hole Selection task.
  The *Calibrate I0* task is still available in the *Preparation* tab.
- The **Image Display** > Right-click > **Move Stage Here and Acquire** option is now only available when no foil holes have been selected yet. If the *Move Stage Here and Acquire* option were still available, then accidentally selecting it would overwrite the Hole Selection or Area Selection for the involved Grid Square.

EPU > **Automated Acquisition**

For Faster Acquisition mode:

- The area in which the Foil Holes are collectively centered is enlarged from a 6 μm to a 12 μm radius.
- The efficiency of the calibration that is executed at the start of the Automated Acquisition run is improved to decrease overhead.

19.4   Solved issues

Besides the Solved Issues that are listed below, numerous smaller issues have been solved that were not listed as Known Issues for preceding releases.

ID	Description	Remarks
EPU-986	EPU User Interface hangs for a while when starting the Automated Acquistion	--
EPU-4319	Access denied could happen when creating a new folder when setting the output directory	--

20 EPU 2.6.0 and EPU 2.6.1

20.1 Mandatory and Breaking Changes

None Identified.

20.2 New features

Preparation > **Acquisition and Optics Presets**
The Falcon 4 camera is now available.

Atlas > **Screening**

● Reset Selected reverts the selected Slot Position to its initial status and erases the Atlas. If desired, a new Atlas can be acquired.

● It is now possible to specify the number of tiles for the screening Atlases. The specified Number of tiles applies to all Slot Positions.

EPU > **Square Selection**

● The Image Display > Color Enhancement function applies a color mapping to the intensity values in a gray-scale image. This makes it easier to recognize intensity gradients and areas with similar intensity.

● If the Atlas is loaded from a Screening session, then:

  ● The default selection no longer contains all detected Grid Squares, but only the selected Grid Square categories in the Screening Atlas.

  ● The automatic Grid Square Suggestion function is active. Grid Square Suggestion is a machine learning algorithm that identifies and highlights multiple Grid Squares that are not included in the selection yet, but that have similar properties as the existing selection.

    With the Smart Extend function, the best match of the suggested Grid Squares is added to the existing selection.

EPU > **Hole Selection**
The Image Display > Color Enhancement function applies a color mapping to the intensity values in the image. This makes it easier to recognize intensity gradients and areas with similar intensity.

EPU > **Automated Acquisition**

● In Faster Acquisition mode, the Automated Acquisition run starts with an automatic Hole Position Correction calibration. This calibration acquires a limited number of Foil Hole images with image shift. This calibration can take up to 3 minutes.

  The *Move stage to location* function also uses the corrected Foil Hole coordinates. Because the Hole Position Correction Calibration function does not acquire a new Grid Square image, the red crosshair in the Image Display may end up at a small offset from the Foil Hole center in the Grid Square image.

● To improve targeting accuracy, the Automated Acquisition procedure executes an automatic Hole Position Refinement function at the start of each Grid Square. This function updates the coordinates of the Foil Hole centers in the Grid Square.

20.3   Improvements

General

- Responsiveness of the User Interface is improved. This is especially notable when switching between presets in Preparation > Acquisition Optics.
- The user friendliness of the Histogram side panel and the Filter Ice Quality side panel is improved. It is easier to relocate the left and right boundary and the Gamma curve.

Preparation > **Acquisition and Optics** > **Presets**

- The C2 Aperture for the Atlas Preset is no longer fixed at the largest aperture.
- The Import function ignores Presets that are not native to EPU.
- Measured Dose Rate values are now also reset when the energy filter parameters change, for example the slit width.
- The Auto Functions > Tasks > Calibrations section is collapsed by default to prevent accidentally starting a calibration instead of the stand-alone task execution.

Atlas > **Screening**

- If a Slot Position can not be scheduled, then a tooltip shows the reason why the Scheduling checkbox is disabled.
- The Column Valves are opened automatically at the start of a Screening acquisition.

EPU > **Session Setup**

Acquisition Mode > Faster Acquisition is no longer a Beta functionality.

EPU > **Square Selection**

The Gridsquare detection algorithm is significantly improved, which results in more reliable screening and automated acquisition.

EPU > **Automated Acquisition**

The Foil Hole positioning accuracy is improved.

20.4   Solved issues

Besides the Solved Issues that are listed below, numerous smaller issues have been solved that were not listed as Known Issues for preceding releases.

Solved in EPU 2.6.0

ID	Description	Remarks
EPU-1874	Incorrect imagebeamshift info in acquired data	Metadata in Gatan K2/K3 images

Solved in EPU 2.6.1

ID	Description	Remarks
EPU-4525	Not all GridSquares found in Atlas	Introduced in EPU 2.6.0

21 EPU 2.5

21.1 Mandatory and Breaking Changes

None Identified.

21.2 New features

Preparations > **Acquisition and Optics Presets**
● The most recent acquired preview for each Preset remains available until a new Preview is acquired. On the preview image, the context menu provides navigation options.
● In the Data Acquisition Preset it is possible to select the C2 Aperture. The other Presets automatically use the same C2 Aperture, except for the Atlas Preset, which will always use the largest available C2 Aperture.

Atlas > **Screening**
For systems with Titan 3.X or Talos 2.X, when a new Screening Session is created, the slot descriptions are imported from the TEM User Interface > Autoloader control panel.

Atlas > **Acquire Atlas**
The Load from Screening function imports the Atlas for the loaded specimen from the Screening task. This way, no new Atlas needs to be acquired. If the specimen has rotated or has otherwise shifted, then it is still possible to acquire a new Atlas.

21.3 Improvements

EPU > **Template Definition**:
● The Defocus List is simplified, so it is much more user-friendly to create, edit and remove defocus values, and to copy defocus lists to existing Acquisition Areas.
● The position of an Acquisition Area relative to the center of a Foil Hole is no longer specified in separate X and Y distances, but as the radial distance. This makes it easier to compare the offset with the maximum Image Shift.

EPU > **Setup Session**
The selection of values and settings that is supported by the Session Preferences is extended with Hole Selection, Area Selection and Automated Acquisition Settings (incl. Phase Plate settings). This makes it faster and easier to setup new EPU sessions.

EPU > **Hole Selection** and **EPU** > **Automated Acquisition**
The accuracy of the Find Holes function is significantly improved. This reduces the risk of acquiring images that are not usable for high-quality 3D reconstruction.

21.4   Solved issues

Besides the Solved Issues that are listed below, numerous smaller issues have been solved that were not listed as Known Issues for preceding releases.

ID	Description	Remarks
EPU-2089	Foil hole numbering goes out-of-sync after Skip Hole during a long run	
EPU-1076	Defocus list is not copied from selected Acquisition Area.	

22   EPU 2.4

EPU 2.4 is the first release that supports:

- Systems with a Windows 10 operating system.

  These are systems with Titan 3.X or Talos 2.X software.

- The Gatan BioQuantum 1967 filter with K3 camera.

  Features for the Gatan BioQuantum filter with K3 camera are only available on systems with a TEM Server version that supports an *embedded* Gatan BioQuantum filter with K3 camera.

22.1   Mandatory and Breaking Changes

None Identified.

22.2   New features

Atlas > **Atlas Acquisition** and **Screening**

The Objective aperture mechanism retracts automatically before the acquisition starts, and returns to its prior position after acquisition ends.

Atlas > **Screening**

The new Load to Stage function loads the cartridge from the highlighted slot.

EPU > **Session Setup**

- For the Gatan BioQuantum with K3 camera, the *TIFF LZW* image format is added.

  LZW is a lossless compression technique to decrease the file size of the images.

- The *Save preferences* function stores an EPU Session Preferences file.

  In EPU 2.4, this file contains:

  - All Acquisition and Optics Settings presets.

  - The results for the Image Shift calibration, I0 calibration, and the Atlas Optical Alignment.

  - The EPU Session Setup values, except for the session's name and description, the Storage folder, and the Email settings.

  - The Template Definition for Quantifoil specimens.

  The EPU Session Preferences file contains all available information. It is not necessary to define all the above information before an EPU Session Preferences file can be stored. The contents may be extended for future releases.

- The *New from preferences* function creates a new EPU Session and loads the values from the selected EPU Session Preferences file. Any existing values are overwritten with the available values. If no value is available in the EPU Session Preferences file for a specific parameter, then the existing value is maintained.

  It is not possible to load an EPU Session Preferences file into an existing EPU Session.

EPU > **Automated Acquisition**

- When the conditions for the *Faster Acquisiton* mode are met, then EPU automatically uses Faster Acquisition mode for Lacey Carbon specimens. For Quantifoil specimens it remains a user setting.

- The automated run stops automatically when the column valves are closed, for example due to vacuum or cooling issues. Depending on the *Session Setup > Email settings*, an email is sent when the run stops.

22.3 Improvements

Preparation > **Acquisition and Optics Presets** > **Advanced Camera Settings**

For Gatan BioQuantum with K3 camera, the Counted mode replaces the Linear mode for all presets. The Data Acquisition preset also offers the Counted / Super Resolution mode.

23   EPU 2.3

23.1   Mandatory and Breaking Changes

None Identified.

23.2   New features

EPU > Session Setup

For Quantifoil specimens, a new Faster Acquisition mode is added. In Faster Acquisition mode, EPU saves time by centering groups of Foil Holes instead of each individual Foil Hole. If the system configuration and optics conditions allow for it, EPU can save even more time by using Image/Beam Shift instead of Stage Shift to visit all Foil Holes in the centered group.

To use Image/Beam Shift:

- The system must not have an Image Corrector.
- Phase Plates must not be used.
- AFIS (Aberration Free Image Shift) must be calibrated. AFIS is available on systems with TEM 6.15 and later.

The conventional centering method is now named Accurate Hole Centering.

EPU > Template Definition

For Quantifoil specimens, an Export and Import functionality are added for the Foil Hole Template.

The Template file contains all Template Areas, their positions and their settings. When a Template file is imported for a new Quantifoil specimen, EPU scales the Template Area positions depending on the Foil Hole diameter ratio between the source specimen and the target specimen.

23.3   Improvements

General

The Zoom functionality in the image display is simplified. The slider has been removed. Also the [+] and [–] keys can no longer be used for zooming in and out. The scroll wheel of the mouse is the only remaining zoom control.

EPU > Session Setup

The Use Phase Plate checkbox has moved from the Automated Acquisition task to the Session Setup task.

EPU > Template Definition

It is no longer possible to schedule multiple acquisitions per Acquisition Area. The Defocus List is still available with the same functionality as before.

24 EPU 2.2

24.1 Mandatory and Breaking Changes

None Identified.

24.2 New features

The Accelerated Phase Plate activation functionality supports the new generation of slow activating phase plates.

24.3 Improvements

Preparation > **Acquisition and Optics Presets**
The Dose Measurement and Dose Fractions functionalities for the Falcon 3EC camera are improved.

25   EPU 2.1

25.1   Mandatory and Breaking Changes

None Identified.

25.2   New features

EPU 2.1 does not introduce new features. The main purpose of EPU 2.1 is to:
● Restore functionalities and performance levels of EPU 1.12 that could not be migrated from EPU 1.12 to EPU 2.0
● Solve issues that are reported by EPU 2.0 Beta customers.

25.3   Improvements

General
● Improved responsiveness of the User Interface.
● Improved image quality of the Image Display.
● The EPU User Manual is reworked from a high-level guide towards stepwise instructions, similar to the Cryo-EM SPA Workflow app.

EPU > **Automated Acquisition**
Increased throughput rate.

26 EPU 2.0

26.1 Mandatory and Breaking Changes

Note EPU 2.X does *not* support the Falcon II camera.

26.2 New features

Preparations > **Acquisition and Optics Settings**
The *Thon Ring* preset is added.

Auto Functions
- Autocoma (licensed functionality) is introduced.
- Autostigmate (licensed functionality) is introduced.

Atlas > **Screening** functionality is introduced.

26.3 Improvements

- Rebranding from FEI to Thermo Scientific is completed:
  - The User Interface is fully redesigned.
  - File locations have been aligned with the Thermo Scientific brand.
    (see details below)
- The Results Viewer is dropped. Install the Thermo Scientific Imaging Codec Pack to view images with built-in Windows image viewers.
- The Dose Fractions functionality is simplified.
  The detailed Fraction Advisor is dropped.
- The temporary Trial license is no longer available.

The new file locations are:
- Session files:
  `C:\Users\<user account>\AppData\Roaming\`
  `Thermo Scientific EPU\Sessions\`
- Parameters and setting files:
  `C:\Users\<user account>\AppData\Roaming\`
  `Thermo Scientific EPU\Parameters\`
  The Parameters folder replaces the `EPUShell` directory that was used in EPU 1.X versions. When installing EPU 2.X for the first time, the contents of the `EPUShell` directory are migrated to the `Parameters` folder.
- `Omp.config` file:
  `C:\ProgramData\Thermo Scientific EPU\Configuration`
- Application and Installation log files:
  `C:\ProgramData\Thermo Scientific EPU\Log\`
  `C:\ProgramData\Thermo Scientific EPU\Log\Installation\`

27 EPU 1.12

EPU 1.12 is a compatibility release. As such, this release:

● Adds support for the most recent TEM Server versions on the supported microscopes.
● Does not introduce new features.
● Solves multiple functionality and performance issues.

Note	EPU 1.12 is the last release that supports the Falcon II camera.

27.1 Mandatory and Breaking Changes

None Identified.

27.2 New features

No (major) items.

27.3 Improvements

No (major) items.

28   Known Issues

A large amount of effort is spent on adding and improving workflows and on continuous quality improvements.

Historic Known Issues that are solved in a released software version are not listed.

ID	Issue Description and Workaround
EPUAPI-2930	When re-acquiring an atlas and resuming an existing session made with that atlas, smart grid square selection fails to select any square.
	Create a new session after re-acquiring the atlas.

| ID	Issue Description and Workaround
EPUAPI-2343	Atlas Image Outdated in Calibrate Image Shifts Task: This problem can occur if an Atlas session has been created, EPU is then shut down, and the sample is exchanged while EPU is still not running. In this scenario, the Atlas image loaded in the Calibrate Image Shifts task will not correspond to the current sample. Please note that this issue does not occur if the sample is exchanged while EPU is running.
	Ensure you exchange the sample while EPU is running; or, if the sample is exchanged with EPU shut down, reacquire the Atlas image.

ID	Issue Description and Workaround
EPUAPI-2136	Smart filter does not work in a given EPU session when *Session > Output settings > Image format* is set to `TIFF`.
	Select a different image format: **Session > Output settings > Image format > MRC**.

ID	Issue Description and Workaround
EPUAPI-2133	Previous versions of EPU facilitated LZW TIFF compression as an output format. In the latest version, when importing a preset generated from these older versions, the compression option may still be selected. However, this option has been removed from the EPU UI for maintenance reasons, making it impossible to disable through the EPU UI.
	To resolve this issue, modify the AppData settings to disable the LZW TIFF compression. If you are unsure how to do this, please contact your support representative for further assistance.

ID	Issue Description and Workaround
EPUAPI-1735	Automated Acquisition Termination Error. This error is occasionally encountered during Automated Acquisition runs with an Athena connection. The apparent cause is that the Athena connection is disrupted which causes the process to terminate prematurely. The error messages indicate issues with executing image storage activities or Athena being unavailable.
	● This issue does not occur consistently. Wait until the Athena connection is restored and restart the run. ● Continue your run without Athena. Log out from Athena and rely instead on the core EPU functionality for image storage.

ID	Issue Description and Workaround
EPUAPI-1642 EPUAPI-1643	Hole finding in Hex grids may not work properly when skipping a hole in the Hole Selection task. Skipping a hole or more is typically needed in Glacios systems where the beam diameter is larger than the Foil Hole. This affects two functionalities within the Hole Selection task: Foil Hole Selection and Smart Filter.
	Workarounds: ● Disable Smart Filter when using the Measure Hole Size ▦ functionality; or ● Select Foil Holes manually.

ID	Issue Description and Workaround
NPD-4284	On systems equipped with the Selectris Energy Filter, the application may lose access to the stored values for the filter's entrance aperture position. This leads to an error when starting the *Optimize Optics* Autofunction. The error message reads "Energy filter entrance position not available".
	Go to the Sherpa application and open the *Energy Filter* plugin. This will restore the missing values.

ID	Issue Description and Workaround
EPU-11489	Hole centering may fail on Hex grids on Krios and Glacios systems when skipping a hole while using the Measure Hole Size ▦ functionality. Skipping a hole or more is typically needed in Glacios systems where the beam diameter is larger than the Foil Hole. While this affects the usability of Automated Acquisition, there is **no** issue with: ● Manual selection of holes. ● Automatic selection using Measure Hole Size ▦ for the purpose of Fast Screening rather than Acquisition.

ID	Issue Description and Workaround
EPU-11233	For Falcon 4 cameras, the LZW compression feature is removed temporarily while undergoing maintenance.

ID	Issue Description and Workaround
EPU-10595	License activation link is broken.
	Manually visit the URL https://manual.bprotected.nl/activation.aspx?pub=Thermo+Scientific.

ID	Issue Description and Workaround
10230	Automatic alignments do not prepare system for acquisition in MicroProbe mode.
	MicroProbe mode is not aligned automatically. In order to acquire data in MicroProbe mode, the system must be aligned manually from PEOUI.

ID	Issue Description and Workaround
9718	When the Chrome browser is not installed, the Athena shortcuts in EPU might not work.
	Workaround: Install the Chrome browser or navigate to Athena manually.

ID	Issue Description and Workaround
7461	When setting `NrOfFractions=1` for non-square images, no reference images are acquired.
	Workaround: Set `NrOfFractions` more than 1.

ID	Issue Description and Workaround
7203	When previewing fractions in EPU, other applications cannot use the camera.
	Workaround: In EPU, navigate to another tab or task to release the camera.

ID	Issue Description and Workaround
6334	After executing the template in *EPU > Template Execution*, there is no way to inspect the acquired images. The acquired images are displayed during execution, but an acquired image is removed from the display as soon as a new image is acquired.
	Workaround: Not available

ID	Issue Description and Workaround
EPU-4002 EPU-3693	Camera names and/or microscope settings are incorrect after a camera upgrade from Gatan K2 to Gatan K3.
	• Stop EPU • For all user-accounts, delete the `EFTEM_MicroscopeSettings.sxml` file in the `%appdata%\Thermo Scientific\EPU\Parameter\` folder.

ID	Issue Description and Workaround
EPU-3040	On some systems, the displayed Dose is incorrect when Binning is not 1.
	Renew the Counts-to-Electron calibration for Linear mode

ID	Issue Description and Workaround
TT115829	Throughput issue when using K2 on BioQuantum. Calls to the energy filter can add significant delays. These can happen when switching between data acquisition and foil hole acquisition or between data acquisitions, depending on which function creates the problem.
	Workaround: Reset the camera and GMS. If that does not help, then reboot the Gatan PC.

ID	Issue Description and Workaround
TT121858	If the Atlas session folder is moved or renamed, then it is not possible to manually load an Atlas. In the EPU User Interface, a critical error appears that the `Atlas.dm` file may be corrupt.
	Workaround: Close EPU, restore the Atlas session folder path, start EPU, and try again.

29 Copyright, Limited Rights and Revision History

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Revision Table

Revision	Date	Description of Changes

2.6	20-JAN-2020	● Revised the document structure.
		● Scope is limited to:
		   ● EPU 1.12 (the final EPU 1.X release)
		   ● all EPU 2.X releases
		For an overview of changes in historic revisions, please see the Release Notes document that is available in EPU 2.5 and/or earlier releases.

2.6.1	10-FEB-2020	Update for EPU 2.6.1
2.7	16-APR-2020	Update for EPU 2.7
2.8	25-JUN-2020	Update for EPU 2.8
2.8.1	03-SEP-2020	Update for EPU 2.8.1
2.9	13-OCT-2020	Update for EPU 2.9
2.10	19-JAN-2021	Update for EPU 2.10
2.11	14-APR-2021	Update for EPU 2.11
2.11a	29-APR-2021	Add known issue EPU-7348 and patch for EPU 2.11
2.11.1	31-MAY-2021	Update for EPU 2.11.1
2.12	01-JUL-2021	Update for EPU 2.12
2.12.1	04-AUG-2021	Update for EPU 2.12.1
2.13	12-OCT-2021	Update for EPU 2.13
2.14	25-JAN-2022	Update for EPU 2.14
3.0	08-APR-2022	Update for EPU 3.0
3.1	03-AUG-2022	Update for EPU 3.1
3.2	26-SEP-2022	Update for EPU 3.2
3.3	19-JAN-2023	Update for EPU 3.3
3.3.1	27-FEB-2023	Update for EPU 3.3.1
3.4	18-APR-2023	Update for EPU 3.4

Revision	Date	Description of Changes
3.5	14-JUL-2023	Update for EPU 3.5
3.6	06-OCT-2023	Update for EPU 3.6
3.7	12-JAN-2024	Update for EPU 3.7

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