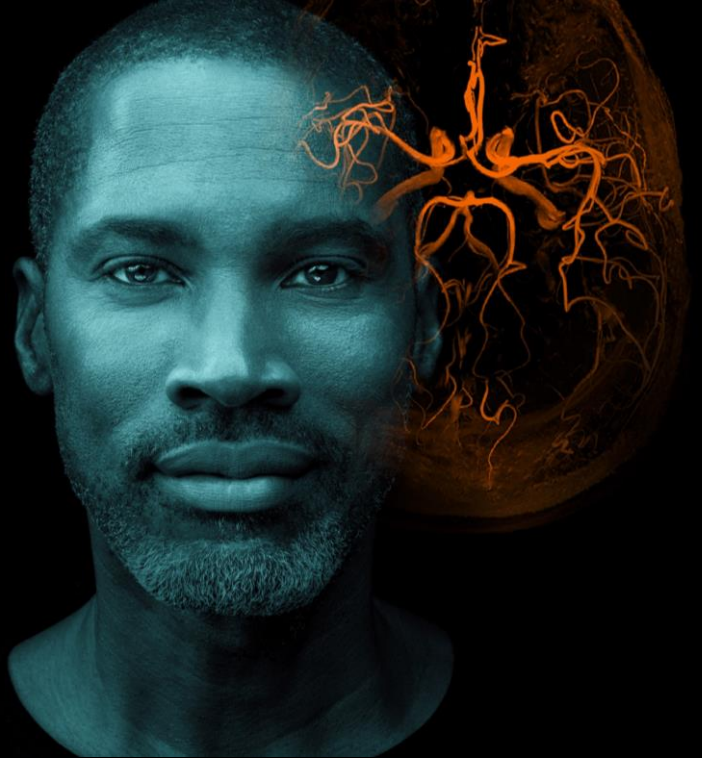
September 2023

CERA 7.0
Your 3D X-ray Imaging Backend



The scientific overlay is not that of the individual pictured and is not from a device of Siemens Healthineers. It was modified for better visualizat

Highlights at a Glance

Redesigned 3D Backprojector

CERA XPlorer Enhancements

Metal Hardening Reduction

Projection Inferencing Interface

Extension to Phantom Based Alignment

Dear CERA Customers,

building upon innovations from our medical imaging background and nourished by trends and developments from a multitude of imaging markets, the Siemens Healthineers CERA software developed into the cutting-edge 3D X-ray imaging platform that you know.

CERA's flexible, modular design allows you to comfortably augment your 3D software applications with product-ready, high-performance algorithmic modules, according to your specific needs. Access to our source code examples, to our direct technical support and to our lean, intuitive CERA XPlorer supports fast integration and helps to short-cut the path from idea to product.

Today, we are excited to announce the release of CERA 7.0. It comes with a redesign of core functionality, and offers several exciting new features and enhancements that can be utilized to differentiate your product in terms of performance and workflow. Highlights of the new version are summarized in this newsletter.

If you have questions regarding the use or evaluation of CERA, do not hesitate to talk to us and find your software expectations to be met.

Sincerely yours,

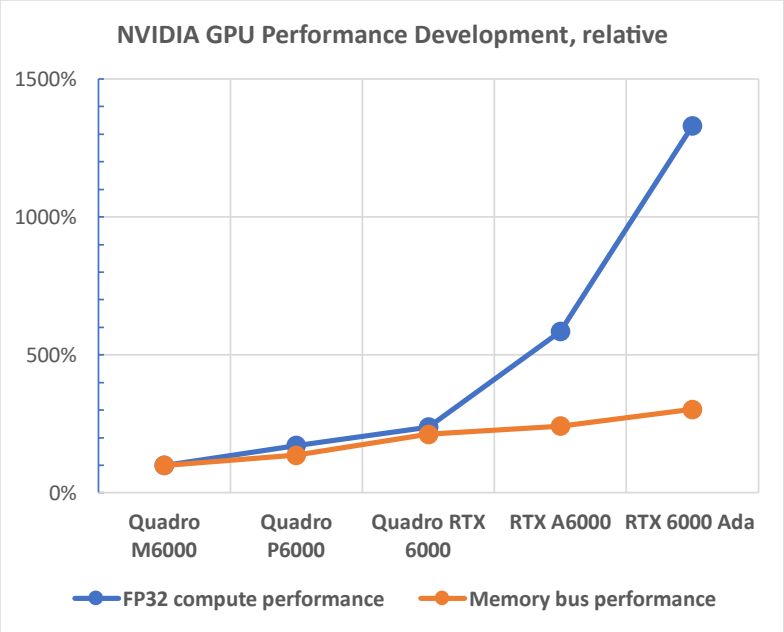
The Siemens Healthineers CERA team

SIEMENS Healthineers

Redesigned 3D Backprojector

3D backprojection is at the heart of any 3D X-ray reconstruction algorithm. It is an essential, computationally demanding operation, and needs to beneficially handle large amounts of data on hardware with potentially heterogeneous resource availability.

In CERA 7, the backprojector has been entirely redesigned, taking into account that I/O performance has developed differently than compute performance, which relocated dataflow bottlenecks over the years. Backprojection is now based on a dynamic work unit distribution rather than on a static, synchronous sequential streaming approach. Former CERA streaming strategy choices, which were not always intuitive to implement for users, are thus now obsolete. A dynamic optimization model can be used to finetune the workload balancing for a given set-up and problem size. Compute hardware, also heterogeneous multi-GPU set-ups, can be better utilized.



Information source: geizhals.de

CERA XPlorer Enhancements

The CERA XPlorer now allows for user-side and integrator-side customization of UI elements and enables the inclusion of other languages. Furthermore, high-resolution displays are better supported.

Furthermore, the CERA XPlorer can now be hosted on the cloud-based Siemens Healthineers Smart Simulator platform. It is thus available for on-demand access to you or your end-customer through a web browser - even on thin clients and mobile devices. Please get in touch with us to evaluate this set-up for your workflows.

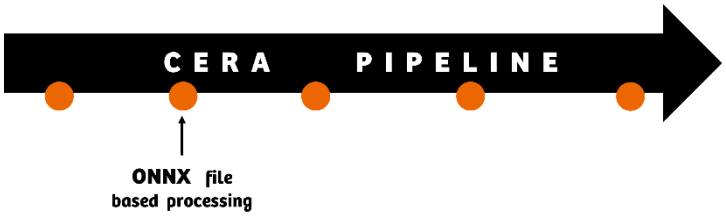
Metal Hardening Reduction

CERA 7 introduces a metal hardening reduction (MHR) algorithm that is designed to empirically tackle beam hardening effects that are caused by local image structures.

MHR thus enables you to significantly improve image quality for data sets consisting of a complex geometric mix of both strongly and weakly attenuating materials, such as plastic and metal. The new feature complements CERA's metal artifact reduction and is the method of choice for cases where the strongly attenuating material does completely absorb X-rays, but where it leaves residual signal for the projections.

Projection Inferencing Interface

CERA 7 offers a flexible interface to apply machine-learning-based 2D projection processing in your imaging pipeline. Machine learning models generated in your house, i.e. trained on your specific X-ray projection data and with your specific application in mind, can thus readily be integrated into your product. CERA's machine learning interface is based on the ONNX file format, a standard in the machine-learning community. Possible applications include projection denoising or deblurring, or application-specific enhancement of key image features. In addition, the ONNX format allows to apply system-specific projection processing algorithms such as flat-field corrections and those algorithms can be adapted by simply changing their ONNX-description.



Extensions to Phantom Based Alignment

CERA 7 introduces several enhancements to the phantom-based alignment (PBA) functionality, which can now take advantage of prior knowledge of the acquisition geometry to achieve faster and more reliable workflows. Also, geometries that are defined projection-specific (for instance using projection matrices or SOUV-vectors) can now be transformed into globally parameterized geometries (such as circle or helix parameters).

Questions?

cera-support.team@siemens-healthineers.com

Published by Siemens Healthineers AG