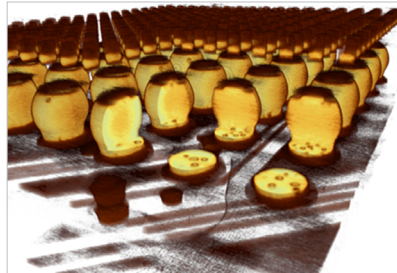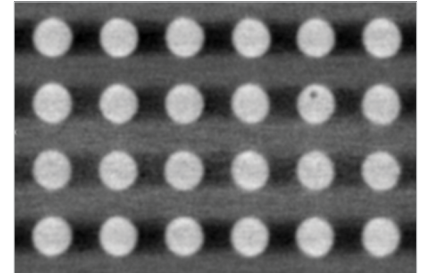# 3D X-ray Microscope Field Conversion and Upgrade Options
Protect Your Investment by Updating and Extending Your Capability

3D-package flip chip bumps and 25 µm-diameter Cu-pillar microbumps imaged with ZEISS Xradia 620 Versa. The C4 bumps have numerous voids at the substrate interface.


A lone 25 µm-diameter Cu-pillar microbump with a single void is identified in a plan-view virtual XRM cross section from the same dataset as the left image.

Overview

ZEISS X-ray microscopes are designed to be upgradeable and extendible with future innovations and developments so that your investment is protected. This ensures your microscope capabilities evolve with the advancements in leading technology. This is one of the key differentiators in the 3D X-ray imaging industry. From Xradia Context microCT, to Xradia 510/520 Versa, and now with the addition of Xradia 610/620 Versa, you can field-convert your system to the latest X-ray microscope products. In addition to instrument conversions at your facility, new modules that are being continuously developed will be available as field upgrades to further enhance your instrument with advanced capabilities. Also, periodic major software releases including important new features are developed and rolled out to continuously enhance and extend your ability to gain insights critical to solve problems and advance your processes and products.

Available Field Conversions

Context microCT   510 Versa   520 Versa   610 Versa   620 Versa
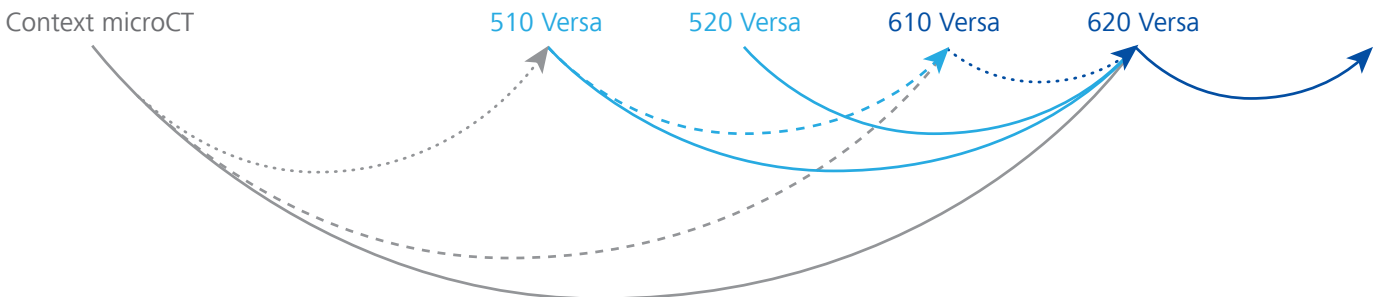
Seeing beyond

3D X-ray Microscope Field Conversion and Upgrade Options

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Value of Converting Existing System to Xradia 620 Versa

- **Higher X-ray flux without loss of resolution**
  High power (25 W) X-ray source provides significantly higher X-ray flux and up to 2x faster scans without compromising resolution compared to its predecessors.

- **Improved spatial resolution**
  True spatial resolution of 500 nm with a minimum achievable voxel size of 40 nm is achieved with Xradia 600-series Versa.

- **Instant source start up and enhanced reliability**
  A new source control system improves source responsiveness enabling faster scan setup leading to a more satisfying and engaging user experience. The source is also engineered for improved reliability even at higher X-ray power.

- **AFC – Automated Filter Changer**
  The integrated programmable automatic filter changer allows you to select from a broad range of high and low energy filter options to optimize image quality.

- **WFM – Wide Field Mode**
  Wide Field Mode (WFM) provides you with either an extended lateral field of view for imaging large sample types or higher resolution imaging using the standard field of view, both in a single tomography with 0.4x and 4x objectives.

- **DSCoVer – Dual Scan Contrast Visualizer**
  Dual Scan Contrast Visualizer (DSCoVer) provides user-tunable visualization, image enhancement, and segmentation using 2D histograms to enable compositional probing for features normally indistinguishable in a single scan.

- **HART – High Aspect Ratio Tomography**
  HART provides higher throughput imaging for your flat samples such as those found in semiconductor packages.

Additional Field Upgrade Modules

- **FPX – Flat Panel Extension**
  Image large samples at high throughput and create workflow efficiencies with FPX for industrial applications and research.

- **Autoloader**
  Maximize your instrument's utilization and increase operator efficiency with Autoloader for improved sample handling.

- ***In situ* kit and environment cells**
  Perform *in situ* and 4D (time dependent) studies for non-destructive characterization of microstructures in controlled environments with time.

- **ORS Dragonfly Pro**
  Conduct extensive qualitative and quantitative analysis with advanced 3D visualization and analysis software.

- **LabDCT – Laboratory Diffraction Contrast Tomography**
  Conduct non-destructive 3D crystallographic mapping of orientation and microstructures with first ever laboratory-based diffraction contrast tomography imaging module.

Please refer to the individual product/accessory flyer for more information. For information on the latest Scout-and-Scan software releases, please email info.pcs@zeiss.com.
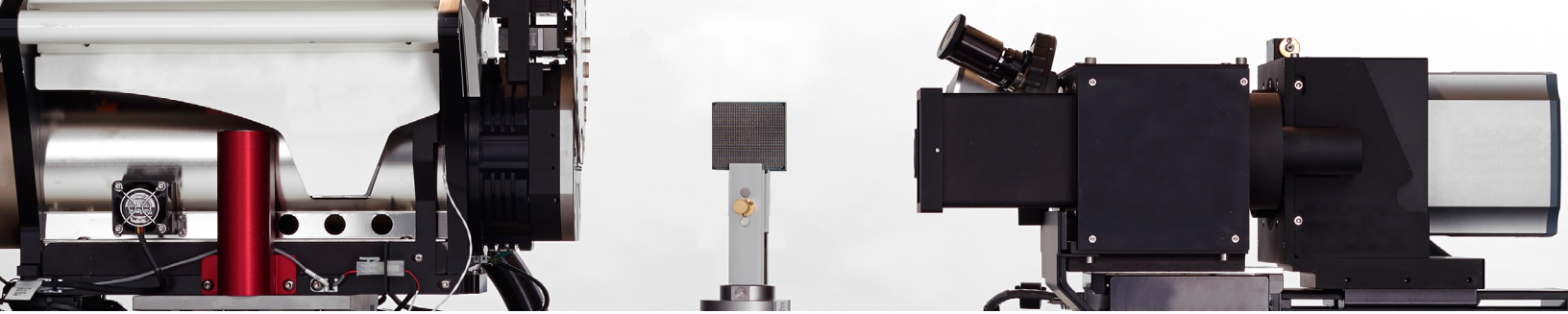
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Imaging	Xradia 410 Versa	Xradia 510/520 Versa	Xradia 610 Versa	Xradia 620 Versa
Spatial Resolution [a]	0.9 µm	0.7 µm	0.5 µm	0.5 µm
Resolution at a Distance (RaaD) [a,b]	1.5 µm	1.0 µm	1.0 µm	1.0 µm
Minimum Achievable Voxel [c]	100 nm	70 nm	40 nm	40 nm

(Voxel size at sample at maximum magnification)

X-ray Source				
Architecture	Sealed Reflection	Sealed Transmission	Sealed Transmission Fast Activation	Sealed Transmission Fast Activation
Voltage Range	20-90 kV	30-160 kV	30-160 kV	30-160 kV
Maximum Power Output	8 W	10 W	25 W	25 W

Detector System

ZEISS X-ray microscopes feature an innovative detector turret with multiple objectives at different magnifications.
Each objective features optimized scintillators that deliver the highest absorption contrast details.

	Xradia 410 Versa	Xradia 510/520 Versa	Xradia 610 Versa	Xradia 620 Versa
Standard Objectives	0.4x, 4x, 10x, 20x	0.4x, 4x, 20x	0.4x, 4x, 20x	0.4x, 4x, 20x
Optional Objectives	40x	40x, Flat Panel Extension (FPX)	40x, Flat Panel Extension (FPX)	40x, Flat Panel Extension (FPX)

Stages				
Sample Stage (load capacity)	25 kg	25 kg	25 kg	25 kg
Sample Stage Travel (x, y, z)	50, 100, 50 mm	50, 100, 50 mm	50, 100, 50 mm	50, 100, 50 mm

Versa Features				
Scout-and-Scan™ Control System	▪	▪	▪	▪
Scout-and-Zoom	▪	▪	▪	▪
Vertical Stitch	▪	▪	▪	▪
XRM Python API	▪	▪	▪	▪
Automated Filter Changer (AFC)		520 only		▪
High Aspect Ratio Tomography (HART)		520 only		▪
Dual Scan Contrast Visualizer (DSCoVer)		520 only		▪
ZEISS LabDCT for Diffraction Contrast Tomography		Optional (520 only)		Optional
Wide Field Mode	0.4x	510 - 0.4x | 520 - 0.4x and 4x	0.4x	0.4x and 4x
GPU CUDA-based Reconstruction	Single	510 - Single | 520 - Dual	Dual	Dual
ZEISS Autoloader	Optional	Optional	Optional	Optional
In Situ Interface Kit	Optional	Optional	Optional	Optional
ZEISS OptiRecon	Optional	Optional	Optional	Optional
ZEISS ZEN Intellesis	Optional	Optional	Optional	Optional
ORS Dragonfly Pro	Optional	Optional	Optional	Optional

[a] Spatial resolution measured with ZEISS Xradia 2D resolution target, normal field mode, optional 40x objective.
[b] RaaD™ working distance defined as clearance around axis of rotation.
[c] Voxel is a geometric term that contributes to but does not determine resolution, and is provided here only for comparison.
ZEISS specifies resolution via spatial resolution, the true overall measurement of instrument resolution.

Seeing beyond