

# Composer

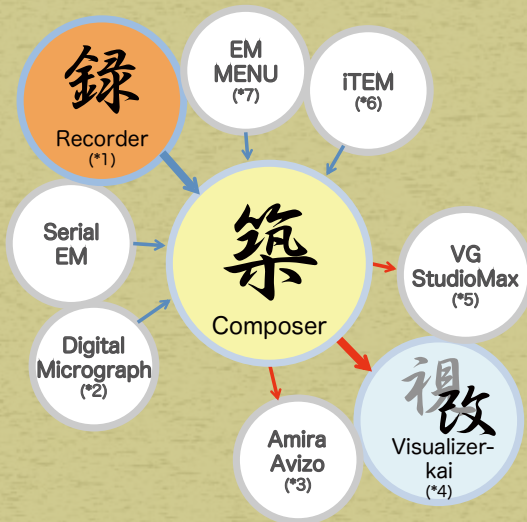
## § Outlines

**Composer** is an application which reconstructs 3D images from sequential tilt images acquired with transmission electron microscopes (TEMs) based on the principles of tomography (inverse Radon transform). It features an innovative interface that radically simplifies the task of alignment, typically the most important yet difficult aspect of tomography. In addition to reconstruction algorithms and FBP (WBP), Composer is equipped with SIRT functionality to handle even low-contrast images. With its easy operation and high-speed computation, Composer delivers high throughput that is a class apart from other software.

## § Features

- Abundant input image formats

Composer supports the leading image and stack formats in addition to output with our Recorder application to enable processing of images recorded with other systems.



- Alignment without marker

Composer uses a proprietary technique that automates the high-precision alignment of specimens without the need for special markings.

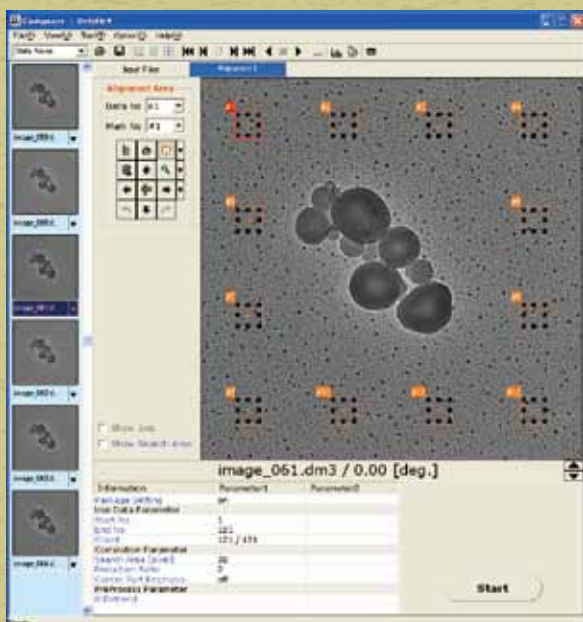
- Alignment precision control

The reliability of reconstructed images is heavily dependent on alignment precision. Composer's alignment precision control function is effective in improving the reliability of reconstructed image results.

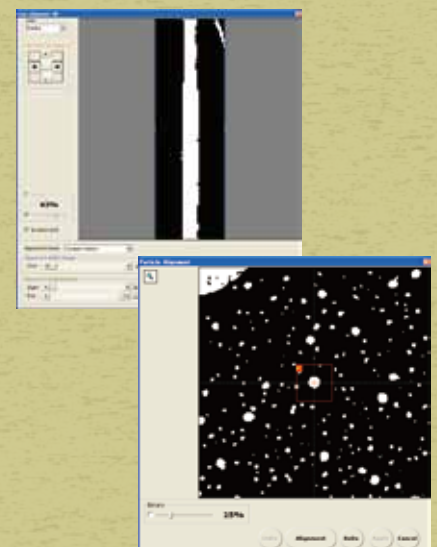
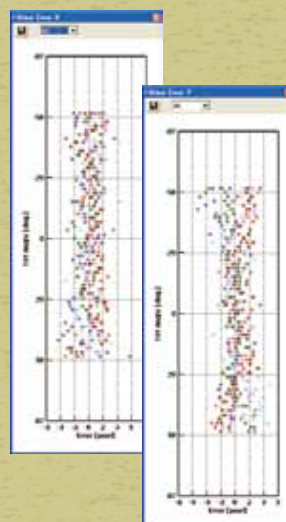
- Automatic alignment with marker

This function is useful for alignment of pre-marked images. Algorithms specifically designed for marked images enable system automation of precise alignment tasks.

Alignment for sequential tilted images without markers.



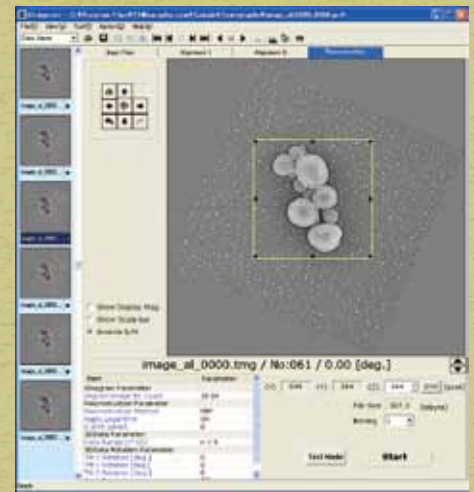
(→) Line Alignment automatically aligning the central coordinates of LineProfile of the marker.



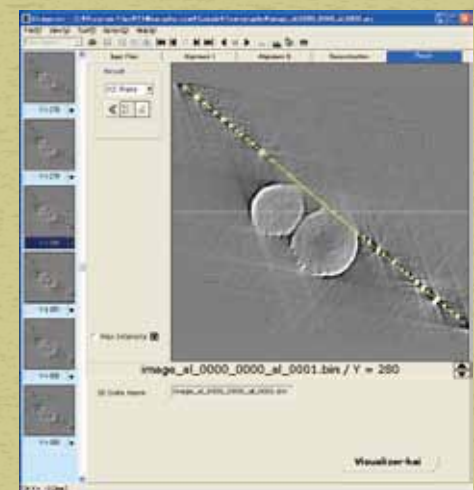
(↑) Particle Alignment automatically aligning the coordinate of the center of gravity of the marker.

(↑) Accuracy of the alignment can be evaluated and be improved in each sub-pixel.

- The specific alignment function for dual axis series  
The specific alignment function for dual axis series is implemented. It will be effective to reduce artifacts due to axis orientation.
- Parameter compensation function  
Composer features a newly-developed algorithm that automatically corrects the various measurement errors (mechanical tilt angle errors, image distortion & rotation) that occur during sequential imaging. This function is particularly effective for alignment of high-resolution images.
- Reconstruction algorithm  
Composer's reconstruction algorithm features SIRT based on iterative methods as well as the standard CT technique FBP (WBP). The algorithm is effective on low-contrast images such as low dose imaging and unstained specimens.
- High-speed & high-efficiency reconstruction engine  
Composer's reconstruction engine adopts multithread programming to support multi-core MPUs currently in the mainstream, thus allowing users to make full use of high-performance PCs. GPU-based acceleration is also available as an optional feature for users requiring even greater processing speeds.
- Fine adjustment of reconstruction results  
Composer is equipped with a fine adjustment function for rotation correction and reconstruction range adjustment of reconstructed image results. This function helps to reduce ineffective reconstruction operations, improve memory use, and shorten computation time.
- Data conversion function  
As is the case for input, Composer supports various output formats such that it also functions as a data converter.



Equipped with SIRT  
in reconstruction algorithm



Fine adjustment of the reconstruction result  
(Rotation compensation)

- (\*1) Recorder is a product of JEOL Ltd.
- (\*2) Digital Micrograph is a product of Gatan Inc. of the U.S.A.
- (\*3) Amira / Avizo are products of Mercury Computer Systems Inc. of the U.S.A.
- (\*4) Visualizer-kai is a product of SYSTEM IN FRONTIER INC.
- (\*5) VGStudio Max is a product of Volume Graphics GmbH
- (\*6) iTEM is a product of SIS GmbH (Germany)
- (\*7) EM-MENU is a product of TVIPS (Germany)

## § Specifications

Input image format	TMG, DM3(*8), BITMAP, TIFF, MRC, ST
Output format	TMG, BITMAP, TIFF, MRC, BIN, REC, AVI
Positioning method	Pre Alignment, Cross Correlation(using various kinds of filters at the same time), Fiducial Marker, Line Alignment, Particle Alignment, Manual Alignment, Alignment accuracy evaluation functions
Reconstruction method	Filtered Back Projection, Simultaneous Iterative Reconstruction Technique(GPU Accelerated)
Other supporting functions	Acquiring information confirmation, Magnification display, Scale bar display, Screen capturing, Slide show, Display of the tilted axis

(\*8) DM3 is the image file format of Gatan Inc.

The descriptions in this document are based on conditions as of May 2014. The functions and specifications of this product may be changed without any prior notification. Confirm the latest information. Any proper nouns such as company names and products names in this document are trademarks or registered trademarks of the respective companies.

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