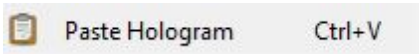
Octopus Software Release Notes

2.2.0

- New Instrument Profiles. Selected profile is now shared across all 4Deep software - select instrument in one software package and it will be used automatically in other packages. Better management of standard and custom profiles.
- Optimizations in hologram reconstruction CUDA code.
- Bug fixes and stability improvements.
- Updated to the latest libraries - Qt 5.9.6, OpenCV 3.4, CUDA 9.1.

2.1.0

- Image segmentation in “2D Object Detection” is done on GPU (when available) - increasing detection speed ~2x.
- Paste Hologram/Background name and reconstruction distance from Stingray.

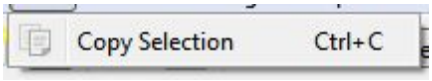


- Optimizations in hologram reconstruction CUDA code.
- Ability to set reconstruction position as fraction of μm.
- Added support for the latest “Volta” NVIDIA GPUs.
- Bug fixes and stability improvements.
- Updated to the latest libraries - Qt 5.9, OpenCV 3.3, CUDA 9.0.

2.0.0

- 64-bit software supports large RAM sizes, improves performance and stability.
- Support for the latest submersible microscope - “S6”.

- During recording, metadata containing information about instrument profile and recording parameters is stored directly into hologram image file.
- Reconstruction parameters are set automatically based on the metadata stored in the hologram image file.
- Detection of the microscope model based on information stored in the microscope EEPROM (on models that support this).
- Floating point support for laser pulse duration - better control of the exposure on microscopes that support it.
- Excel export uses the new “2007” file format, removing limitations on spreadsheet size.
- Selected region in reconstructed view can be copied to Stingray database - Edit/Copy selection.



- Faster hologram reconstructions.
- Bug fixes and stability improvements.
- Updated to the latest libraries - Qt 5.7, OpenCV 3.1, VTK 7.1, CUDA 8.0.

1.8.2

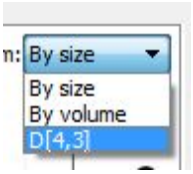
- Bug fixes and user interface improvements.
- Laser pulse duration is now double, with 100 ns step. Much better control of laser pulse duration on microscopes that support it.
- Pulsed mode is on by default.
- Improved autopulse algorithm.

1.8.1

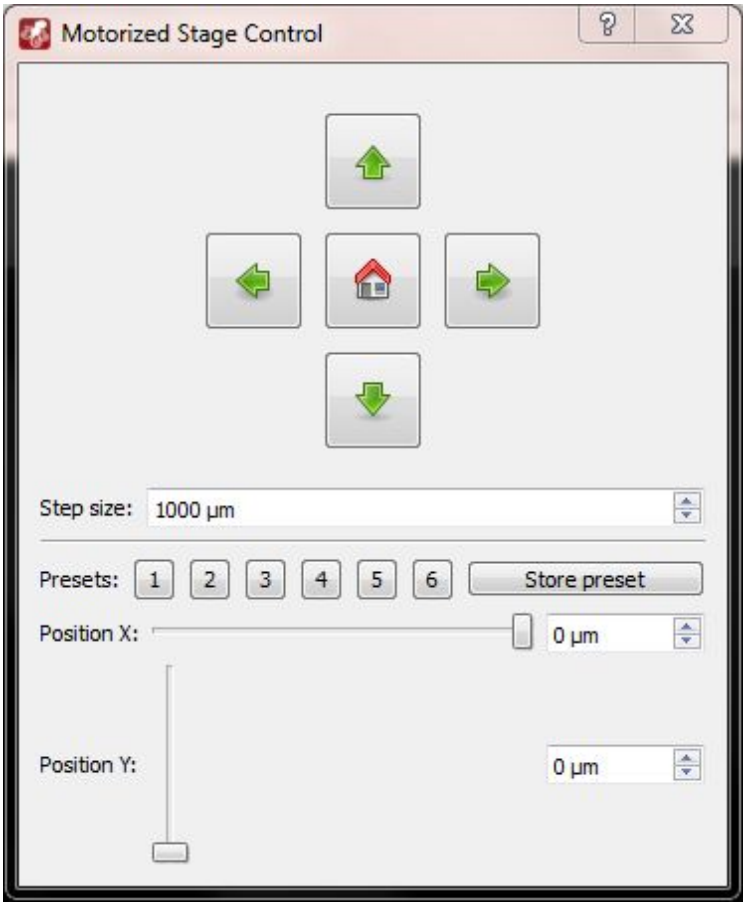
- Bug fixes. Fixed crash in D[4,3] histogram export.
- Improved performance in camera code.
- Additional remote commands - `RECONSTRUCT_HOLOGRAMS`, `SAVE_RESULT_IMAGE`, `OUTPUT_MODE`.
- Cosmetic changes.
- Updated manual.

1.8.0

- Bug fixes. Fixed crashes in the camera control code.
- D[4,3] analysis added for histograms. In this type of analysis, relative particle volume as a fraction of total volume of all particles is calculated in each histogram bin.



- Implemented support for motorized X-Y stages in Desktop microscope. Currently, Zaber ASR series stages with X-MCB controllers are supported.



- Updated manual.
- Updated the libraries to the most recent versions.

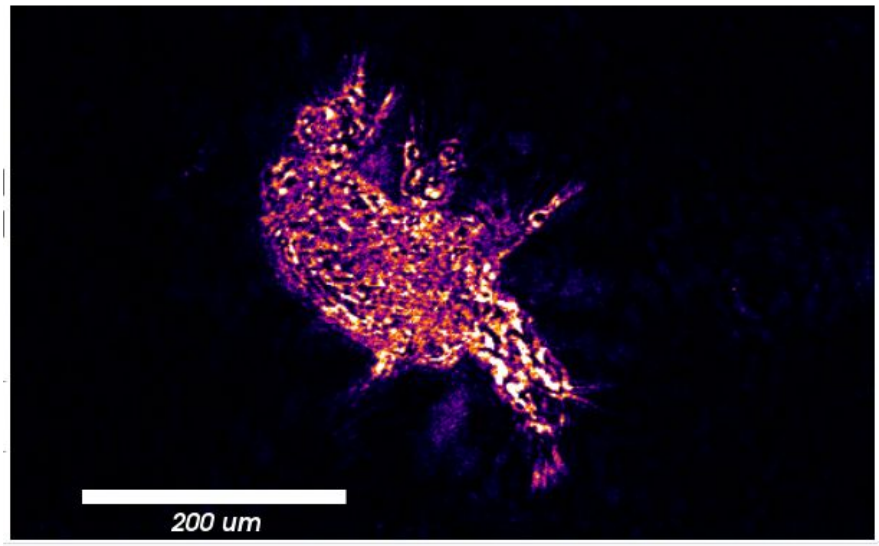
1.7.0

- Improved connection to microscopes - IP address of the camera is set automatically.
- Greatly improved 3D view performance.
- Use 1 µm size bins instead of fixed 32 bins to improve resolution of frequency distributions.
- Cosmetic improvements to axis and labels.
- Bug fixes.
- Updated to VTK 6.3.0

1.6.0

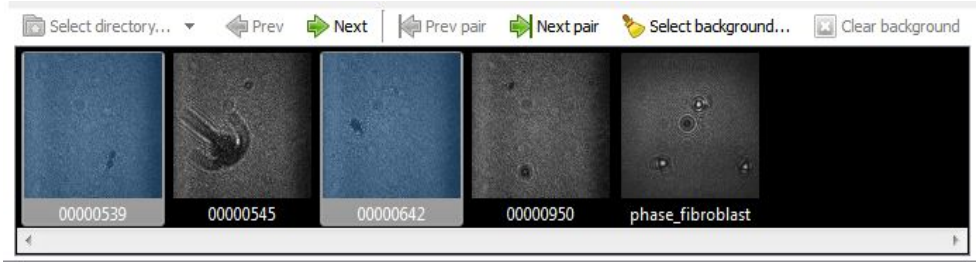
- Welcome screen shows quick tutorial on first program run.
- Show histograms of loaded hologram files.
- Show histograms of images received from camera to detect under/over exposure.

- Added scale bar in addition to axes to the 2D reconstructed view.



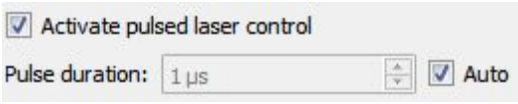
- Full screen view for 2D/3D reconstructions.

- Image gallery for loading holograms, selecting multiple holograms for background subtractions, navigating between images in the directory.

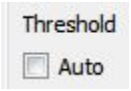


- Ability to drag and drop holograms from external programs such as Windows Explorer into Octopus.
- Better visual representation of 2D reconstruction position.

- Improved autofocus algorithm covers the entire range of reconstruction positions and improves accuracy.
- Auto pulse control sets optimal laser pulse duration/camera gain based on camera image histogram.



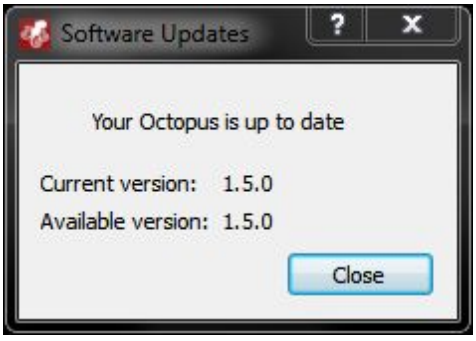
- Auto threshold uses Otsu algorithm to set optimal threshold for 2D particle detection automatically.



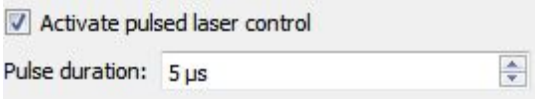
- New normalization algorithm reduces the effect of “lensing” from round transparent objects.
- New camera image queue reduces latency and improves camera performance.
- Fix running of memory when reconstructing at high speed in 3D view mode.
- Additional remote commands for setting the 2D reconstruction position, and setting from/to positions and number of planes for 3D reconstruction.
- Updated to CUDA 6.5.

1.5.0

- Notifications about new versions of software being available for download.

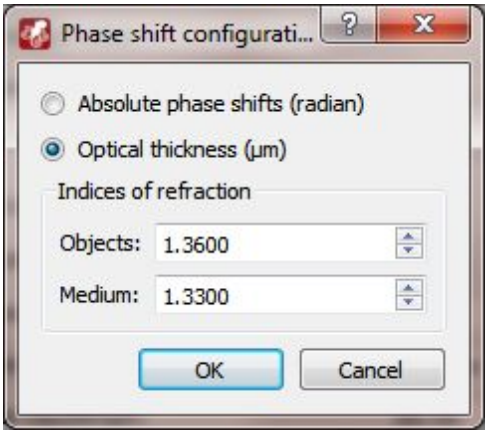


- Pulsed lasers support in the submersible microscopes.

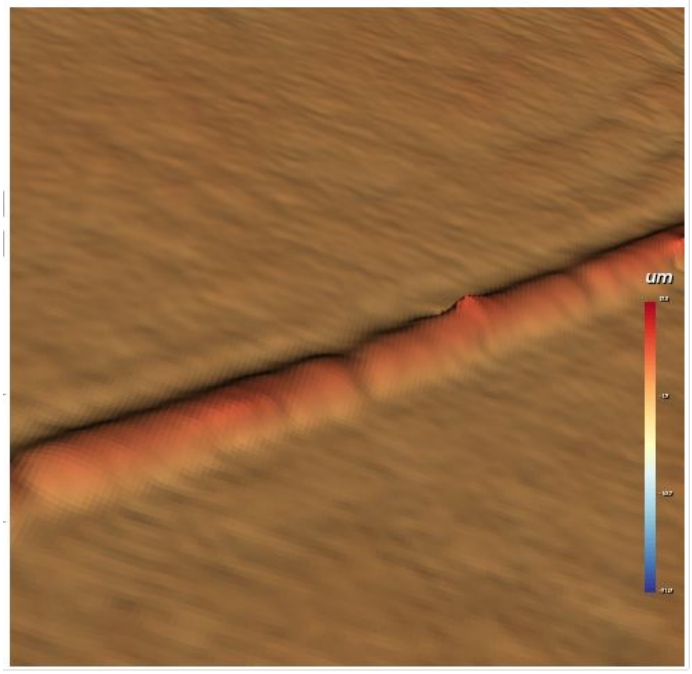


- 2D phase unwrapping on both CPUs and GPUs (with NVIDIA CUDA).

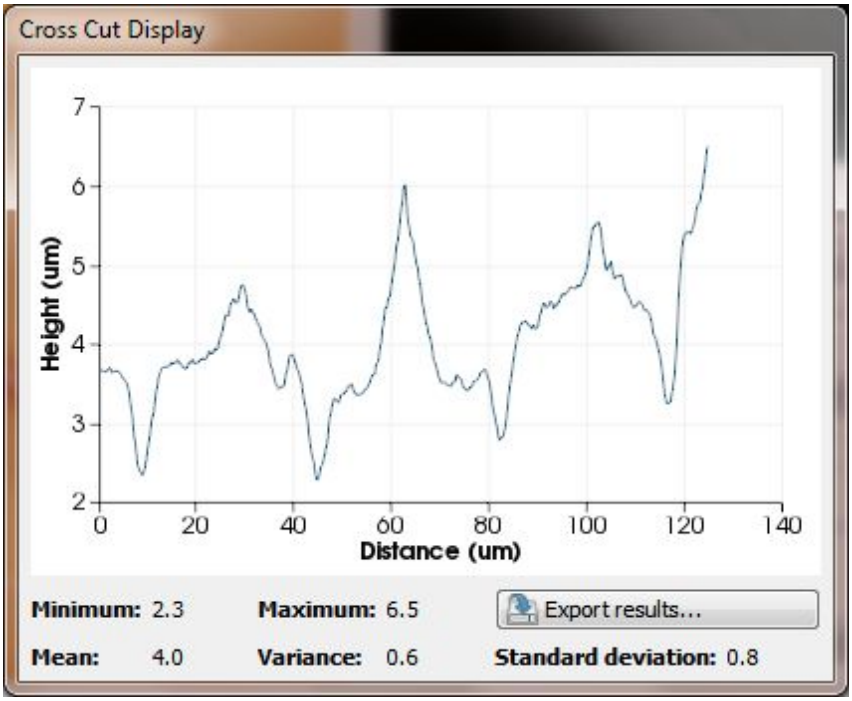
- Full implementation of the quantitative phase imagery for translucent samples (both absolute phase shifts in radians and optical thickness profiles in microns can be calculated).



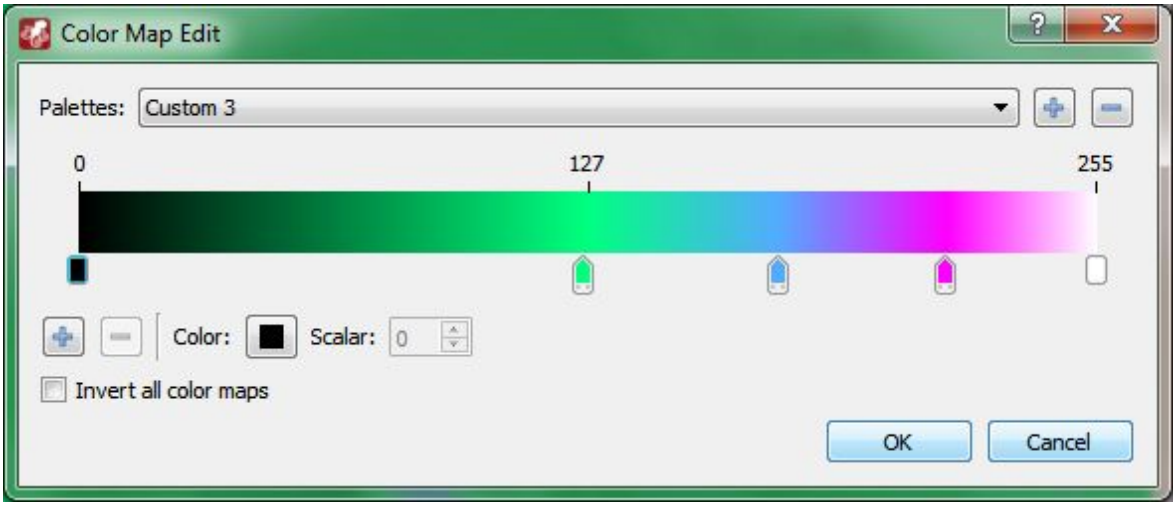
- 3D topography view to display height profiles based on quantitative phase data.



- Crosscuts can display absolute phase shift calculations (in radian) and optical thickness maps (in microns) in addition to pixel intensities.



- Scale can support absolute phase shift calculations (in radian) and optical thickness maps (in microns) in addition to pixel intensities.
- A complete overhaul of color maps with a selection of standard color maps available and ability to create custom color palettes with up to 256 control points.

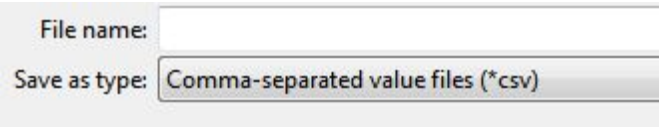


- Digital zoom of holograms - allows to zoom central region of reconstructed image up to 200%.
- Fast switching of reconstruction output type in the toolbar.

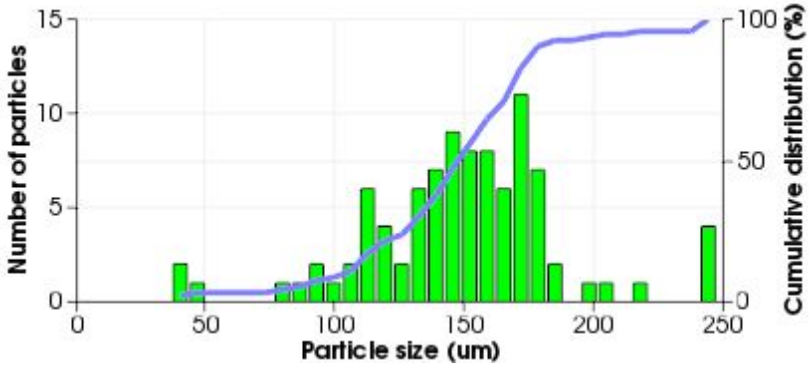
- Updated to Pleora 4.x SDK for improved camera support.
- Inform the user when frames cannot be saved to the disk at the current frame rate.
- Improved frame saving code for extra stability and performance.
- Fixed crash on reconnect with the camera that lost data connection.
- Support for electron beam holography in the Octopus Electron version.
- Support for reconstructions on NVIDIA Maxwell GPUs.

1.4.0

- Export data to Comma-separated values (CSV) files in addition to Excel files - particle size/volume distributions, particle data, cross cut data.



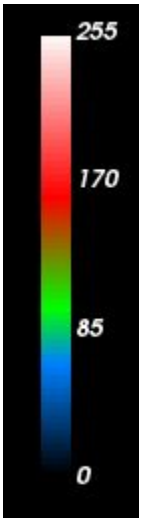
- Hologram reconstruction performance improvements, especially when the same hologram is reconstructed at multiple distances.
- Ability to reconstruct holograms at distances beyond 7000 microns (for the submersible microscope).
- Ability to reconstruct holograms on CPU, when CUDA reconstructions are not available.
- Autofocus improvements.
- Particle size/volume distribution cumulative curves.



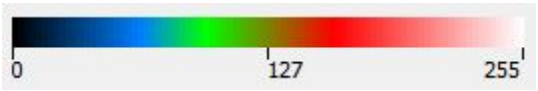
- Camera remote control allows to control camera parameters remotely via TCP/IP networks.
- Camera connection improvements - no interface lockups when camera is

connecting.

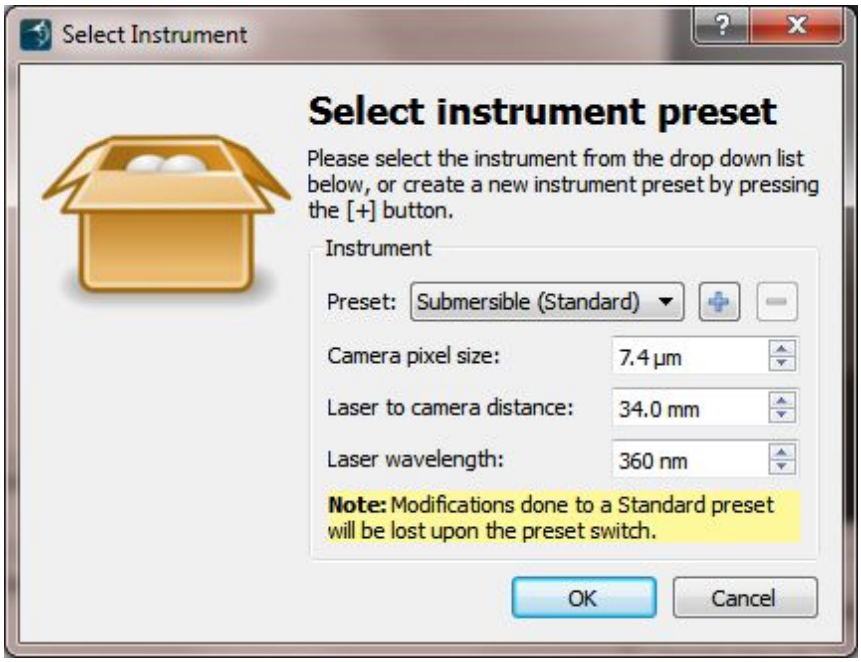
- Ability to control 2D hologram reconstruction position with shortcut keys (A, D, W, and X).
- Scale on 2D and 3D display.



- Added white fixed point to the color map.



- Select instrument on the first run.



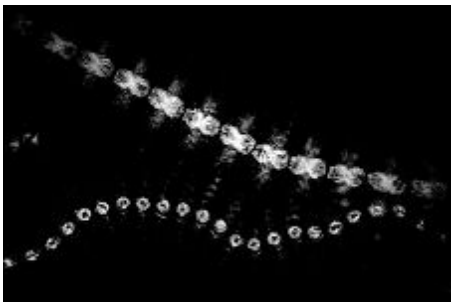
- Support for the Cuvette microscopes.

- For Standard instrument presets, set correct minimum and maximum distances for 2D and 3D reconstructions.
- Updated to VTK 6.1.

1.3.0

- Video recording ability - AVI and MPEG movies can be produced from the reconstructed images either online or offline.

- Ability to select both hologram and background at the same time in the file dialog.
- Ability to reconstruct a hologram series - using the pairwise subtraction of 4 or more holograms to reconstruct a “compound hologram” - useful to generate 4D images to track particle velocities or swimming patterns of the microorganisms.

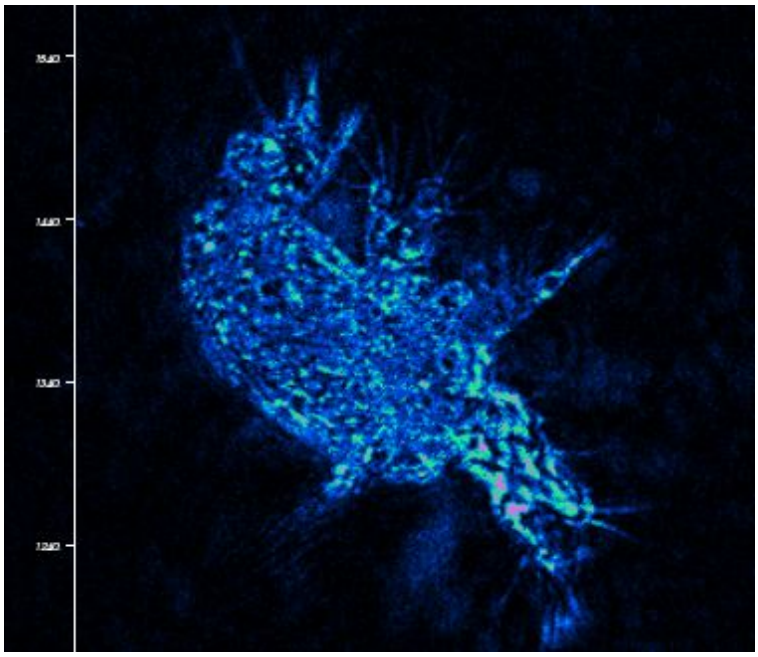


- Improvements to the instrument preset selector.
- Fixed the problem with phase reconstructions due to incorrect images size.
- Faster switching to the Camera mode.
- Chinese translation - user interface switches to Chinese if Chinese is selected in the Regions settings in the Windows Control Panel.

- Bug fixes.
- Updated to CUDA 5.5.
- Updated the libraries to the most recent versions.

1.2.0

- A complete overhaul of the Reconstructed Hologram View with new display and data measurement options, and hardware-accelerated zooming and panning.



- Axes in the reconstructed hologram view.

- Legend in the reconstructed hologram view showing file names and reconstruction parameters.

- Contour display in the reconstructed hologram view.

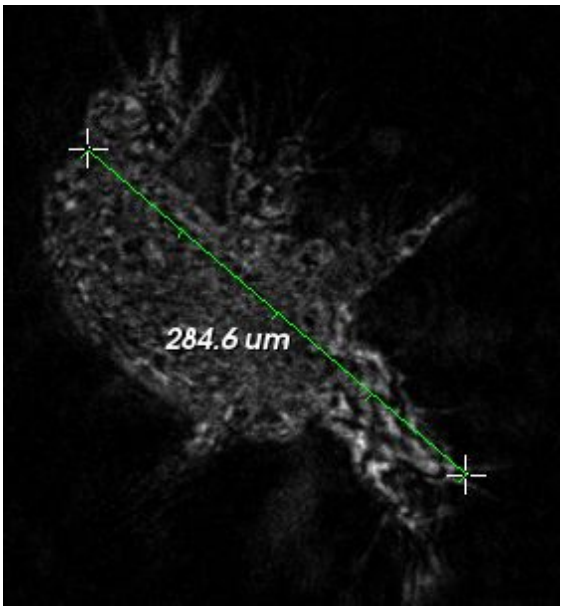
- Color mapped display in the reconstructed hologram view.

- Ability to change brightness in the reconstructed hologram view.

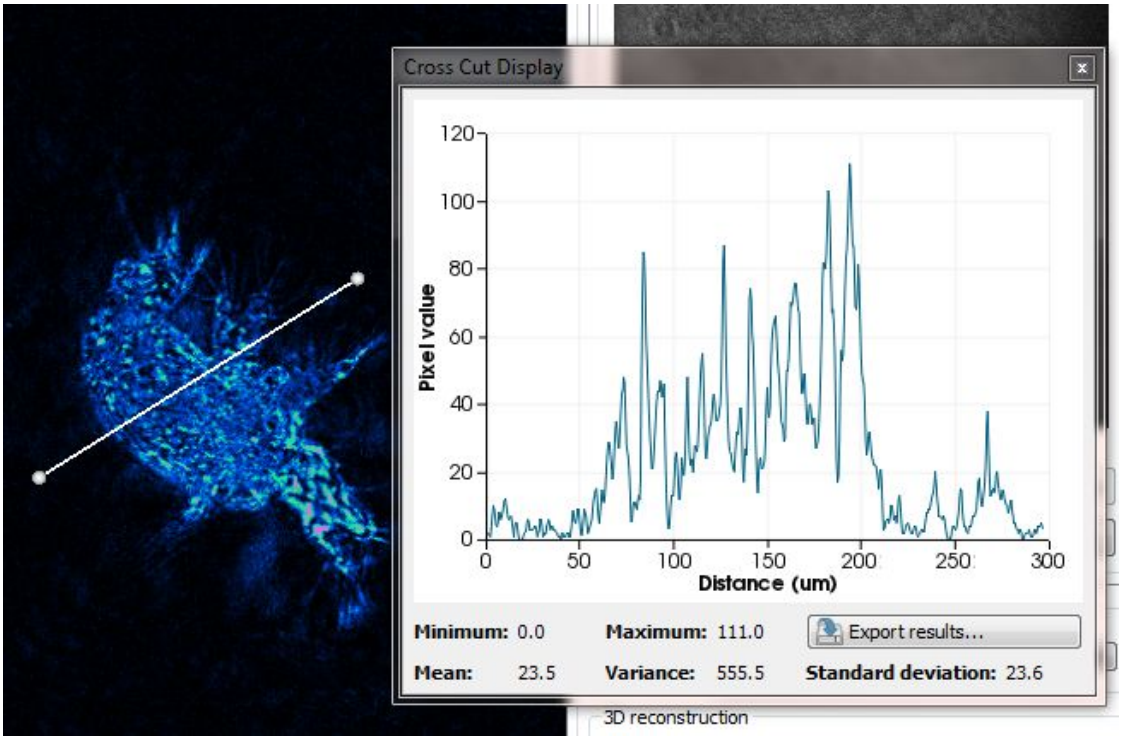
- Zoom to select allows zooming the view to the previously selected region in the

reconstructed hologram view.

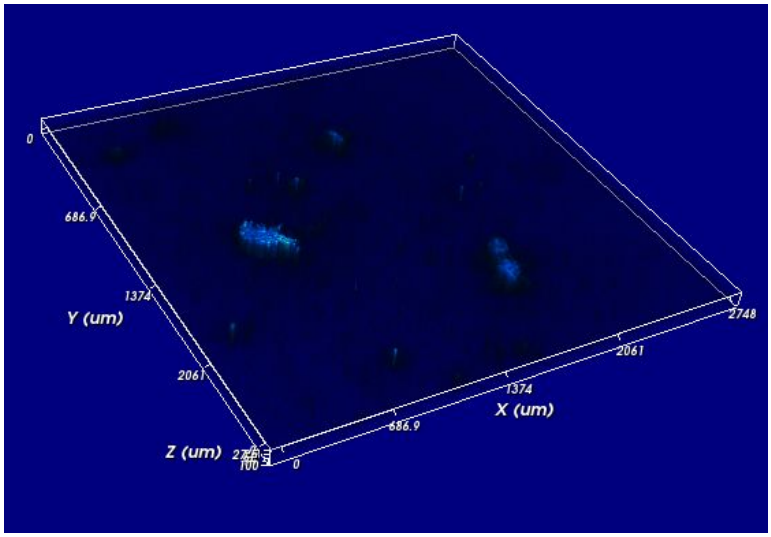
- Interactive measure tool for measuring sizes in the reconstructed hologram view.



- Cross Cut tool for measuring pixel intensity along the selected line in the reconstructed hologram view.

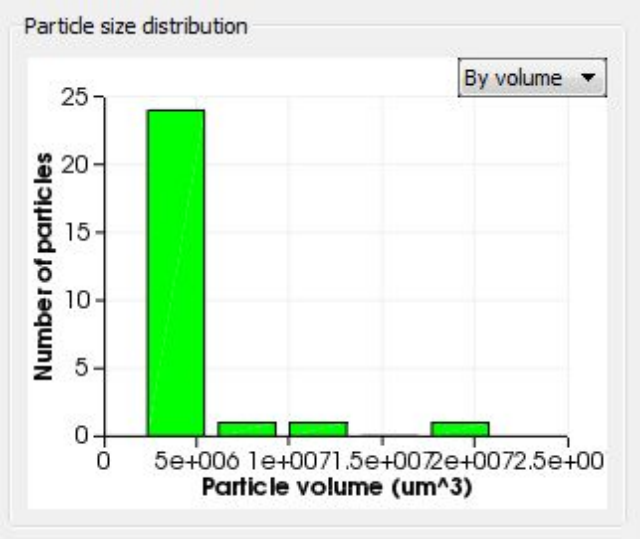


- Printing of the results shown in the reconstructed hologram view.
- Performing reconstructions in parallel with displaying the data - responsiveness of the Octopus GUI has been improved.
- Autofocus improvements.
- Axes in the volume view.



- Ability to turn axes and outline on/off in the volume view.

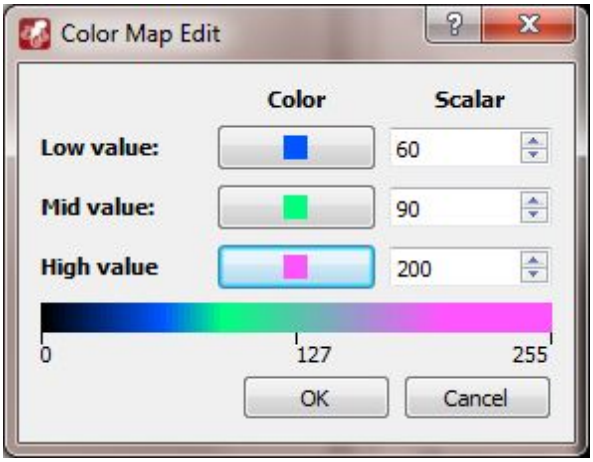
- Ability to calculate histograms for particle volumes in addition to sizes in 2D and 3D Object Detection.



- Various Camera performance and stability improvements.
- Ability to set background hologram and clear background hologram in the live view from the Camera.

- Ability to control Gain/Auto Gain and Exposure/Auto Exposure in Camera settings.

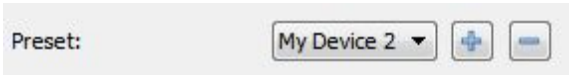
- Ability to edit color maps, with customization of colors and scalars for the 3 color maps points.



- Demo mode in Octopus.

1.0.1

- Standard and custom presets in the Reconstruction Options.



- Detected particle data can be saved in 2D and 3D Object Detection.
- Histogram data can be saved in 2D and 3D Object Detection.

- Improved PPM calculations in 2D and 3D Object Detection.
- Improved autofocus for small objects.

1.0.0

- Initial release.