

Inspect3D

Release Notes

Version 4.5

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Contents

1	Overview	6
1.1	Purpose	6
1.1.1	Audience	6
1.2	Scope	6
1.3	Hardware Requirements	6
2	Component Release Notes	7
2.1	Documentation	7
2.2	List of Packages	7
2.3	Example Scripts	8
2.4	Test Data	8
3	Inspect3D Releases	9
3.1	Release History	9
3.2	What's new in this release ?	10
3.2.1	Inspect3D 4.5	10
3.2.2	Inspect3D 4.4	10
3.2.3	Inspect3D 4.3	10
3.2.4	Inspect3D 4.2	11
3.2.5	Inspect3D 4.1.3	11
3.2.6	Inspect3D 4.1.2	11
3.2.7	Inspect3D 4.1.1	11
3.2.8	Inspect3D 4.1	11
3.2.9	Inspect3D 4.0	12
3.2.10	Inspect3D 3.1	12
3.2.11	Inspect3D 3.0	12
3.2.12	Inspect3D 2.5	12
3.2.13	Inspect3D 2.1	13
3.2.14	Inspect3D 2.0	13
3.2.15	Inspect3D 1.0	13
4	Known Issues in 4.5	15

Summary of Changes

Version	Description	Date
1.7	Release notes for Inspect3D 4.5	1 th September, 2019
1.6	Release notes for Inspect3D 4.4	17 th December, 2018
1.5	Release notes for Inspect3D 4.3	06 th February, 2018
1.4	Release notes for Inspect3D 4.2	19 th July, 2017
1.3	Release notes for Inspect3D 4.1.3	18 th January, 2017
1.2	Release notes for Inspect3D 4.1.2	02 nd September, 2016
1.1	Release notes for Inspect3D 4.1.1	03 rd June, 2016
1.0	Release notes for Inspect3D 4.1.0	27 th June, 2014

Document Conventions

The following typefaces are used throughout this document:

- The 'Courier' typeface is used for directory objects and attributes, file names and command line code.
- *'Italics' are used for emphasis and for cross References.*
- **This bold typeface is used to represent information you should type in at the keyboard.**



Note: This Note is used to illustrate that you should pay particular attention to its accompanying information.

1 Overview

1.1 Purpose

This document provides a definitive description of the Thermo Fisher scientific Inspect3D application up to version 4.5. Installation of EPU on a system is not part of this document, but is documented in a separate document.

1.1.1 Audience

These release notes are intended for those managing the configuration of Thermo Fisher scientific Inspect3D installations and users of Thermo Fisher scientific Inspect3D version 4.5.

1.2 Scope

This document describes the content of the Inspect3D release as well as its dependencies and the release history of the product.

1.3 Hardware Requirements

- Windows 7 Pro 64-bit, Windows 8 Pro 64-bit or Windows 10 Pro 64-bit (no Windows XP)
- NVIDIA GPU with compute capability 2.0 or higher and at least 2 GB of memory; see <http://en.wikipedia.org/wiki/CUDA> for the list of CC 2.0 and higher enabled cards
- For NVIDIA GPU, driver version shall be either greater or equal to 391.29.
- Preferably Intel quad core processor or higher
- Minimum of 8 GB or RAM, 32 GB recommended
- Minimal 2TB of disk storage, with SSD for fast disk access recommended
- Widescreen monitor, 1920x1080 resolution recommended
- DVD player for installation of the software

2 Component Release Notes

2.1 Documentation

The following documents are provided as part of the Inspect3D release 4.5.

Generic Title	Filename	Location
Usage of ConfigTester.exe	ConfigTester.pdf	DVD
Usage of Inspect3D_ConfigChange.exe	Inspect3D_ConfigChange.pdf	DVD
Inspect3D Software User's Guide	Inspect_3D_UG_final.pdf	DVD + Inspect3D start menu
Inspect3D Installation manual	Inspect3D installation manual.pdf	DVD
Inspect3D release notes	Inspect3D release notes.pdf	DVD

2.2 List of Packages

The following packages are present on the DVD of Inspect3D release 4.5.

Component	Software Package	Version
Inspect3D	Software\Inspect3D	4.5

2.3 Example Scripts

The DVD of Inspect3D release 4.5 contains example scripts in Python, Jscript and Matlab code to demonstrate how the scripting interface of Inspect3D can be used. The following files are included:

Technology	Files	Location
JScript	Convert.js, definitions.js, ScriptPage_split.htm	Scripting\I3DScripting Demo JScript
Matlab	I3D_Script_Demo.m	Scripting\I3DScripting Demo Matlab
Python	I3D_Script_DemoFullWorkflow.py, I3DScript_AlignmentWithDifferentFilterSettings.py, I3DScript_ConvertUnknownFileFormat_And_Align.py, I3DScript_ConvertUnknownFileFormat_And_Align.py, I3DScript_FeatureTrackingOnAlignedFile.py, I3DScript_FileEditor_EditSliceInfo.py, I3DScript_MultipleAlignment.py, I3DScript_MultipleReconstructions.py, I3DScript_RawFile_Alignment_Feature tracking.py, I3DScript_ReduceKnownFileFormat_And_Align.py, I3DScript_VolumeManipulation.py	Scripting\I3DScripting Demo Python

2.4 Test Data

The DVD of Inspect3D release 4.5 contains some test datasets that can be used for checking the installation and/or getting acquainted with the software:

- FELtestseries.mrc
- FELtestseries_gold.mrc
- kidney_dual_0.mrc
- kidney_dual_90_b.mrc
- KLH.mrc

3 Inspect3D Releases

3.1 Release History

4.5.0 – Release September 2019

4.4.0 – Release December 2018

4.3.0 – Release February 2018

4.2.0 – Release July 2017

4.1.3 – Release January 2017

4.1.2 – Release September 2016

4.1.1 – Release May 2016

4.1.0 – Release June 2014

List of Packages Delivered

This section presents the list of packages that were modified and will be delivered with release 4.1.0:

- Thermo Fisher scientific Inspect3D 4.1.0. setup package
- Bergson LicenceManagementRuntime

4.0.0 – Release March 2013

3.1.0 – Release

3.0.0 – Release

2.5.0 – Release

2.1.0 – Release

2.0.0 – Release

1.0.0 – Release

3.2 What's new in this release ?

3.2.1 Inspect3D 4.5

- Rename "Reduce" tab to "Pre-processing Data" tab.
- Inspect3D now integrates Motion Correction support on the "Pre-processing Data" tab.
- Reconstruction preview follows the selected parameters.
- Problem with odd size images in StackAlignment tab is fixed.
- IMOD files can now be imported to Inspect 3D.
- Support for Serial EM MRC-2014 variant.
- EDS reconstructions: ability to apply alignment to "sparse" tilt series.
- Tilt axis adjustment parameters are now saved in the shift file.
- 30 day trial license support.
- Some small fixes and improvements.

3.2.2 Inspect3D 4.4

- Inspect3D now integrates a patch tracking algorithm in the feature tracking tab.
- Optimization of reconstruction for rod-like sample is now available on UI
- GPU alignment now gives the same result as CPU alignment. Option text is changed to reflect the change. CPU option will be dropped in future releases.
- Significant bug fixed in feature tracking alignment.
- Installation directory changed to C:\Program Files\Thermo Scientific Inspect3D
- Some small fixes and improvements.

3.2.3 Inspect3D 4.3

- Inspect3D now integrates our exclusive bimodal reconstruction technique: HEFT. A specific reconstruction preview has been added for it.
- Inspect3D now also integrates additional iterative reconstruction techniques: SART, CGLS and EM.
- Inspect3D now contains an additional reconstruction option for the (W)BP to dampen high tilt missing wedge artefacts.
- FEI logo and references have been rebranded into Thermo Fisher scientific ones.
- Some small fixes and improvements.

3.2.4 Inspect3D 4.2

- Inspect3D now fully supports 32-bit data.
- Inspect3D can now apply an alignment computed from one file (e.g. STEM stack) to a list of other files (e.g. EDS stacks).
- Inspect3D now allows setting up reconstruction parameters to a list of files simultaneously (e.g. STEM and EDS stacks).
- The reconstruction grid has been redesigned to work more fluently.
- Some small fixes and improvements.

3.2.5 Inspect3D 4.1.3

- Fixed bug in reconstruction of large datasets that don't fit in memory.
- SIRT algorithm is now applicable to rod-like specimens through configuration switch.
- Several bugs have been fixed, especially in Tilt Axis Adjustment, Reconstruct Volume and Inspect Stack tabs.
- The installer no longer asks to update Inspect3D when it cannot.

3.2.6 Inspect3D 4.1.2

- Inspect3D converts data from 32 bits to 16 bits on-the-fly in order to process it.

3.2.7 Inspect3D 4.1.1

- Inspect3D handles alignment of non-square images.
- Usability improvements have been made to Stack Alignment task and Tilt Axis Adjustment panel.
- Inspect3D now uses the same library as Amira/Avizo (ImageAccess) to read MRC files.
- Inspect3D can now open and read FEI extended MRC-2014 files.

3.2.8 Inspect3D 4.1

- Several bugs have been fixed, especially in Alignment and Reconstruction tabs.
- No dongles needed any more for any feature of Inspect3D.
- Scripting interface is extended with more functionalities and more examples are provided.
- Improvements in the UI based on feedback (movie maker, manual intervention in alignment, better naming etc.).
- Windows 8.1 Support.



Remark! Version 4.1 does not support Windows XP any more.

3.2.9 Inspect3D 4.0

- Inspect3D Software is scriptable through any COM aware language (e.g. JavaScript, MATLAB, and Python).
- GPU acceleration of e.g. cross correlation alignment step, general feature tracking, and reconstruction.
- New user interface guides the user more seamlessly through the workflow.
- Fully 64 bit: arbitrarily large data volumes can be handled.

3.2.10 Inspect3D 3.1

- Inspect3D supports Windows 7 (both 32 and 64 bits).

3.2.11 Inspect3D 3.0

- Setup Wizard added: UI adapts itself based on sample type.
- Dual Axis Merging (USB dongle protected).
- Significant change in Feature Tracking page (new layout, auto-refine, clickable charts etc.).
- Bead cloaking.
- New GPU reconstruction routines, including full control of SIRT settings.
- Many layout changes and functionality enhancements.

3.2.12 Inspect3D 2.5

- Throughout the code, minor bugs have been fixed.
- Filter setup:
 - Non-linear filtering (multipass Median, Min, Max).
- Reconstruction on the GPU (optional feature):
 - Use hardware (GPU) acceleration of (weighted) backprojection and SIRT reconstruction algorithms to speed up reconstructions by a factor of 100.
- Volume manipulation:
 - Crop and tilt the reconstructed volume.
 - Rebin reconstructed volume.
 - Filter reconstructed volume:

- 3D Median (arbitrary kernel size).
- 3D Moving Average (arbitrary kernel size).
- 2D Gauss of x-y planes.
- Two types of 2D anisotropic diffusion.
- Any 2D filter set in Filter setup page.
- MRC plugin for Amira 3.1.1.

3.2.13 Inspect3D 2.1

- New license mechanism.
- Throughout the code, minor bugs have been fixed.
- Calculate alignment shifts: added charts for magnification change and rotation of tilt axis change.
- Feature Tracking:
 - Large changes occurred with many bug fixes.
 - Added general feature tracking.
 - Added magnification change.
 - Added many user interaction options (e.g. split bead history, movie).
 - Added buttons for easy manipulation.
 - Added many internal functions to optimize the solution.
- Reconstruct volume:
 - Minor bug fixes in volume setup and ART/SIRT routine.
 - Added time left estimate.
- Inspect Stack:
 - Minor bug fixes. Added true pixel size in image info display.
- Manipulate Volume Task added.

3.2.14 Inspect3D 2.0

It contains the following extra features:

- ART/ SIRT reconstruction.
- Marker tracking (manual, semi-automatic, fully automatic).
- Fine alignment for shift and rotation changes.
- Several improvements and bug fixes.

3.2.15 Inspect3D 1.0

It contains the following features:

- Import of many data types and merging to mrc.
- Editing of mrc headers.
- Data reduction, including a.o. thresholding, hot pixel removal and region-of-interest selection.
- Interactively set filters for cross correlation alignment.
- Automatic calculation of alignment.
- Inspection and editing of alignment results.
- Automatic (coarse) determination of the direction of the tilt axis.
- Manual finetuning of the position and direction of the tilt axis.
- Graphical setup of the volume to be reconstructed.
- Reconstruction of a volume using weighted backprojection.
- Inspection of data sets using movies, slicing and projections.

4

Known Issues in 4.5

This is a list of known issues in the current release: