

# TEM Server 7.9

## Service Release Notes

**PN 309816**

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# 1 Introduction

TEM 7.9.X is a TEM Server software version. It is released for Thermo Scientific Transmission Electron Microscope (TEM) systems as the following microscope software versions:

- Titan 3.9.X for High End systems with a Titan column.
- Talos 2.9.X for Mid Range systems with a Talos column.

This document describes the changes and improvements made with respect to the previous release, TEM Server 7.8.1.

## 1.1 Mandatory and breaking changes

### Titan and Talos

- On systems with a Thermo Scientific Selectris (X) filter, the EFTEM lens series are revised. After a software upgrade from TEM Server 7.8.X or earlier, all EFTEM alignments and all EFTEM Magnification Calibrations must be renewed for all High Tension voltages.
- The Gatan US1000XP, OneView or Continuum NR camera have moved from the GCI2 interface to the faster and more stable GatanRpcServer interface. On systems with a Gatan US1000XP, OneView or Continuum NR camera, the following installation and licensing actions must be performed after a software upgrade from TEM Server 7.8.X or earlier:
  - Install the Gatan DM Remote Server software.
  - Remove the GCI2 license

### Titan

On systems with a Probe Corrector, the following *Alignments* control panel > *Calibrate NanoProbe* calibrations must be renewed after a software upgrade from TEM Server 7.8.X or earlier:

- Calibrate Trackball
- Calibrate Beam Shift
- Image/Beam calibration

## 2 System, Software and Hardware Compatibility

### 2.1 Supported microscope types and software upgrades

**Note** This TEM Server 7.X release does not support a direct upgrade from TEM Server 6.X software.

**Note** Verify that all microscope hardware is supported before installation of this TEM Server release.

Refer to [Supported hardware](#) on page 12 for a list of supported modules and subsystems.

#### 2.1.1 Supported High End systems with Titan software

Series	System	Upgrade from Titan 2.X on Win7 (TEM Server 6.X)	Update from Titan 3.X on Win10 (TEM Server 7.X)
Titan	G1 80-300 G1 Cubed 80-300 G2 60-300 G2 80-200 G2 Cubed 80-300 ETEM ETEM G2 Krios Halo	Not available	Not applicable
	Themis 200 Themis 300 Cubed Themis 300 Themis G2 200 Themis G2 300 Cubed Themis G2 300	NSR	Regular procedure
Metrios	G1 L G2 DX G2	Not available	Not applicable
	DX G3	NSR	Regular procedure
	AX	Not applicable	Regular procedure
Themis	ETEM G3	Not available	Not applicable

Series	System	Upgrade from Titan 2.X on Win7 (TEM Server 6.X)	Update from Titan 3.X on Win10 (TEM Server 7.X)
	200 G3 300 G3 Z G3 Z G3.1 S G3	NSR	Regular procedure
Krios	G2 G3 G3i	NSR	Regular procedure
	G4 G4i	Not applicable	Regular procedure
Spectra	200 300 Ultra	Not applicable	Regular procedure

### 2.1.2 Supported Mid Range systems with Talos software

Series	System	Upgrade from Talos 1.X on Win7 (TEM Server 6.X)	Update from Talos 2.X on Win10 (TEM Server 7.X)
Talos	F200X F200S F200C L120C Arctica	Upgrade package from the full catalog possibly with upgrade NSR(s)	Regular procedure
	F200X G2 F200S G2 F200C G2 F200i L120C G2 Arctica G2	Upgrade package from the full catalog	Regular procedure
	F200X G2.1 F200S G2.1 F200C G2.1 F200i G1.1 F200E L120C G2.1 Arctica G2.1	Not applicable	Regular procedure

Series	System	Upgrade from Talos 1.X on Win7 (TEM Server 6.X)	Update from Talos 2.X on Win10 (TEM Server 7.X)
Glacios	7NC 1139918	Upgrade package from the full catalog	Regular procedure
	7NC 1149551	Not applicable	Regular procedure

### 2.1.3 Special attention points for systems with an NSR

If a system has one or more NSRs, then the installation of a software upgrade must be treated with the same caution and attention to detail as the initial delivery of the NSR(s).

Pay special attention to:

- System configuration:
  - See: [Supported hardware](#) on page 12 .
  - See: [Discontinued hardware](#) on page 18 .
- Non-standard software functionalities.  
Verify that all non-standard functionalities are still supported.

## 2.2 Compatible software versions

**Note** This chapter specifies the *minimum* software versions that are compatible with this TEM Server release.

Newer software versions may be available that are backward compatible with this TEM Server release.

- Check [TEM SW Archive](#) for the most recent compatible software versions.
- Refer to the release notes of the listed software products for a specification of the supported TEM Server releases.

In the tables below, the *Upgrade* column specifies whether or not an upgrade is necessary.

Upgrade	Explanation
<b>Mandatory</b>	The application <i>must</i> be upgraded to maintain system functionality and/or performance. If the application is not present on the system, then it is not necessary to install it.
Automatic	The application upgrade is included in the TEM Server installation.
Optional	The application <i>can</i> be upgraded, this is not required for system functionality or performance.
No change	There is no new application version.
<b>Uninstall</b>	The application must be removed.
N/A	The application does not support, or is not supported by this TEM Server release.

### 2.2.1 Microscope PC

The Microscope PC must run on the Windows 10 IOT Enterprise operating system.

Software	Version	Upgrade	Remarks
Tomography	5.7	<b>Mandatory</b>	Includes Tomography 4.20 for STEM and STEM/EDS experiments.
EPU	2.12	<b>Mandatory</b>	
EPU-D	1.8	<b>Mandatory</b>	
MAPS	3.18	<b>Mandatory</b>	
Velox	3.2	<b>Mandatory</b>	
Apollo	1.1.0	Automatic	Included in Titan and Talos SW installation.



Software	Version	Upgrade	Remarks
TIA	5.9.0	Automatic	Included in Titan and Talos SW installation. There will be no new features in TIA anymore, only critical issues are solved.
GMS	3.4.4.3420	<b>Mandatory</b>	For TEM Server 7.9.0
	3.4.4.3447	<b>Mandatory</b>	For TEM Server 7.9.1
Bruker Esprit	2.2.1.4328	<b>Mandatory</b>	For Dual-X / Single-X
Sherpa	2.6	Automatic	Included in Titan and Talos SW installation.
CEOS	5.1.5	Automatic	<ul style="list-style-type: none"> <li>Included in Titan SW installation. Only for systems with corrector(s).</li> <li>Requires Linux Kernel 7.8 on the Corrector PC.</li> </ul>
Metrios UI	4.6	<b>Mandatory</b>	
Quadera Software	N/A	N/A	
RAPID	4.0.6	<b>Mandatory</b>	
Imaging Codec Pack	3.15.0	Automatic	Included in the Prerequisites installation.
Data Collector	3.5.1	Automatic	Included in Titan and Talos SW installation.

## Service Tools

**Note** The mentioned software versions are the minimum version numbers for this TEM Server release. Service Tools are often backward compatible with a limited range of preceding TEM Server releases.

SW Product	Version	Remarks
AutoAlignments Tip	<b>Uninstall</b>	<ul style="list-style-type: none"> <li>Replaced by <i>Sherpa &gt; HT Conditioning</i>.</li> <li>The AutoAlignments Tip tool is <i>not</i> compatible with TEM Server 7.6.X and later.</li> </ul>
Alignment Checker	1.4.6	<i>Not available for FSEs</i> Check <a href="#">TEM SW Archive - Alignment Checker</a> for latest update.

## 2.2.2 Support PC and Network PC

The Support PC or Network PC must run on a Windows 10 operating system.

SW Product	Version	Upgrade	Remarks
RAPID	4.0.6	<b>Mandatory</b>	Older releases may still work also.
Email Service and Port Forwarder	-	<b>Mandatory</b>	Install from Titan/Talos ISO
Imaging Codec Pack	3.15.0	Optional	

### 2.2.3 Remote Operation PC

SW Product	Version	Upgrade	Remarks
RAPID	4.0.6	<b>Mandatory</b>	Older releases may still work also.
TARO Simple	-	<b>Mandatory</b>	Install from Titan/Talos ISO
Imaging Codec Pack	3.15.0	Optional	

## 2.2.4 Other PCs

SW Product	Version	Upgrade	Remarks
TIA Offline	5.9.0	Optional	TIA Offline is backward compatible. There are no new features in TIA since 4.22. The upgrade is optional, but recommended.
Velox Offline	3.2	<b>Mandatory</b>	Velox Offline is backward compatible.
Bruker Esprit Offline	2.2.1.4328		Same version as on the Microscope PC.
Imaging Codec Pack	3.15.0	Optional	
Inspect3D	Upgrade depends on compatibility with Tomography data		
Amira / Avizo	Upgrade depends on compatibility with Inspect3D data		

## 2.3 Supported hardware

**Note** Although the supported hardware list contains a limited selection of (legacy) hardware that is not available on new, factory-built systems, TEM 7.X software can *not* be retrofitted on all legacy systems.

### Facilities, communication and infrastructure

Functionality	Hardware	Remarks
Microscope PC	HP Z4 G4	
CAN Controller	CCB	Only in the TEM Cabinet, not in the Optics Cabinet
	SCU	
	SCU2	
User I/O	OSD for Talos	
	OSD for Titan G4 and Themis S	
	Loading Area LEDs for Krios G4	
	KVM Extender	

### Source and High Tension

Functionality	Hardware	Remarks
HT Tank	G1	
	G2	
	G2.3	
Gun	FEG G1	XFEG and SFEG, with and without Monochromator
	FEG G2	XFEG and SFEG, with and without Monochromator
	CFEG	
	Thermionic	LaB6 and Tungsten

**Vacuum**

Functionality	Hardware	Remarks
IGPD2 power supply	IGPD2v2	
	IGPD2CI	With cable interlock
	IGPCU 5KV / 5.5KV	

**Optics**

Functionality	Hardware	Remarks
Talos Optics Boards	Version 1	
Current Measuring Board	CMAG	
	CMIB	
Phase Plate	SCU Remote Controlled Heating	Keithley Power Supply (USB)
	PPHS Power Supply (Ethernet)	Type 1 and Type 2
Probe Corrector	DCORPLUS	
	SCOR	
Image Corrector	CETCORPLUS	<ul style="list-style-type: none"> <li>• non-constant power</li> <li>• constant power</li> </ul>
	CcCOR	

## Cameras, filters and detectors

Functionality	Hardware	Remarks
Cameras	Flucam 2	
	Flucam 3	Also known as SmartCam
	Falcon 3EC	
	Falcon 4	Requires a Ceta camera
	Ceta	<ul style="list-style-type: none"> <li>Including Ceta Speed Enhancement (Ceta-2)</li> <li>Supported Sensor Packages: Ceta 16M, Ceta-D/-M/-S</li> </ul>
	Gatan US1000XP	
	Gatan OneView	
Filters	Gatan Filters	See Support for Gatan Filters.
	Selectris	Only for Krios and Glacios
	Selectris X	Only for Krios and Glacios
STEM Detectors	HAADF	
	BF/DF Retractable	
	BF/DF Retractable Mk2	
	Panther STEM BF-S/DF-S	Also known as NextGen- or NG-STEM.
EDS	Super-X G2 / G2 Lite	Requires Velox
	Dual-X / Single-X	Requires Esprit 2.2
	Ultra-X	
Scan Engines	PIA, PIA EDS	
	CAB/A	
	Gatan Digiscan II	
	Gatan Digiscan III	Requires GMS 3.4.4.3420 or later

**Note** All Gatan cameras and filters that are supported by the installed GMS version on the Gatan PC can (also) be installed in Stand-alone configuration.



**Motion and specimen loaders**

Functionality	Hardware	Remarks
CompuStage	Mk1	
	Mk2	
CompuStage Controller	SMCB	
	TSC	
Piezo Enhancement	PI E545	
	PI E727	
Automated Aperture System	AAM-G1	NYCe4000 motion controller
	AAM-G2	<ul style="list-style-type: none"> <li>• TAC controller</li> <li>• Including Heated Apertures</li> </ul>
Autoloader	Plan 1, 2, 3 with NYCe4000	
	Plan 3 with TAC	
IVIS		



### 2.3.1 Compatible Gatan cameras and filters

Product name	Embedding name	Embedding type	License type
UltraScan US1000XP	BM-UltraScan	Local GatanRpcServer	High Perf.
OneView	BM-Oneview	Remote GatanRpcServer	High Perf.
Enfinium 967 / 977 SE / ER	ENFINIUM	Local GCI2	Basic
Quantum 963	EF-CCD	Local GCI2	Basic
Quantum 965	EF-CCD	Local GCI2	Basic
Quantum 966	EF-CCD	Local GCI2	Basic
BioQuantum 967	EF-CCD	Remote GatanRpcServer	High Perf.
BioQuantum 968	EF-CCD	Remote GatanRpcServer	High Perf.
BioQuantum 1967	EF-CCD	Remote GatanRpcServer	High Perf.
Continuum 1065 ER	EF-CCD	Remote GatanRpcServer	High Perf.
Continuum 1066 HR	EF-CCD	Remote GatanRpcServer	High Perf.
Continuum 1077 S	ENFINIUM	Remote GatanRpcServer	High Perf.
Continuum 1069 K3	EF-CCD	Remote GatanRpcServer	High Perf.
Continuum 1069 K3 Dual	EF-CCD	Remote GatanRpcServer	High Perf.
	EF-K3	Remote GatanRpcServer	High Perf.
Continuum 1069 K3 HR	EF-CCD	Remote GatanRpcServer	High Perf.
Continuum 1069 K3 HR Dual	EF-CCD	Remote GatanRpcServer	High Perf.
	EF-K3	Remote GatanRpcServer	High Perf.
BioContinuum 1067 K3	EF-CCD	Remote GatanRpcServer	High Perf.

Embedding type:

- *Local GCI2*: basic interface to the GMS software on the Microscope PC.
- *Local GatanRpcServer*: high performance interface to the GMS software on the Microscope PC.
- *Remote GatanRpcServer*: high performance interface to the GMS software on the Gatan PC.

## **2.4 Discontinued hardware**

The CCB in the Optics cabinet is no longer supported.

## **3**    **Operation, Applications and Workflow Integration**

### **3.1**    **New features**

#### **Titan**

On systems with a CFEG, the Recover function in the Traffic Light will attempt to bring the CFEG to the *Power On* state.

### **3.2**    **Improvements**

#### **Titan and Talos**

In the Traffic Light that is available in software applications such as EPU and Apollo, a moving stage will be reported as *Ready*.

#### **Titan**

The color palette of the user door lights is reduced from red, blue and white to only blue and white.

### **3.3**    **Impact on Service**

*No (major) items.*

## 4 Source and High Tension

### 4.1 New features

*No (major) items.*

### 4.2 Improvements

#### Titan

- For systems with an E-CFEG, a single Flash button in the E-CFEG control panel replaces the High T Flash and the Low T Flash buttons.
- The CFEG no longer shuts down during the *Ice Growth* test (12 hours without flashing advice).

### 4.3 Impact on Service

#### Titan

Sherpa > CFEG tools:

- ESD stability measurement: a graph with the results of 10 runs is added to the PDF report.
- ESD conditioning for CFEG has two new options. These options can be combined:
  - Automatically start the optimization procedure after the stability measurement is finished. The result of the stability measurement does not have to be successful to start the optimization procedure.
  - Automatically restart the optimization procedure after it has finished. The result of the finished optimization procedure does not have to be successful to start a new optimization procedure. The optimization procedure can be repeated up to five times. Select *Stop* to abort the restart-cycle.

## 5 Vacuum

### 5.1 New features

*No (major) items.*

### 5.2 Improvements

*No (major) items.*

### 5.3 Impact on Service

#### **Titan and Talos**

- Vacuum Service UI: the Open Log button is removed.
- The Firmware Validation Check now reports the firmware versions for the IGPDa and IGPDc.

## 6 Optics

### 6.1 New features

#### Titan and Talos

- New EFTEM lens series and column alignments are available for Selectris to improve XO alignment and reduce 2<sup>nd</sup> and 3<sup>rd</sup> order aberrations.
- A prototype of the automated STEM Beam Current Measurement procedure is available in the Dose Control plugin for Thermo Fisher Scientific engineers. Contact GTS for instructions how to make this procedure available in the Sherpa user interface.

### 6.2 Improvements

#### Titan and Talos

- On systems with a Thermo Scientific Selectris (X) filter, the lens series are revised. This improves the crossover (XO) alignment and reduces 2<sup>nd</sup> and 3<sup>rd</sup> order aberrations.
- The STEM calibrations are now HT dependent.
- The STEM Intensity List direct alignment is automated for STEM Diffraction mode. This automated direct alignment will be integrated in the Metrios 4.6 Tool Readiness application.
- The TEM User Interface status panels and Control Panels reacts faster to optics changes.
- Sherpa APM:
  - The Gun Tilt and Gun Shift alignments are automated for systems with Fringe Free Imaging that do not have a Falcon 3EC camera.
  - APM is no longer available for regular users and expert users, only for supervisors and for Thermo Fisher Scientific engineers. If a customer requires that availability is continued for their regular users and expert users, then a 'backdoor' patch can be installed.

#### Titan

- The Fine Monospot Control direct alignment is added.
- The normalization for Intermediate and P2 lenses is improved.

### 6.3 Impact on Service

#### Titan and Talos

- On systems with a Thermo Scientific Selectris (X) filter, the EFTEM lens series are revised. After a software upgrade from TEM Server 7.8.X or earlier, a selection of alignments and calibrations must be renewed or reloaded.
- After a lens series change, the related calibrations are automatically cleaned up.
- The Focus Stigmator calibration is now available in *Sherpa > Factory/Service*  
This is the same automated procedure as the Auto Focus calibration in EPU and Tomography. The results of this calibration are used by automated actions and Auto Functions in Sherpa, EPU, Tomography and Metrios applications.

- The Optics configuration is now *pushed* to DataServices.

### Titan

- The functionality to upload \*.*cfg* files to the Corrector kernel is removed.
- The CetCorPlus manual is updated.
- After a software update from TEM Server 7.8.X or earlier on systems with a Probe Corrector, the following *Alignments* control panel > *Calibrate NanoProbe* calibrations must be renewed:
  - Calibrate Trackball
  - Calibrate Beam Shift
  - Image/Beam calibration

## 7 Cameras, Filters and Detectors

### 7.1 New features

#### Titan and Talos

- Panther STEM

The new multi-pattern scanning function enables drift compensation:

- On systems with Panther STEM and Super-X G2.
- On systems with Panther STEM and synchronized detectors.

The multi-pattern scanning function is available as an interface function for applications such as Velox. It is not a function in the user interface that can be selected by the user.

- EMPAD

Acquisition status synchronization enables the TEM Server to start, stop and abort scanning acquisitions in sync with 3rd party STEM detectors.

- Gatan Digiscan III is now supported.  
Requires GMS 3.4.4.3420 or later.

### 7.2 Improvements

#### Titan and Talos

- Falcon 4

The commercial name, serial number(s) and location (*Bottom Mounted* or *Energy Filter*) are now included in the metadata of MRC, XML and EER files.

- Selectris

The speed of the Auto Zero Loss Peak function for applications is significantly improved. This function is used in applications such as EPU and Tomography.

- FluCam (SMartCam)

The installer now sets the correct Flip and Rotate values.

- The following cameras are now (also) supported via the GatanRpcServer interface, and can now be used together with other Gatan cameras that were already supported via the GatanRpcServer interface:
  - Gatan US1000XP
  - Gatan OneView, single and continuous acquisition.
  - Gatan Continuum NR

### 7.3 Impact on Service

#### Titan and Talos

- The Service Cockpit now shows the following information:
  - Ceta, Falcon 3EC, Falcon 4:



- Commercial name
- Sensor Serial Number
- Location (*Bottom Mounted* or *Energy Filter*)
- Selectris:
  - Commercial name
  - Board Info: SCU, OPD, OMD, AVPS, IOBC: HW/FW version, ID, Product Number, Serial Number.
  - Aperture Info: aperture names and details, Grid Mask name.
- Gatan filters: Commercial name
- Selectris
  - Hot swap is now supported for the OMD, OPD and AVPS boards. Before the start of a hot swap, the Selectris filter must be switched to the Hot Swap state in the *Energy Filter Monitor > Board control* tab.
  - A TAD test is available to check if the OMD, OPD and AVPS boards have the correct part numbers. This check is not available for legacy boards, even if they are functionally fully compatible.
  - Sherpa > Energy Filter:
    - The results of a tuning procedure are available in a one-page report.
- Panther STEM
  - The part number and serial number of the BDFA hardware is now available in the Acquisition Monitor.
- Gatan
  - On systems with a Gatan US1000XP, OneView or Continuum NR camera, the following installation and licensing actions must be performed:
    - Install the Gatan DM Remote Server software.
    - Remove the GCI2 license
- New Health Monitor parameters for Selectris and Gatan filters.
  - All the parameters are triggered on startup, at every change, and hourly.

Parameter	Range	Selectris	Gatan
Slit Insertion State	Retracted, Inserted	X	X
Slit Width	<float> [eV]	X	X
Slit Center	<float> [eV]	X	-
Slit Available	Available, Unavailable	X	X
Spectrum Offset HT	<float> [eV]	X	X
Spectrum Offset Prism	<float> [eV]	X	X
Aperture Diameter	<float> [m]	X	X

Parameter	Range	Selectris	Gatan
Aperture Type	Circular, Mask	X	X
Aperture Air Pressure Enabled	Disabled, Enabled	X	-
Dispersion	<float> [eV]	X	X
Magnification	<float>	X	X
Normalization	Idle, Active	X	-
Normalization - Pre Slit	Idle, Active	X	-
Normalization - Post Slit	Idle, Active	X	-
Normalization - Prism	Idle, Active	X	-
Alignment	Idle, Loading	X	-
Coarse Prism Alignment	<float> [A]	X	-
ZLP calibration	<float> [eV]	X	X
Total Prism Current	<float> [A]	X	-

- New Health Monitor parameters for Ultra-X:

Subsystem	Component	Parameter
EDX	Detectors	Edx Total Input Counts Detector 1..6
EDX	Detectors	Reset Rate Detector 1..6
EDX	Detectors	Temperature Detector 1..6
EDX	Cooler	Edx Temperature
EDX	Cooler	Edx Cooler Current
EDX	Cooler	Edx Cooler Voltage
EDX	Cooler	Edx Defrost Cycles
EDX	Cooler	Bottom Temperature
EDX	Cooler	Top Temperature
EDX	Cooler	MV Temperature

Subsystem	Component	Parameter
EDX	Cooler	UHV Temperature
EDX	Cooler	Edx Time Since Last Defrost or Room Temperature
EDX	Electronics	Edx Front End Temperature 1..2
EDX	Electronics	Edx CabBoard1 Temperature ADC
EDX	Electronics	Edx CabBoard1 Temperature Ambient
EDX	Electronics	Edx CabBoard1 Temperature DAC0..1
EDX	Electronics	Edx CabBoard1 Temperature FPGA
EDX	Electronics	Edx CabBoard1 Temperature PLL

- New Unique Error Codes (UECs) for Ultra-X and Falcon 4:

Subsystem	Devices	DEV_INSTANCES	DEV_ERROR_CODES
EDX	CONTROLLER	FRONT_END_CONTROLLER	ERR_TOUCH_ALARM_DISCONNECTED
EDX	CONTROLLER	FRONT_END_CONTROLLER	ERR_POWERSUPPLY_NOTFUNCTIONING
EDX	BOARD	FRONT_END_1	ERR_POWER_SUPPLY_ERROR
EDX	BOARD	FRONT_END_2	ERR_POWER_SUPPLY_ERROR
CAMERA_SUBSYSTEM	PROCESSING_CONTROLLER_DEVICE	<ul style="list-style-type: none"> <li>• BM_FALCON4_CMTS</li> <li>• BM_FALCON4_AMC1</li> <li>• BM_FALCON4_AMC2</li> <li>• BM_FALCON4_AMC3</li> <li>• BM_FALCON4_AMC4</li> <li>• BM_FALCON4_AMC5</li> <li>• BM_FALCON4_AMC7</li> <li>• EF_FALCON4_CMTS</li> <li>• EF_FALCON4_AMC1</li> <li>• EF_FALCON4_AMC2</li> <li>• EF_FALCON4_AMC3</li> <li>• EF_FALCON4_AMC4</li> <li>• EF_FALCON4_AMC5</li> <li>• EF_FALCON4_AMC7</li> </ul>	ERR_OVER_TEMPERATURE

## 8 **Motion and AutoLoader**

### 8.1 **New features**

*No (major) items.*

### 8.2 **Improvements**

#### **Titan and Talos**

- The collision prevention behavior for the Objective aperture mechanism is improved:
  - The homing procedure for the Objective AAM can only start when the stage position and selected holder are known.
  - The Objective AAM can move when the stage position not ready, but the stage position is known and is safe.
  - The Objective aperture mechanism is retracted when the TEM Server is stopped.
- The available actions for the AutoLoader on the On System Display (OSD) is now depending on the actions that are performed on the AutoLoader via the TEM User Interface or other applications, such as EPU, Tomography or EPU-D.

### 8.3 **Impact on Service**

#### **Titan and Talos**

- The Autoloader Motion Controller type is added to the SystemConfig.
- Aperture mechanisms:
  - The Objective Longstroke Aperture is available in the Configurator.
  - The AAM G2 firmware is updated from V2 to G3.
  - Aperture Alignment Wizard
    - An additional template is available for the Objective Aperture strip in systems with Dual-X.
    - The Objective AAM now has a fixed retract position.
- TAD:
  - When TAD is open, all AAMs can only be controlled via TAD.
  - Motion Safety override is no longer available for the Objective aperture mechanism.

## 9 TAD, Service Tools, Installer and Licensing

### 9.1 New features

#### Titan

- Configurator:
  - The Full Range Constant Power Lens option is available for Krios G4.
  - If Ultra-X is selected, then the Object AAM G2 LS is automatically selected also.
- Installation:
  - The Availability State Logger is installed on Krios G4 systems.
  - If Ultra-X is selected, then the Apollo software is automatically installed.

#### Talos

Falcon 4 is now available for Talos F200X.

### 9.2 Improvements

#### Titan and Talos

- Prerequisites ISO:
  - SSH Client is added.
  - Python Core Packages are removed.
  - KB2964358 is removed.
- Titan / Talos ISO: the Windows Account Manager is removed from the Master Installer menu.
- Configurator:
  - For Krios G4 and Spectra systems, the CMAG is automatically selected.
  - Configurator warnings are stored in a `violation.json` file for easier automated analysis.

### 9.3 Impact on Service

*No (major) items.*

## 10 Solved Issues

### Solved in TEM 7.9.0

ID	Description	Titan	Talos
AUTSTR-2412	APM must not be available for regular and expert users (A backdoor to make APM available for regular and expert users is available on special request)	X	X
AUTSTR-2914	AFIS does not support Selectris	X	X
AUTSTR-2925	LDC: Beamtilt from settings file is not used	X	X
CAMERA-5075 TT869259	F4: Metadata incomplete	X	X
CAMERA-5529	F4: Temperature control Status is "Cooling" when CPI TEC State == "Error"	X	X
CAMERA-6086	F4: ReferenceManager: Acquire progress bar starts with 100% progress and then continues at 0 %	X	X
CAMERA-6436	DualF4: xml metadata does not show which F4 camera is used for the acquisition	X	X
CAMERA-6481	F4: FRU information missing in FRUs tab in AcquisitionMonitor	X	X
CAMERA-6583	F4: Venting the projection chamber is hold for 15 min instead of waiting sensor temp to be > 5 degrees.	X	X
CAMERA-6665	F4: CPI in unknown motion state 2	X	X
CAMERA-6882	F4: EER metadata: sensorPixelSize = 0 on calibrated system	X	X
CAMERA-6891	xml metadata: final image exposure time is off by factor 1e+9	X	X
CAMERA-6965	EER metadata: Use meters ('m') as unit for pixelsize	X	X
CAMERA-6996	EER acquisition should always be done with Binning 1 and Full ROI	X	X
CAMERA-7121	Selectris on Glacios - EF-Falcon shutter frames		X
DBOC-1034	Beamtilt Azimuth rounding bug	X	X
DBOC-953	Make MagCal Falcon4 system camera dependent		X
DBOC-993	Fix Camera Problem Solver for Talos(enhancement tube)		X

ID	Description	Titan	Talos
DBOPTICS-2170	TEM nP beam shift trackball cannot be aligned in 3 Cond mode (90degrees rotation)	X	
DBOPTICS-2447	No longer pixelsize in metadata for Falcon cameras	X	
DBOPTICS-2454	In Image corrected systems change wobbler from OL to LL	X	
DBOPTICS-2464	OL and MC sliders on Lorentz ocx do not move with handpanel	X	
DBOPTICS-2465	Loading alignment file fails when system in LM TEM	X	
DBOPTICS-2493	APM failed due to server error	X	
DBOPTICS-2497	HAADF is inserted and retracted during HM-STEM EDX alignment	X	X
DBOPTICS-2500	HM-STEM EDX offset compensation is low	X	
DBOPTICS-2520	Set/Retrieve Objective Focus in LM STEM fails	X	
DOI-2576	Post-slit centering routine should use D6y instead of D7y for better convergence (Selectris X)	X	X
DOI-2603	XO procedure - fix extreme distortions in LM	X	X
DOI-2644	Sherpa, filter, center post slit does not work	X	X
DOI-2645	Selectris on Glacios – DA tuning is not using all assigned lenses		X
IADM-392	Handover of control of Flucam 2 to and from Nanomegas makes the FluCam unusable	X	X
IN-691	LogViewer is stopped prior to StorageServer installation	X	X
IN-758	CEOS detection does not show any dialog window in silent mode	X	
IN-774	Additional High Tension 150kV is not allowed for Talos L120C		X
IN-778	Phase Plate is not allowed for Titan Spectra C	X	
IN-780	k-Space Control installation via DVD menu fails	X	
MOT-4075	MdlMotion2 multi axis homing succeeds even when an axis fails to home	X	X
OMR-341	LM Holography focus does not work		X
RDTs-1006	Linear Distortion correction fails	X	X

ID	Description	Titan	Talos
RDTS-1007	Flucam Hangs during normalization	X	X
RDTS-459	After switching HT and uploading alignment file corresponding for the HT, the STEM alignment Intensity list does not focus the beam to spot and needs to be redone. (C2 excitation is changed but the change is not sufficient.)	X	X
RDTS-922	FlucamViewer crash when selecting annotation	X	X
RDTS-941	Drag and drop for Vacuum Analyzer	X	X
SCANDIUM-3327	Hardware synchronization of non-embedded STEM detectors is broken	X	X
SCANDIUM-3451	Updated scan alignments are not properly applied to a running scan	X	X
SCANDIUM-3537 SCANDIUM-3554	Current coefficients must reflect the sum of the participating segments and not the average	X	X
SCODBO-5790	No high T flashing when logged in with user account	X	X
SCODBO-5978	Gunlens is not recalculated after HT switching On (legacy)	X	X
SCODBO-5993	High T flash button enabled when HT is off	X	X
SCODBO-6159	HM does not display warning when IGPf Testline Voltage and IGPf Testline Voltage (unaveraged) when voltage becomes lower than 3000 V	X	X
SCODBO-6193	CFEG: Need to select Power button multiple time to go to Power on state	X	X
SCODBO-6264	Gunlens voltages are not updated	X	X
SCOEMT-5569	Trafficlight increase allowed HT margin	X	
SCOEMT-5628	Unknown fluscreen calibration factor message	X	
SCOEMT-5675	Cannot add items to show on TEM User Interface status bar	X	X
SCOEMT-5708	Crash during recovery of traffic light	X	
SCOIADGAT-2301	GFI Timeouts when interacting with the slit.	X	X
SCOIADGAT-2411	Abort during Continuous Acquisition crashes GMS	X	X
SCOIADGAT-2446	GatanRemoteTEM crash	X	X



ID	Description	Titan	Talos
SCOIADGAT-2522	Range window get stuck when switching between Single and Range mode	X	X
SCOIADGAT-2571	Tecnai projection interface could not be retrieved, camera's do not respond.	X	X
SCOIADGAT-2658	Dispersion values are not consistent in GMS.	X	X
SCOMS-1617	Autoloader (Service) OCX has wrong help page	X	X
SCOMS-1639	B axis movement possible while its disabled in the Stage OCX.	X	X
SCOMS-1892	Autoloader cockpit exchange procedure vacuum safety checks are incorrect	X	X
SCOMS-2186	Autoloader: Load cartridge failed: Stage operation failed during loading/unloading cartridge	X	X
SCOMS-2208	TEM scripting for Autoloader broken	X	X
SCOVAC-1576	Allow to readout firmware version of IGPD's in the firmware validator too	X	
SCOVAC-1608	Cryocycle can be started with dewar much higher then 5%	X	
VMR-189	VacuumAnalyzer will crash when SCUSimulator services is restarted	X	X

**Solved in TEM 7.9.1**

ID	Description	Titan	Talos
BG-422	Autostar python tests hangup in LICENSING code	X	X
BG-435	Licensing Log is in wrong directory	X	X
DBOPTICS-2694	Fix download of corrector HAL parameters	X	
DOI-2766 OMR-416 RDTS-1144	<ul style="list-style-type: none"> <li>XO for Talos: When performing in SA also perform for Mi</li> <li>EFTEM alignments do not match expected implementation (Titan vs Talos)</li> </ul>	X	X
DOI-2789 RDTS-1180	Crash in Energy Filter software	X	
IADTPI-276 RDTS-1049	Digital Micrograph (GMS) error acquiring Velox SI / EDS+EELS sync: "SI Acquisition aborted. No SI data found"	X	X

ID	Description	Titan	Talos
IN-893	Upgrade to 7.9 fails when measuring board is CCB	X	
IN-924 SCANDIUM-3836 RDTS-1141	NanoMEGAS with Ceta-2	X	
IN-950 OSD-892	OnSystemUI - Tornado installation fails with error code 1		X
MOT-4617	Aperture alignment checker flags the DualX OBJ template layout	X	
MOT-4651	CountSaturationExceeded event generating unwanted UECs	X	
MOT-4748	Crash after switching to nanoprobe		X
MOT-4811	Low spot sizes available with holder removed - X-ray safety		X
MOT-4902	Obj aperture blocked by stage from unknown reason		X
MOT-5016 RDTS-1210	After upgrade to 2.9.0, iVIS stopped compensating in the TAD	X	X
OMR-414 RDTS-1107	In bottom bars(menu), the list of lenses are triple		X
OMR-415	Adding Lorentz Lens into Status bar with no Loretz mode installed	X	
SCANDIUM-3826 RDTS-1165	Crash after attempt to use STEM interface that is not supported in system config	X	X
SCANDIUM-3908	BF-STEM current measurement is incorrect when more than one segments are enabled	X	X
SCOEMT-6036	Crash in the TrafficLight Service	X	X
SPEC-5266	Ultra-X tuning tool does not reach correct resolution	X	
SPEC-5279	High zero peak on UltraX systems	X	
SPEC-5492	Fix Issues with Tuning Tool for UltraX.	X	
SPEC-5540	Ultra-X Tuning Tool: HPD spectral step fails due to incorrect offset detection	X	
SPEC-5705 RDTS-1206	PulseProcessor Gain, Tuning and calibration gain wrongly applied	X	

ID	Description	Titan	Talos
SPEC-5755 RDTS-1206	SDD Connectivity check conditions too strict	X	
SPEC-5825	EDX FAT tool countrate & shapingtime measurement set is acquiring with 100% DT	X	
SPEC-5826	TuningTool AdcGain step must be performed with zerostrobe on	X	
SPEC-5827	Zero strobe switched on and remained on after retuning	X	
SPEC-5828	Ultra-X FAT tool does not calculate correct resolution	X	
SPEC-5829	FAT tool Collection Efficiency incorrect (RT iso LT)	X	
SPEC-5830	EdxTuningTool & FatTool installer License texts are not appropriate	X	
SPEC-5831	Tuning and FAT tool issues	X	
SCOMS-2375	HealthMonitoring shows a Holder temperature of 0K	X	

# 11 Known issues

ID	Description	Titan	Talos
AUTSTR-1732	Precondition for undo for AutoSTEM does not work		X
AUTSTR-1847	AutoCTF plugin not loaded when no cameras available	X	X
AUTSTR-2351	AutoCTF results are displayed in bold characters in Sherpa Results window	X	X
AUTSTR-2856	APM sets the microscope in EFTEM mode with a Selectris Falcon4 to a spot size where the center beam function fails because the beam is too intense	X	X
AUTSTR-2955	AutoSTEM training failed because of 3Fold stigmators		X
AUTSTR-3029	Preparation task for LDC alignment selects wrong magnification	X	X
CAMERA-6746	F4 post counting gain does not update data created after acquisition	X	X
CAPPPS-3016	F4: AMC7 stays disconnected after cable interruption between CMTS and MPC	X	X
DBOPTICS-1008	DiffStig excitation must be extended to increase disto correction range does not work on system with salve	X	
DBOPTICS-1967	F4: Beam too early unblanked beam during mag change causes the reactive dose protector to kick (Cont. Acq.)	X	X
MOT-4530	AAE adjustment in opposite direction starts with a delay/hiccup	X	X
RDTS-733	Dynamic recording active on ceta 1	X	X
RDTS-979	MagCal tables do not update automatically after installation of the B-prism Workaround: If the lens series is changed, user should delete the database and redo all magcals.	X	
SCOEMT-5787	Service Tool: UI look & Feel	X	
SCOEMT-5787	Unexpected error msg shown in logging area for a sensor which is not present	X	
SCOEMT-5799	LED display when sensor is disconnected	X	
SCOEMT-5801	LEDs are not restored properly after SCU power reset	X	

ID	Description	Titan	Talos
SCOEMT-5802	Disable the tool UI when connection is lost	X	
SCOEMT-5803	Temp readouts not updated correctly	X	
SCOEMT-5808	Unexpected error msg shown for a sensor which is NOT present	X	
SCOEMT-5825	Behavior when manual value is just applied, and server is stopped/ crashed	X	
SCOEMT-5827	Inconsistent behavior upon SCU communication cable disconnection	X	
SCOEMT-5828	Sensor disconnected error message is not displayed	X	
SCOEMT-5830	URv3 Factory Tool: Power reset case with tool open is not handled well	X	
SCOIADGAT-2009	SCOIADGAT-2009 Server Busy Message when closing GMS. Issue is mitigated with GMS 3.4.4 but still may occur. Workaround: Click retry on the pop-up when closing GMS.	X	X
SCOIADGAT-2459	Custom ROI image corrupted on certain Read out areas.	X	X
SCOIADGAT-2628	GMS does not close sometimes. Workaround: End task manually from task manager.	X	X
SCOIADGAT-2745	Remote DM Monitor for BM-OneView without additional Gatan filter camera does not provide useful information. Workaround: Disable Remote DM Monitor from MSL configuration, if OneView is the only Gatan camera installed.	X	X
TT652982	FeiAutoStarServer.exe server still running, after Sherpa and TEM server stopped	X	X
TT682665	Optimono: BioQuantum (Quantum 967) doesn't support EELS	X	X
TT718847	Correct Objective Stigmator gives HRESULT 80004005	X	X
TT725645	Find Beam routine: in TEM mode (3-condenser mode) does not work properly	X	
TT733615	AutoCTF is very slow and irresponsive	X	X
TT736864	Find Beam button in Monochromator (Expert) OCX does not function	X	
TT751977	Inconsistent (incomplete) error messages when no camera present	X	X

ID	Description	Titan	Talos
TT751980	AutoCTF fails when starting at a too high defocus	X	X
TT752118	Auto coma: fails after first iteration, because image is then set to focus	X	X
TT754769	TEM servers installation aborted at CEOS SW installation step. Workaround: Work Instruction is available.	X	
TT760558	Install aborted due to CEOS Workaround: Work Instruction is available.	X	
TT760647	Task cannot be stopped during image acquisition	X	X
TT761235	Sluggishness on Themis 1 after S-CORR upgrade. Workaround: Work Instruction is available.	X	
TT767667	Find Beam in Monochromator (Expert) doesn't work (however Sherpa does work)	X	
TT767671	STEM Auto Tuning functionality cannot be added to the workset	X	X
TT772811	Incorrect FFT fit reliable for AutoCTF	X	X
TT780477	AutoCTF hangs	X	X
TT785183	Preconditions Center Objective Aperture alignment ignored when no 100u aperture	X	X
TT785186	No user feedback when missing 100u objective aperture in APM	X	X
TT792457	APM: UI issues	X	
TT794507	APM Fails when filling system with LN2	X	
TT801222	Sherpa hangs since CTF estimation algorithm cannot handle incorrect pixel sizes	X	
TT821401	CTF estimation 'freezes' AutoCTF run	X	X
TT821740	AFIS alignment shows misleading error message	X	
TT824931	Sherpa stop button remains active after a (manual) APM run	X	X
TT838769	APM rotation centre validation does not work in fringe free mode	X	X
TT844339	APM: 200kV saved as 300kV	X	

ID	Description	Titan	Talos
TT848747	Run AlignBeamShift on APM from Sherpa let the Sherpa application hang	X	X
TT849040	APM: camera settings not read from AutoCTF settings file	X	X
TT851908	AFIS alignment: wrong (confusing?) error message shown to user	X	X
TT855189 RDTS-76	Sherpa CTF fit not correct, while being OK	X	X
TT873751	AutoCTF: wrong results displayed when measurement fails during coma correction	X	X
TT885724	Missing elements in Sherpa UI for supervisor and user account	X	X
--	Sherpa: In TEM Server 7.5.x and earlier, there is an incorrect value in the APM settings. After upgrade to 7.6.0 or later a warning appears: "Incorrect parameter in the APM settings: [FocusCorrection].maximum_number_of_iterations with value: 5.0".  This warning is shown only once. The incorrect value will be replaced by the default value after first startup of Sherpa.	X	X

Descriptions and workarounds for a selection of Known Issues is available:

- In [Fluid Topics](#) .
- On the Service CD.

For an overview of the Known Issues that are reported after the software is released, see: [307271](#) .

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