

# Use of Recast3D for real-time reconstruction

Z. Huang

ziyu.huang@stfc.ac.uk

## Ziyu Huang

Central Laser Facility, STFC Rutherford Appleton Laboratory,  
Harwell Campus, Didcot, UK

## Tinesimba Zata

Central Laser Facility, STFC Rutherford Appleton Laboratory,  
Harwell Campus, Didcot, UK

## Tom Cobb

Diamond Light Source Ltd, Harwell Science & Innovation  
Campus, Didcot, UK

## Jacob Filik

Diamond Light Source Ltd, Harwell Science & Innovation  
Campus, Didcot, UK

## Introduction

This paper introduces our work on developing a distributed real-time tomography reconstruction platform for EPAC based on Recast3D, with the collaboration of Diamond Light Source (DLS).

Recast3D is a visualization software for tomographic imaging based on-demand reconstruction of arbitrary slices, and is built for use in a distributed, real-time, and online construction pipeline.

## System Architecture

In this platform, we firstly scan objective by degrees and capture arbitrary slice images from detector camera which has integrated into EPICS environment by AreaDetector, then adopt Apache Kafka as the data broker to store serialized images data. When the Recast3D runs, it will consume the images data from Kafka server, deserialize, reconstruct and display the quasi-3d image into user interface. Figure 1 shows the raw scanned slice images and reconstructed 3D image in Recast3D.

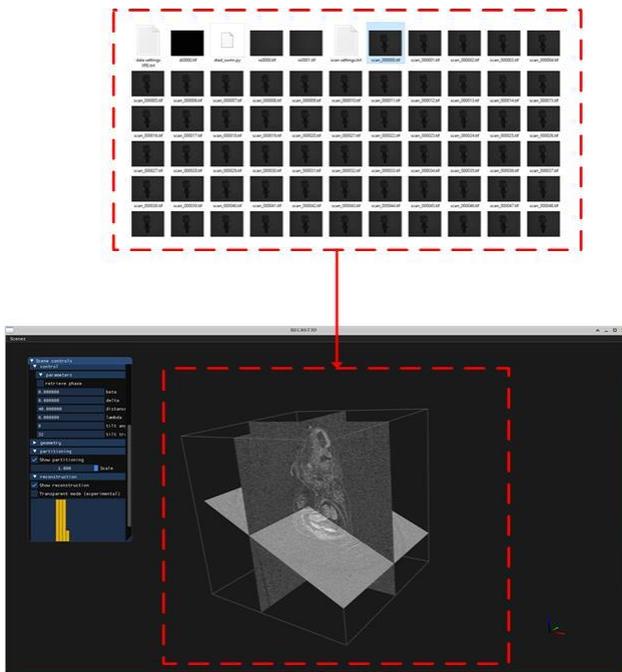


Figure 1: The raw scanned slice images and reconstructed 3D image in Recast3D

## Performance Test

Currently, we adopt NVIDIA GTX 1060 with 6 GB GPU memory as the graphic card. Recast3D supports image data downsample thus we conduct the reconstruction speed tests with different sampling parameters. From the tests, a set of 512\*512\*90 images need cost 17.08s (189.7ms/image) to reconstruction, a set of 1024\*1024\*180 images need cost 29.10s (161.7ms/image) to reconstruction, and a set of 2048\*2048\*361 images need cost 123.44s (341.9ms/per image).

## Conclusions

Recast3D is a useful real-time tomography reconstruction software toolkit, we established prototype platform and did the performance tests. According to the results, we can notice that the reconstruction time will get slow with the increase of images number and resolution. Thus for the next step, we prepare to purchase a more powerful GPU to continuously reduce reconstruction time.

## Acknowledgements

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## References

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