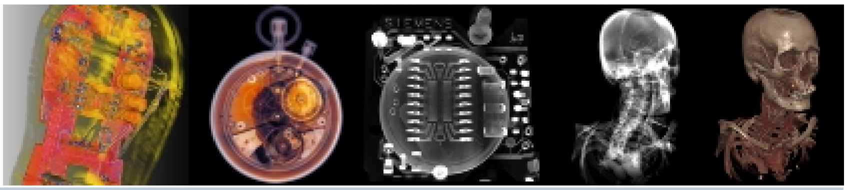

Imaging Solutions Newsletter 01/2017

CERA 4.0 - More efficiency and precision for CT image reconstruction

Dear CERA customer,

the new CERA 4.0 software introduces exciting new features and delivers on our mission. We want to be THE enabler of our customers when it comes to efficiency, precision, and image quality in cone-beam CT imaging applications - for Siemens Healthineers and for external OEM customers in complementary markets such as Dental or Industrial CT.

About 10 years ago, we started the development of CERA - a powerful and flexible platform for CT image reconstruction and 3D visualization - to address the common needs and specific challenges of our customers in ONE software platform. This growing platform and our ability to combine knowledge from multiple application fields puts us in a unique position to drive innovations for our customers.

Sincerely yours,
CERA team.

The CERA 4.0 highlights at a glance
- Advanced scatter reduction via beam stop array
- Dual-helix reconstruction for field-of-view extension
- Theoretically exact reconstruction with higher resolution
- Enhanced iterative reconstruction for planar CT and AXI 3D
- CERA BASIC 4.0 includes ITR module

Visit us online
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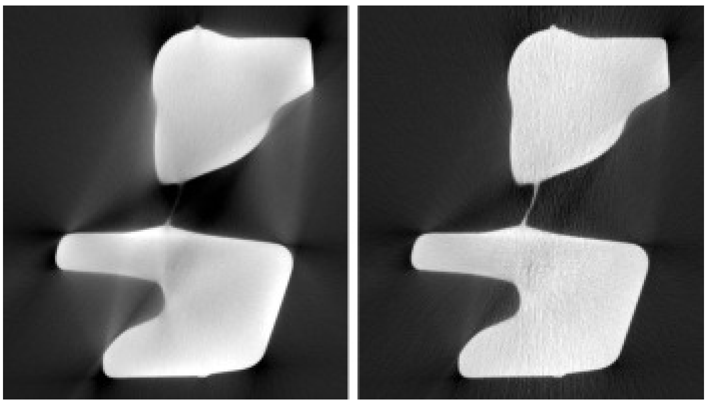
Questions?
> cera-support.healthcare@siemens.com

The CERA 4.0 highlights at a glance

Advanced scatter reduction via beam stop array



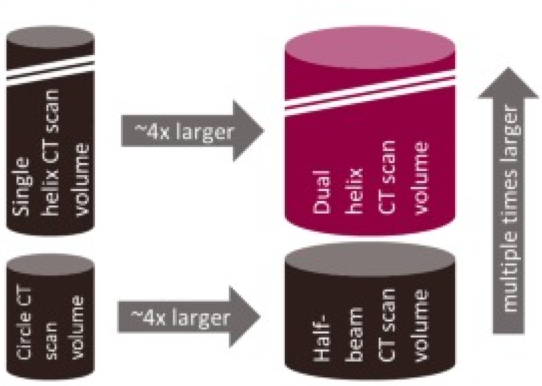
Reconstruction without (left) and with (right) scatter reduction using manually adjusted window-levels for similar image impression

With CERA 4.0 an advanced scatter reduction method is introduced, which exploits characteristic scatter information gathered from an additional scan with a beam stop array (BSA) in a unique manner. Improvements of the new CERA RED algorithm over the previous approach are:

- Better local adoption to scatter fluctuations in the image.
- Quick BSA scan: The number of BSA projections required to gather a proper statistics can be relatively small.

- Parameter re-use for at-line and in-line CT: A determined scatter characteristic can be transferred to similar CT scans with similar objects.

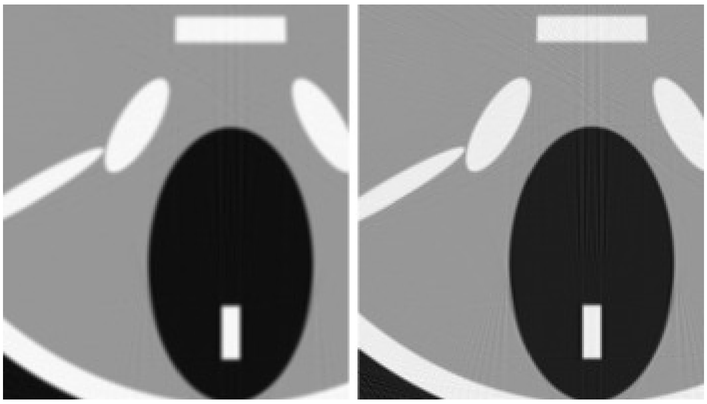
Dual-helix reconstruction for field-of-view extension



Scan volume extension with dual-helix

With CERA 4.0 it is now possible to increase the field-of-view's volume by a factor of 4 through a dual-helix algorithm. This new algorithm supports to either shift the turntable or detector between the two scans and it requires only a small helix overlap region. Also, the new algorithm does not use projection or volume stitching and thus avoids related image quality losses. Dual-helix reconstruction requires TXR + SRM add-on modules.

Theoretically exact reconstruction with higher resolution

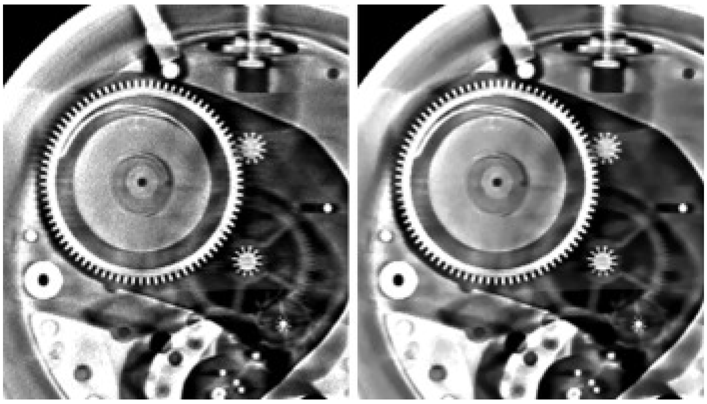


Theoretically exact reconstruction with normal (left) and extra sharp (right) setting

The theoretically exact reconstruction (TXR) module now supports higher spatial resolution and it allows the user to select one out of three different sharpness levels. In general, CERA TXR is a direct analytical reconstruction method designed to support:

- Precise reconstruction results without Feldkamp artifacts from helical, circle plus line, and other complete scans.
- Robustness against object truncation unlike iterative algorithms such as SART.
- Short processing times similar to Feldkamp reconstruction. For instance, a helical dataset is typically reconstructed >10 times faster with TXR than with SART, thanks to the direct analytical conversion.

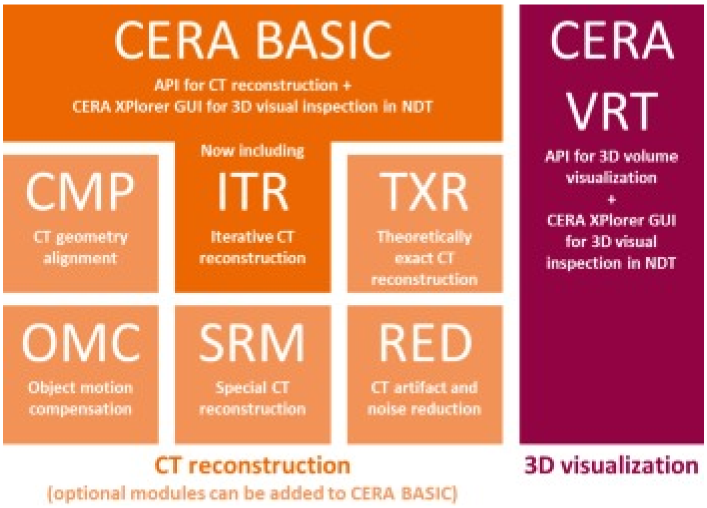
Enhanced iterative reconstruction for planar CT and AXI 3D



Enhanced iterative reconstruction from a low-dose linear tomosynthesis data set, using the slice separation technique with low/high regularization settings (left/right)

The enhanced iterative reconstruction algorithm for oblique CT scans supports a better separation of slices (e.g. layers of an assembled PCB) as well as a faster and more robust convergence as compared to standard iterative reconstruction algorithms like SART.

CERA BASIC 4.0 includes ITR module



CERA 4.0 software module overview (CMP, OMC, SRM, TXR, and RED are add-on modules for BASIC 4.0. OMC is not available for industrial CT)

The new BASIC 4.0 reconstruction package includes the former add-on module ITR with iterative reconstruction in addition to the highly efficient image pre-processing and FDK reconstruction. Hence, BASIC 4.0 supports both high performance and flexibility for applications and trajectories such as circular CT, robotic CT, planar CT, or 3D automatic X-ray inspection.

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