

# Velox 2.16

## Release Notes

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## Document History

Rev A, September 2024

# Introduction

## Purpose

This document describes the Thermo Scientific Velox software releases.

- Velox Online for use on the Microscope PC of a supported TEM system.
- Velox Offline for use on any computer that meets the minimum requirements.

## Audience and Scope

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

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

## Hardware Requirements

The Velox software can be used on the Microscope PC of Thermo Scientific and FEI TEM systems with a compatible microscope software release and a compatible camera and/or detector.

The Velox Offline software requires the following hardware specifications:

Specification	Minimum	Recommended
CPU	Intel Core i5 with at least 4 cores, or an equivalent AMD processor.	Intel Core i7 / i9 with at least 4 cores, or an equivalent AMD processor.
RAM	16 GB	
Disk		500 GB SSD for fast loading and saving.
Graphics	<ul style="list-style-type: none"> <li>• 1.5 GB dedicated RAM</li> <li>• Support for OpenGL 3.3</li> <li>• Driver dd. Aug 2017 or later</li> </ul>	
Operating System	Windows 10	Windows 10

## System, Software and Configuration Compatibility

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

Although the Velox 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).

### Preferred Velox Version per Microscope Software Version

Titan	Talos	Velox	Remarks
3.16 - 3.21	2.16 - 2.21	3.14.0	
3.15 - 3.20	2.15 - 2.20	3.13.1	
3.14 - 3.19	2.14 - 2.19	3.12.1	
3.13 - 3.18	2.13 - 2.18	3.11.0	
3.12 - 3.17	2.12 - 2.17	3.10.0	
3.11 - 3.16	2.11 - 2.16	3.9.0	
3.10 - 3.15	2.10 - 2.15	3.8.1	
3.9 - 3.14	2.9 - 2.14	3.7.0	
3.8 - 3.13	2.8 - 2.13	3.6.0	
3.7 - 3.12	2.7 - 2.12	3.5.0	
3.6 - 3.11	2.6 - 2.11	3.4.1	
3.0 - 3.9	2.0 - 2.9	3.3.2	

Titan	Talos	Velox	Remarks
2.15	1.15	2.16	Updated Velox file format aligned with the Velox 3.12 version and beyond.
2.9 - 2.14	1.9 - 1.14	2.14.2	
2.6 - 2.7	1.6 - 1.7	2.6.1	<ul style="list-style-type: none"> <li>No Ceta High Speed Recording</li> <li>No Falcon 3EC</li> <li>No Handpanel Rotation in TEM Mode</li> </ul> Metrios with Titan 2.6 is not supported.
2.5.1	1.5	2.1	<ul style="list-style-type: none"> <li>No Ceta High Speed Recording</li> <li>No Falcon 3EC</li> <li>No Handpanel Rotation in TEM Mode</li> </ul>
2.5.0 and earlier	1.4 and earlier	–	Velox is not available for earlier Titan and Talos software releases.

## Compatible Microscope Software Versions and Operating Systems per Velox Version

Velox	Titan	Talos	Offline	Remarks
3.14.0	3.16 - 3.21	2.16 - 2.21	Win 10 - 11	
3.13.0 / 3.13.1	3.15 - 3.20	2.15 - 2.20	Win 10 - 11	
3.12.0 / 3.12.1	3.14 - 3.19	2.14 - 2.19	Win 10 - 11	
3.11.0	3.13 - 3.18	2.13 - 2.18	Win 10 - 11	
3.10.0	3.12 - 3.17	2.12 - 2.17	Win 10 - 11	
3.9.0	3.11 - 3.16	2.11 - 2.16	Win 10 - 11	
3.8.0 / 3.8.1	3.10 - 3.15	2.10 - 2.15	Win 10 - 11	

Velox	Titan	Talos	Offline	Remarks
3.7.0	3.9 - 3.14	2.9 - 2.14	Win 10 - 11	First version to support Windows 11.
3.6.0	3.8 - 3.13	2.8 - 2.13	Win 10	Please avoid installing Inspect 3D on the Microscope PC. This causes the microscope software to no longer work with Velox and other applications.
3.5.0	3.7 - 3.12	2.7 - 2.12	Win 10	
3.4.0 / 3.4.1	3.6 - 3.11	2.6 - 2.11	Win 10	
3.3.0 / 3.3.1	3.0 - 3.10	2.0 - 2.10	Win 10	
3.2	3.0 - 3.9	2.0 - 2.9	Win 10	
3.1	3.0 - 3.8	2.0 - 2.8	Win 10	
3.0	3.0 - 3.7	2.0 - 2.7	Win 10	Velox 3.X Online and Offline only support Windows 10
2.15.0 / 2.16.0	2.15 - 3.6	1.15 - 2.6	Win 7 - 10	Last version to support Windows 7.
2.14 / 2.14.2	2.9 - 3.6	1.9 - 2.6	Win 7 - 10	
2.13	2.9 - 3.5	1.9 - 2.5	Win 7 - 10	
2.12 / 2.12.1	2.9 - 3.4	1.9 - 2.4	Win 7 - 10	
2.11	2.9 - 3.3	1.9 - 2.3	Win 7 - 10	
2.10	2.9 - 3.2	1.9 - 2.2	Win 7 - 10	

Velox	Titan	Talos	Offline	Remarks
2.9.0 / 2.9.1	2.9 - 3.1	1.9 - 2.1	Win 7 - 10	First version to support Windows 10.
2.8	2.9 - 2.15	1.9 - 1.15	Win 7	
2.7	2.9 - 2.14	1.9 - 1.14	Win 7	Velox 2.7 does <i>not</i> support Metrios with Titan 2.6
2.6.0 / 2.6.1	2.6 - 2.13	1.6 - 1.13	Win 7	Velox 2.6.X does <i>not</i> support Metrios with Titan 2.6
2.5	2.6 - 2.12	1.6 - 1.12	Win 7	Velox 2.6.X and earlier does <i>not</i> support:
2.4.0 / 2.4.1	2.6 - 2.11	1.6 - 1.11	Win 7	<ul style="list-style-type: none"> <li>• Ceta High Speed Recording</li> </ul>
2.3	2.6 - 2.10	1.6 - 1.10	Win 7	<ul style="list-style-type: none"> <li>• Falcon 3EC</li> </ul>
2.2.0 / 2.2.1	2.6 - 2.9	1.7 - 1.9	Win 7	<ul style="list-style-type: none"> <li>• Handpanel Rotation in TEM Mode</li> </ul>
2.1	2.5 - 2.7	1.5 - 1.7	Win 7	
2.0.1	2.5 - 2.7	1.5 - 1.7	Win 7	

## Compatible Cameras for Velox

Camera	Velox	Remarks
Ceta 16M	2.0.1 and later	
Ceta-D	2.8 and later	
Ceta-M	2.9 and later	
Ceta-S	2.10 and later	
Ceta Speed Enhancement (Ceta-2)	2.2 and later	
Falcon 3EC	2.6 and later	
Falcon 4	2.10 and later	
Falcon 4i	3.3 and later	Requires Titan 3.10 / Talos 2.10 or later.
Gatan OneView	3.2 and later	Requires embedding via the GatanRpcServer interface.
Falcon C	3.11 and later	Requires Titan 3.18 / Talos 2.18 or later



**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.

## Compatible Cameras and Filters for Velox


Camera	Velox	Remarks
Selectris / Selectris X	2.14 and later	Requires Titan 3.6 or later, or Talos 2.6 or later.
Gatan Enfinium	1.0 and later	Stand-alone, synchronized acquisition
Gatan Quantum / BioQuantum	1.0 and later	Stand-alone, synchronized acquisition
Gatan Continuum	2.9 and later	Stand-alone, synchronized acquisition



**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.

## Compatible Detectors for Velox

Detector	Velox	Remarks
HAADF	1.0 and later	
BF/DF Retractable	1.0 and later	
BF/DF Retractable Mk2	1.0 and later	
Panther STEM BF-S/DF-S	2.8 and later	
SuperX-G1	1.0 - 2.14.2	Super-X G1 is not supported on microscopes with Windows 10 (Titan 3.X and Talos 2.X).
SuperX-G2	1.0 and later	
Super-X G2Lite	2.3 and later	
Dual-X	2.0.1 and later	
Single-X 100 mm <sup>2</sup>	2.10 and later	Spectrum Imaging with Single-X is supported with TEM 7.15 or higher.
Single-X 30 mm <sup>2</sup> ( <i>Side-entry Bruker 30 EDS</i> )	3.0 and later	Requires Titan 3.7 or later, Talos 2.7 or later. Spectrum Imaging with Single-X is supported with TEM 7.15 or higher.
Ultra-X	3.0 and later	Requires Titan 3.7 or later, Talos 2.7 or later .

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

## Backward compatibility of the Velox Experiment file

The current Velox release can open Velox Experiment files (\*.emd) that are saved with Velox versions 2.0 and later. Older Experiment files are not supported.

When a legacy Experiment file is opened, Velox automatically converts the file format and saves a backup (\*.bkp) of the original Experiment file in the same directory. Depending on the file size, the conversion may take several minutes.


Legacy experiment files can also be converted with the *ExperimentConverter.exe* command line tool, which is available in *C:\Program Files\Thermo Scientific Velox*

The *BatchExport*, *BatchPrune*, *SIConverter* or *EMDConverter* tools also converts files into the latest format automatically before they are processed.

Files which are acquired with Velox 2.16 can be opened with Velox 3.12 and beyond without any conversion. When a Velox EDS SI data file, acquired in 2.15 or earlier version, is opened with the Velox version 2.16 or 3.12 and beyond, it will be automatically converted to the current format and a backup (\*.bkp) file is saved.

Files which are acquired with 2.16 cannot be opened with 2.15 or earlier and 3.11 or earlier.

In general, a converted Experiment file cannot be opened with legacy Velox software versions.

 **Note:** Velox software does not support forward compatibility. We cannot ensure the opening of a file saved with an higher version of Velox.

# Velox 2.16.0

The Velox Online software features data acquisition and processing for the following techniques:

- TEM
- STEM, incl. DPC and iDPC
- 4D-STEM
- EDS:
  - EDS single spectra
  - Spectrum Imaging
  - EDS + EELS
  - EDS + 4D-STEM

Velox Online software supports all FEI and Thermo Scientific Titan and Talos family systems that are running a compatible microscope software version.

The Velox Offline software features only the processing functionalities. It can be installed and used on any computer with a recent Windows operating system.

## New Features

The Velox file format for EDS SI data has been upgraded.

When an EDS SI data file is acquired with Velox 2.16, the data is saved in the upgraded file format which was introduced in Velox version 3.12. As a result, files which are acquired with Velox 2.16 can be opened in 3.12 and beyond without any conversion.

Improvements in the quantification algorithms are included in this version. The relative intensities of peaks within the same family of transitions for several elements are updated. The AutoID and background fitting are improved by including additional constraints and by extending the training datasets of the optimization algorithms.

## Known Issues

Although a large amount of effort is spent to assure the quality of the Velox software, it can still contain issues that affect your preferred workflow.

This chapter describes only the Known Issues for the most recent Velox release.

Historic Known Issues that are solved in the current release or in a preceding Velox release are not listed here. For an overview of the Known Issues in a specific historic release, see the Release Notes document that is included in that software release.

ID	Issue Description and Workaround
<b>VEL-46339</b>	<p>When reloading an annotated file, annotations are shifted on ColorMix display when the system CPU usage is high.</p> <p>Close applications that uses too much resources and load the file again</p>
<b>VEL-24854</b>	<p>Metadata: Super-X G1 Input/output count rates are incorrect.</p>
<b>VEL-34559</b>	<p>If 4D-STEM is or has been activated at any time during a Velox 2.13.0 session, then all subsequent Maps-Velox acquisitions will fail.</p> <p>(4D-STEM is not supported for Maps-Velox acquisitions).</p>
	<p>Disable 4D-STEM in Velox, then restart Velox and Maps.</p>