

EXXIM - all you need for cone beam tomography



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May 4 2009



European – Silicon Valley Entrepreneurship

- What can we learn from European entrepreneurs (if anything)?
- Personal story
- Exxim and Animage
- What's European about it?
- What is Silicon Valley specific?

The Personal Story

Background in Germany and Switzerland

Studied Physics at Universities of Erlangen/Nurnberg and
Freiburg/Germany



The Personal Story -2

PhD work at CERN in Geneva, Switzerland:
Charm quarks, neutral currents, PSI-particles 3.1 GeV/c
Competition with SLAC and MIT/Brookhaven

→ Do something of fundamental importance



Personal Story - 3

- SIEMENS Healthcare in Erlangen Germany
- CT, Angiography, cross-modality work
- VP Engineering
- Head of Basic Research
- Concept Intrapreneurship



Personal Story - 4

Founding of Exxim Computing Corporation
in 2002 (Extreme X-ray IMaging)

- 3 people, 2 products:
 - COBRA software and
 - LIDO active pixel array for detectors

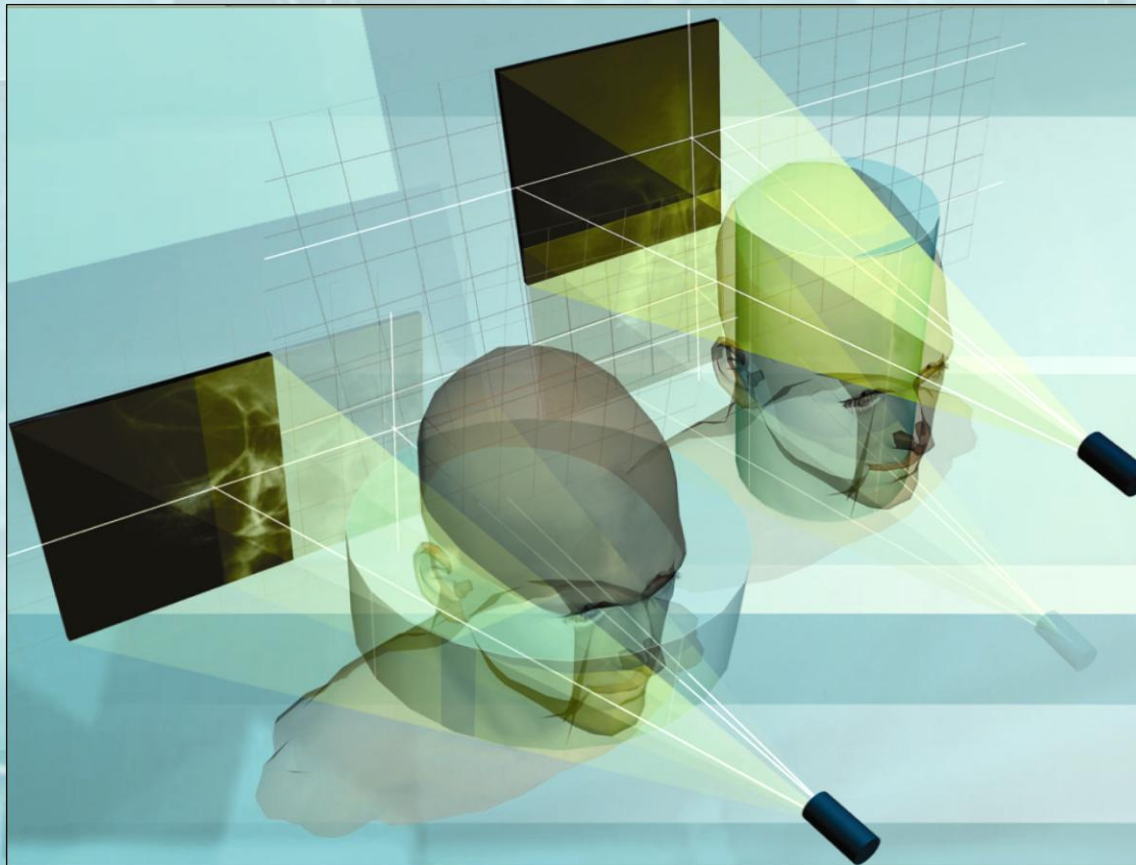


Exxim. Our team

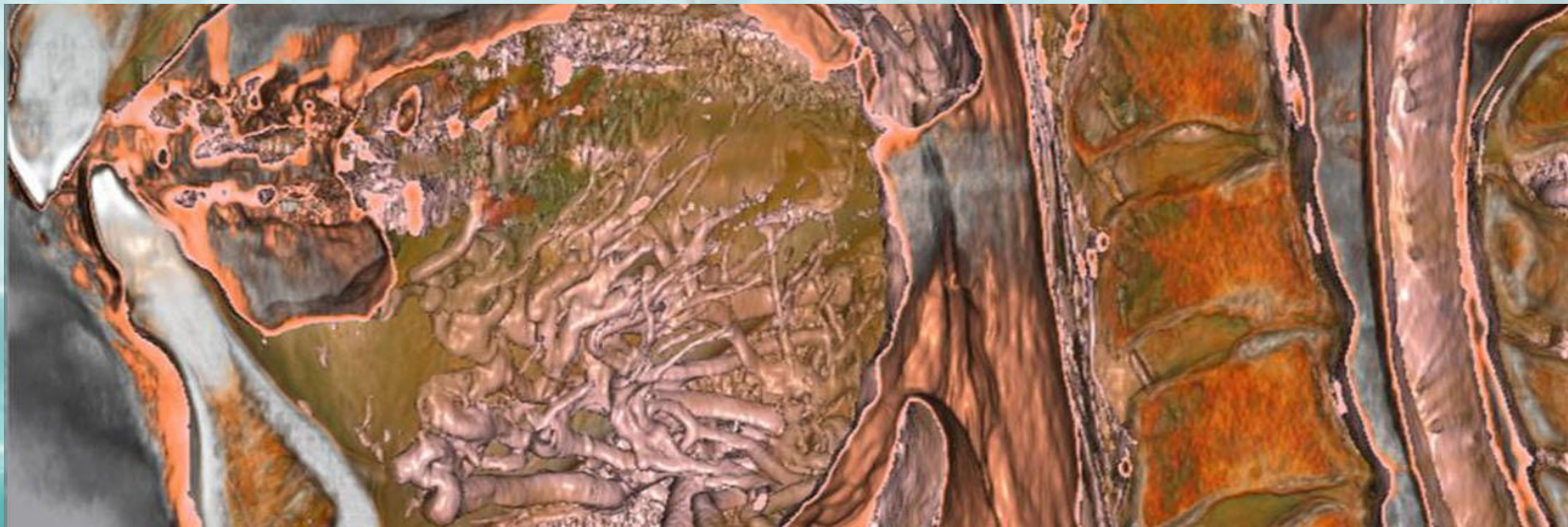
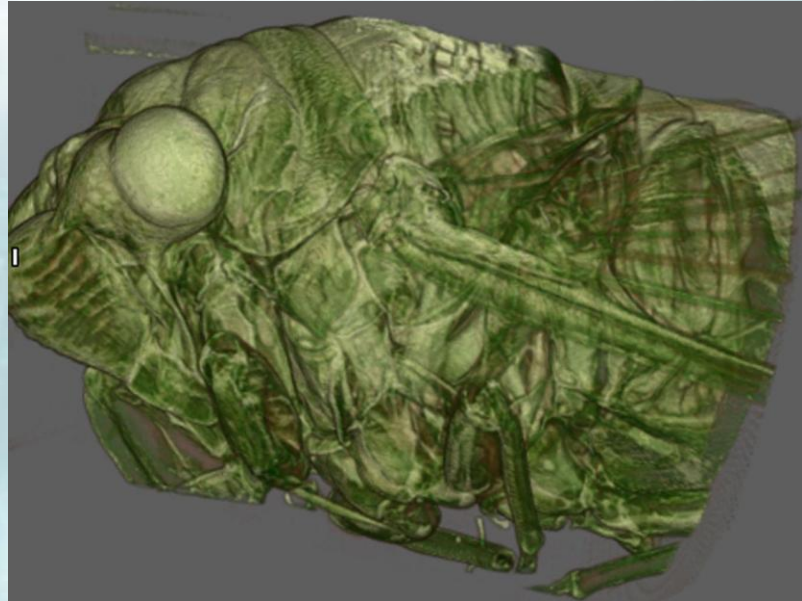
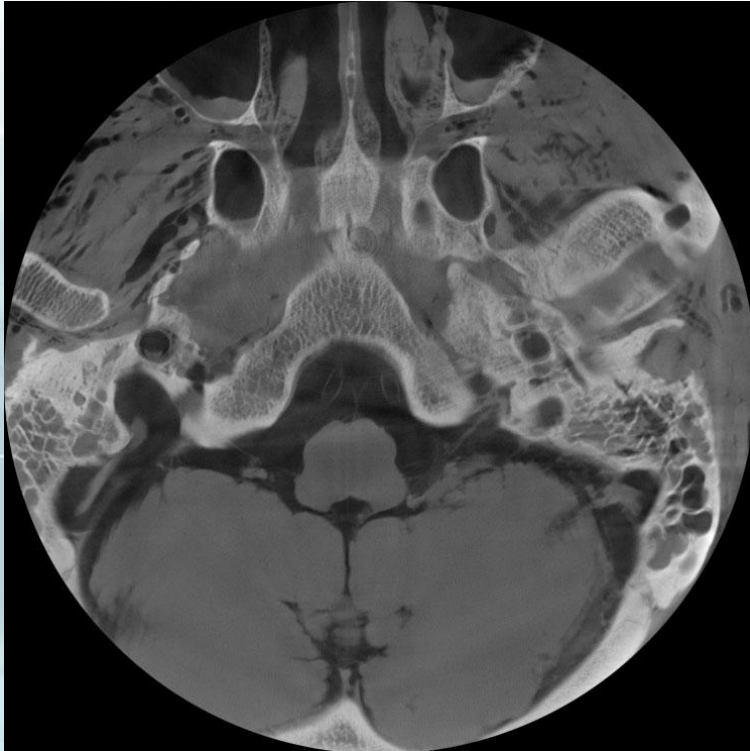


Calculates tomographic slices from a set of 2-D projection images: Cone Beam Tomography

COBRA supports a wide spectrum of scanner hardware configurations



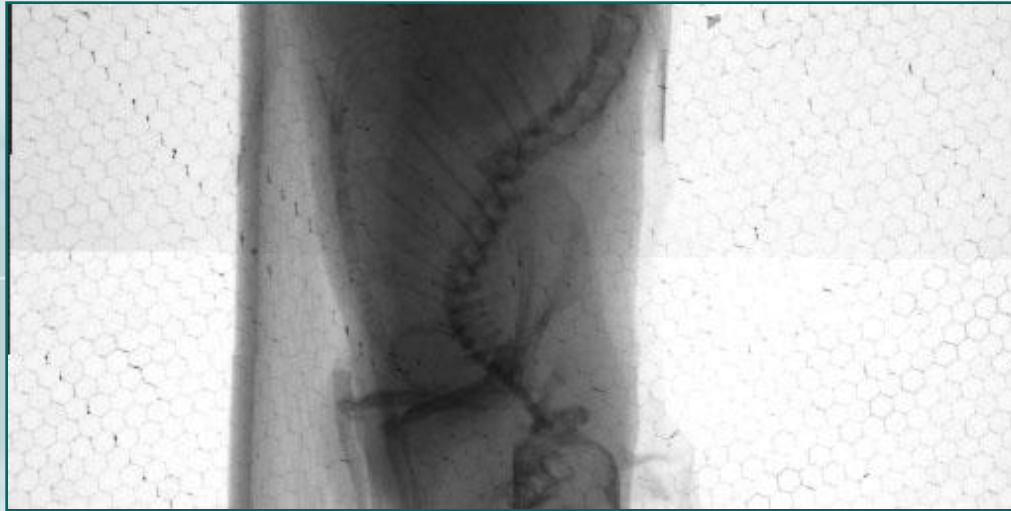
Clockwise: transaxial slice, surface rendered insect, sagittal cut into volume rendered head image



Can be setup on a wide spectrum of computer hardware:
laptops, desktops, desktops with powerful graphics cards (nVidia
Geforce), and network (Cobra Cluster Solutions)

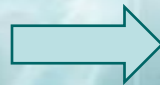


Based on Feldkamp's algorithm

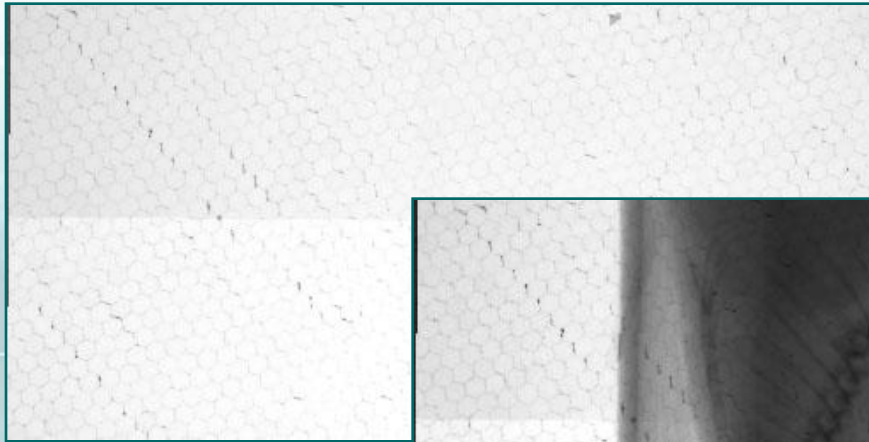


**Raw (intensity values)
projection**

**Air raw (bright field)
projection**



First step of Feldkamp's algorithm: converting input data to attenuation projections

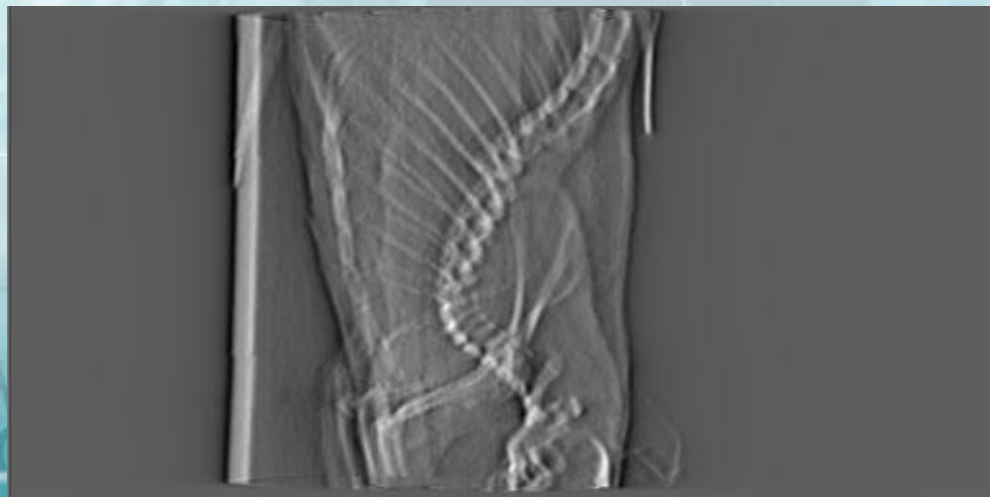
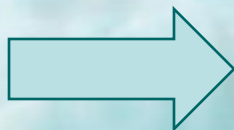


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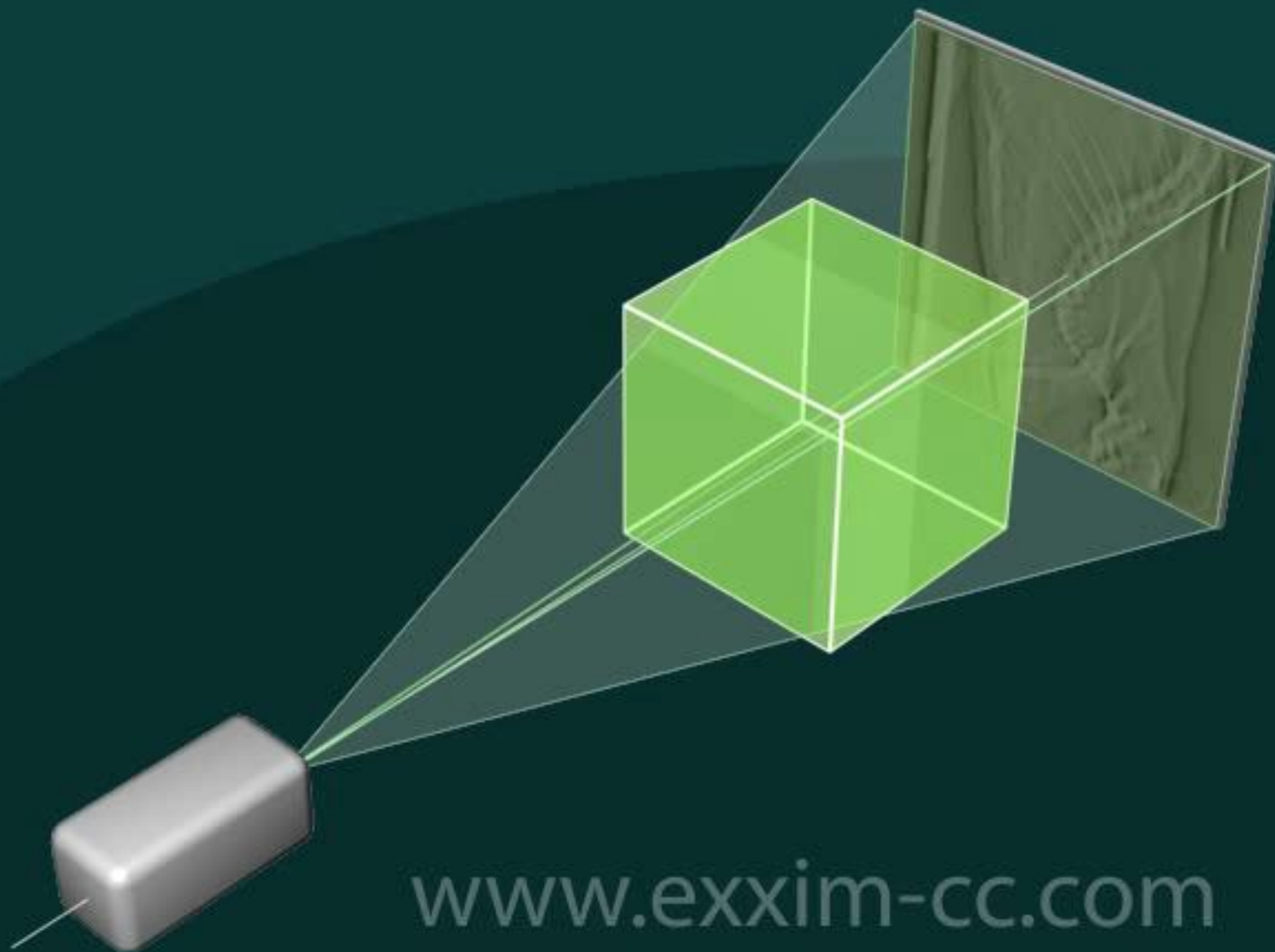
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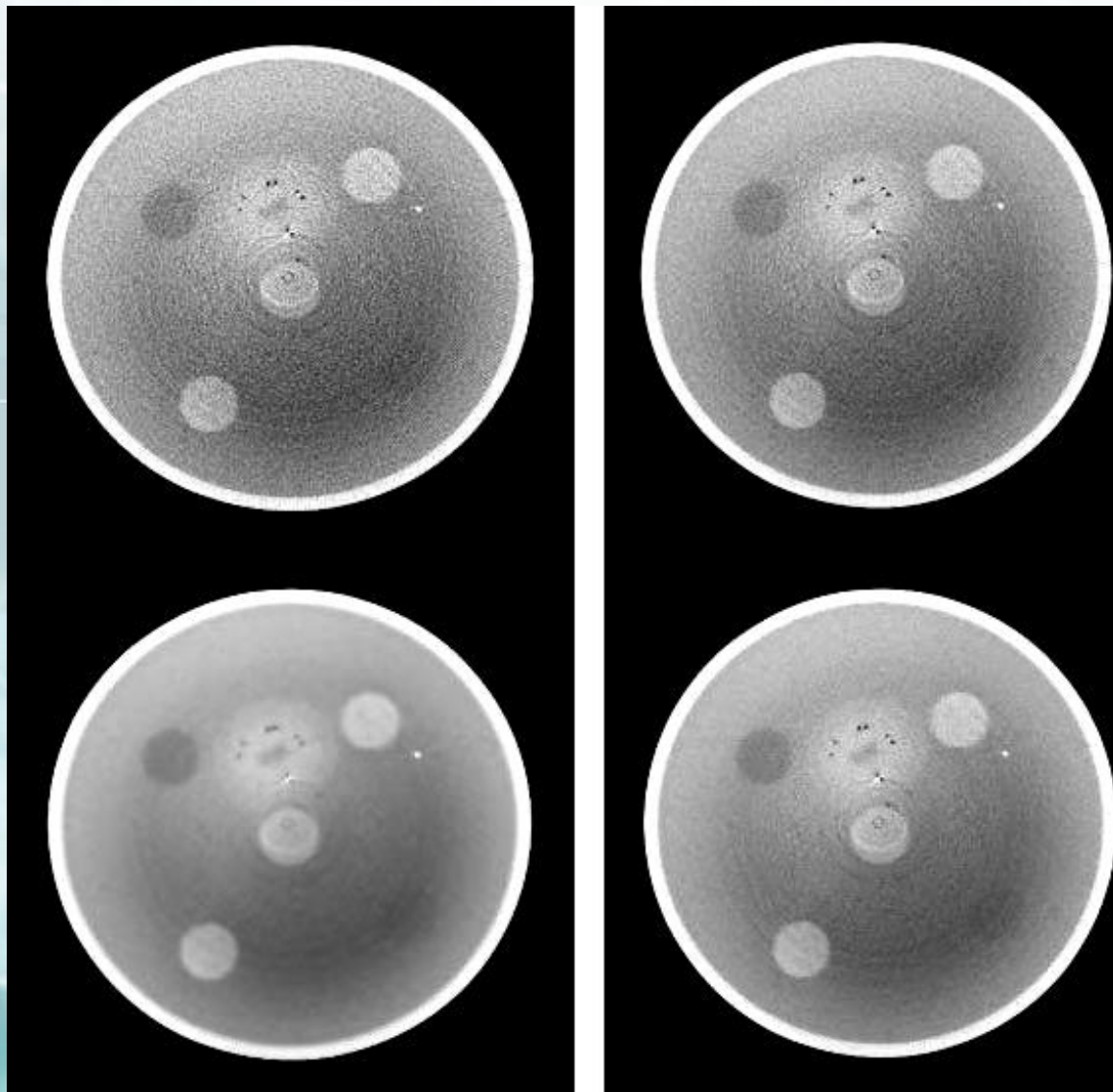


Second step of Feldkamp's algorithm: filtering attenuation projections



Third step of Feldkamp's algorithm: backprojecting and accumulation





Incorporates correction algorithms making output images more accurate and visually pleasant:

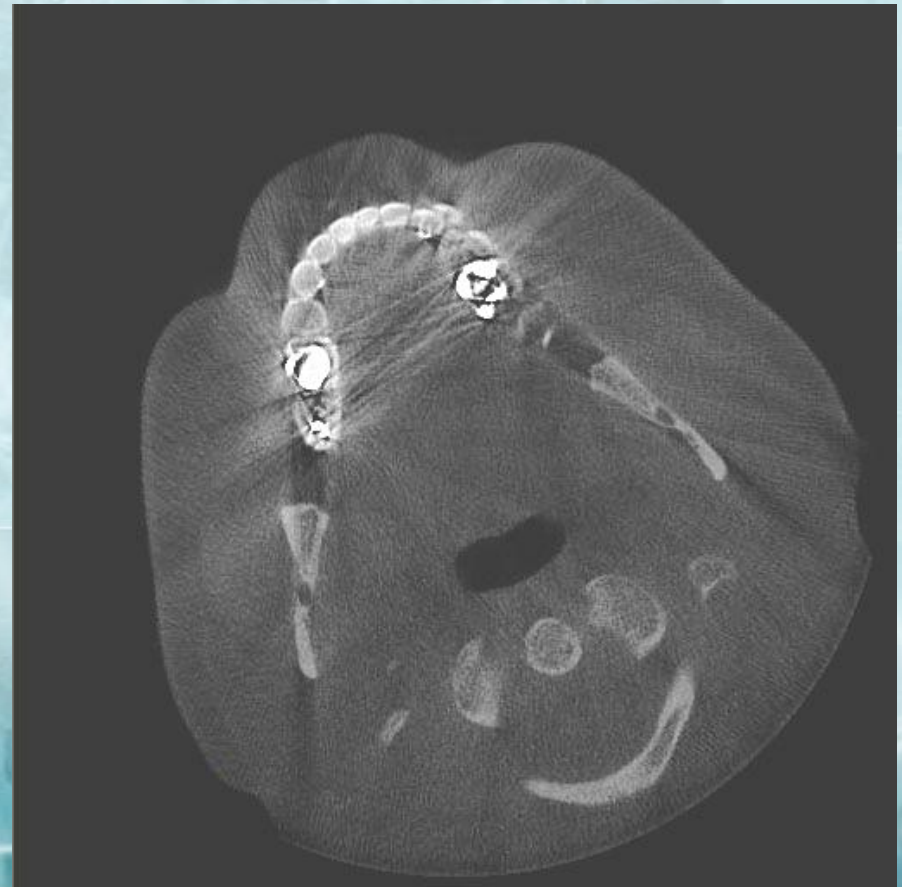
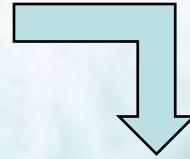
- post-reconstruction noise reduction,
- metal artifact reduction,
- water-level density auto-calibration



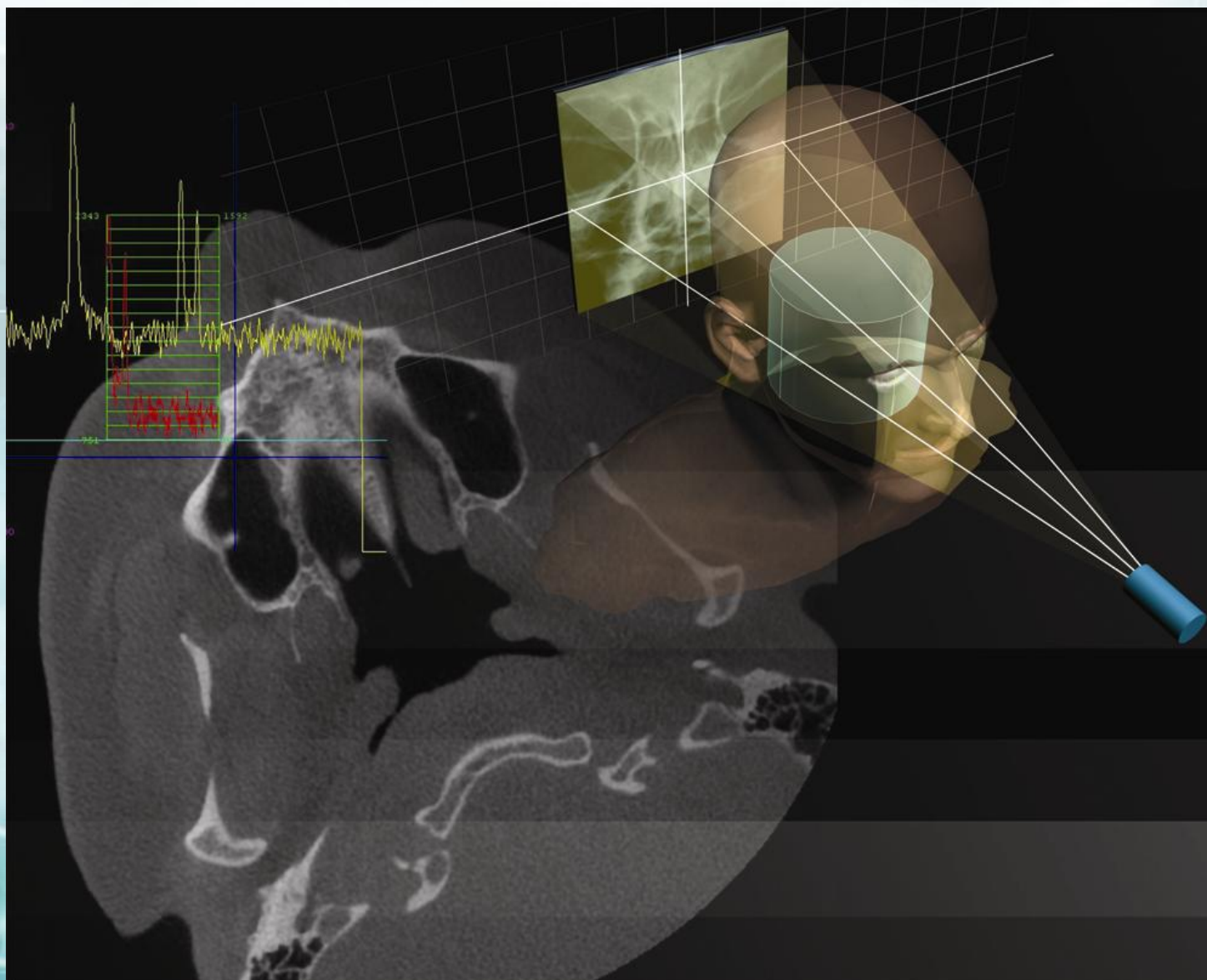
Noise reduction when different factors applied



Important for dental
applications



water-level density auto-calibration



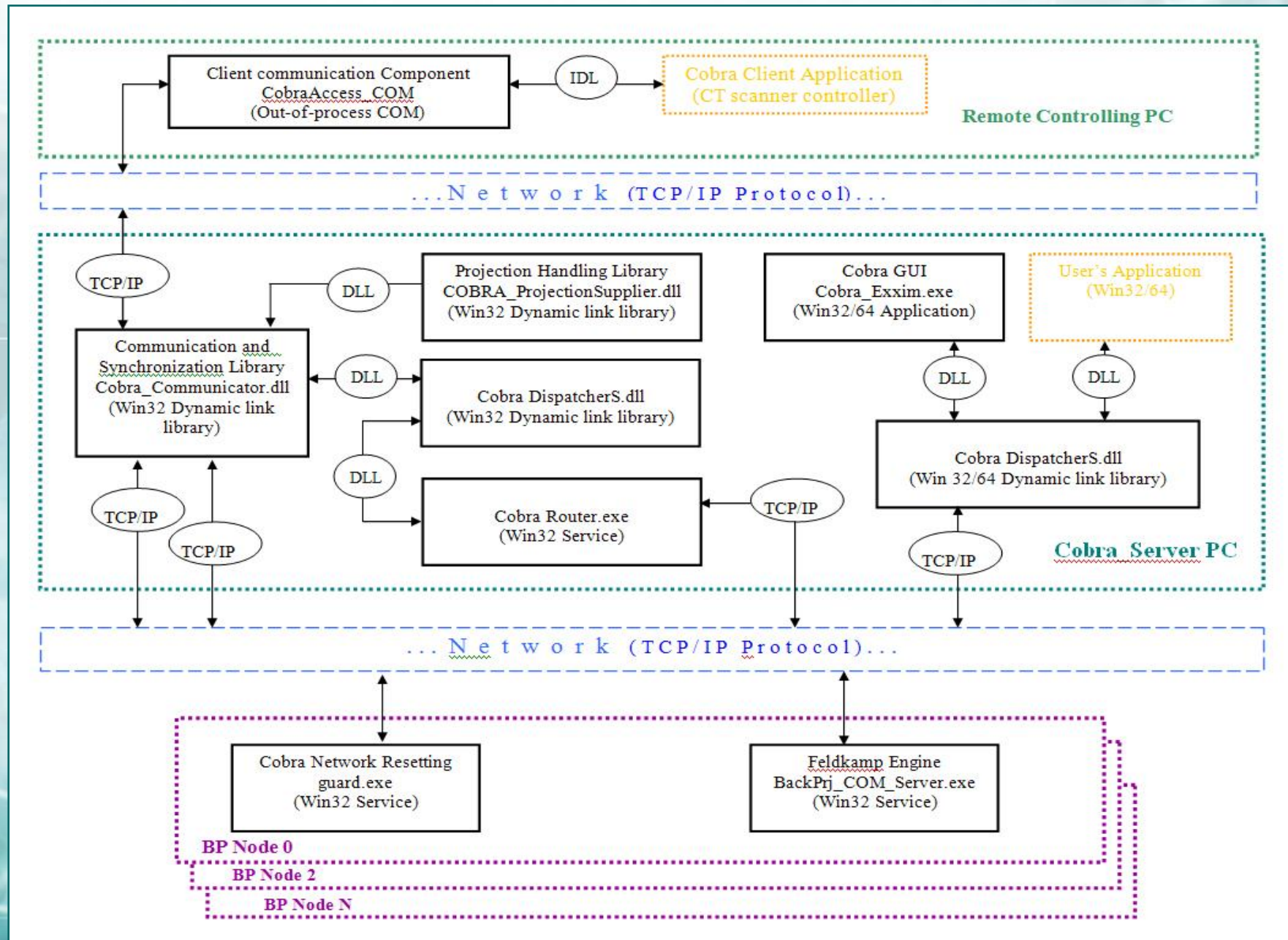
Useful optional features:

- DICOM output,**
- Arbitrary output volume size (cubes even bigger than 4096x4096x4096 can be reconstructed),**
- Output volume origin offset and volume flips,**
- Built-in geometry calibration utility,**
- Accepting input projections containing intensity or logged attenuation values**

Cobra performance

Dual-core 3 GHz PC
nVidia Geforce 285 GTX installed
Windows 64-bit platform

Input data	Output Volume	Reconstruction time
512x512 512 projections	512x512x512	< 20 sec
960x768 600 projections	640x640x576	60 sec
1024x1024 700 projections	1024x1024x1024	180 sec



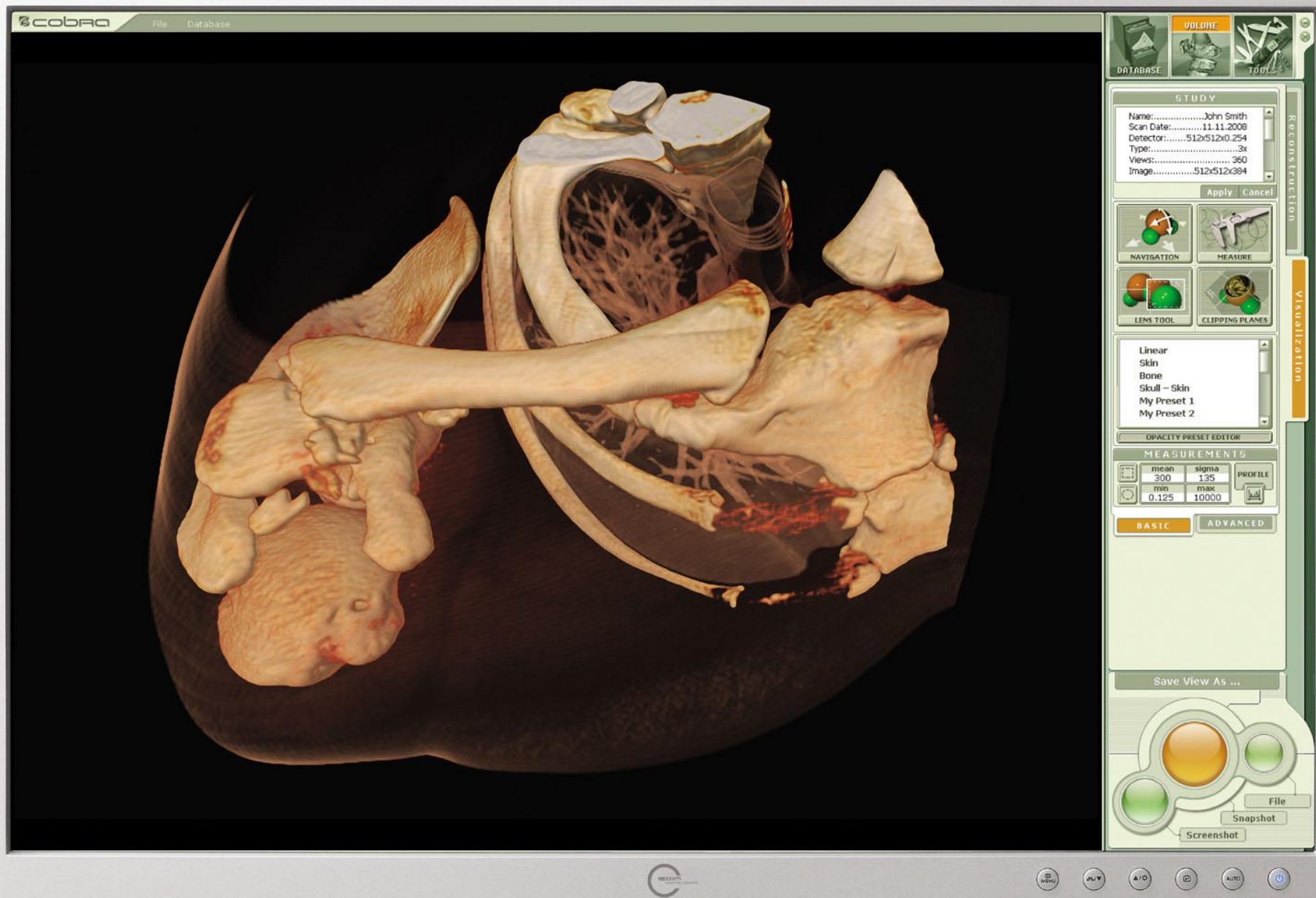
```
char company[]          = "YourCompanyName";
char serialNumber[]     = "YourLicense";

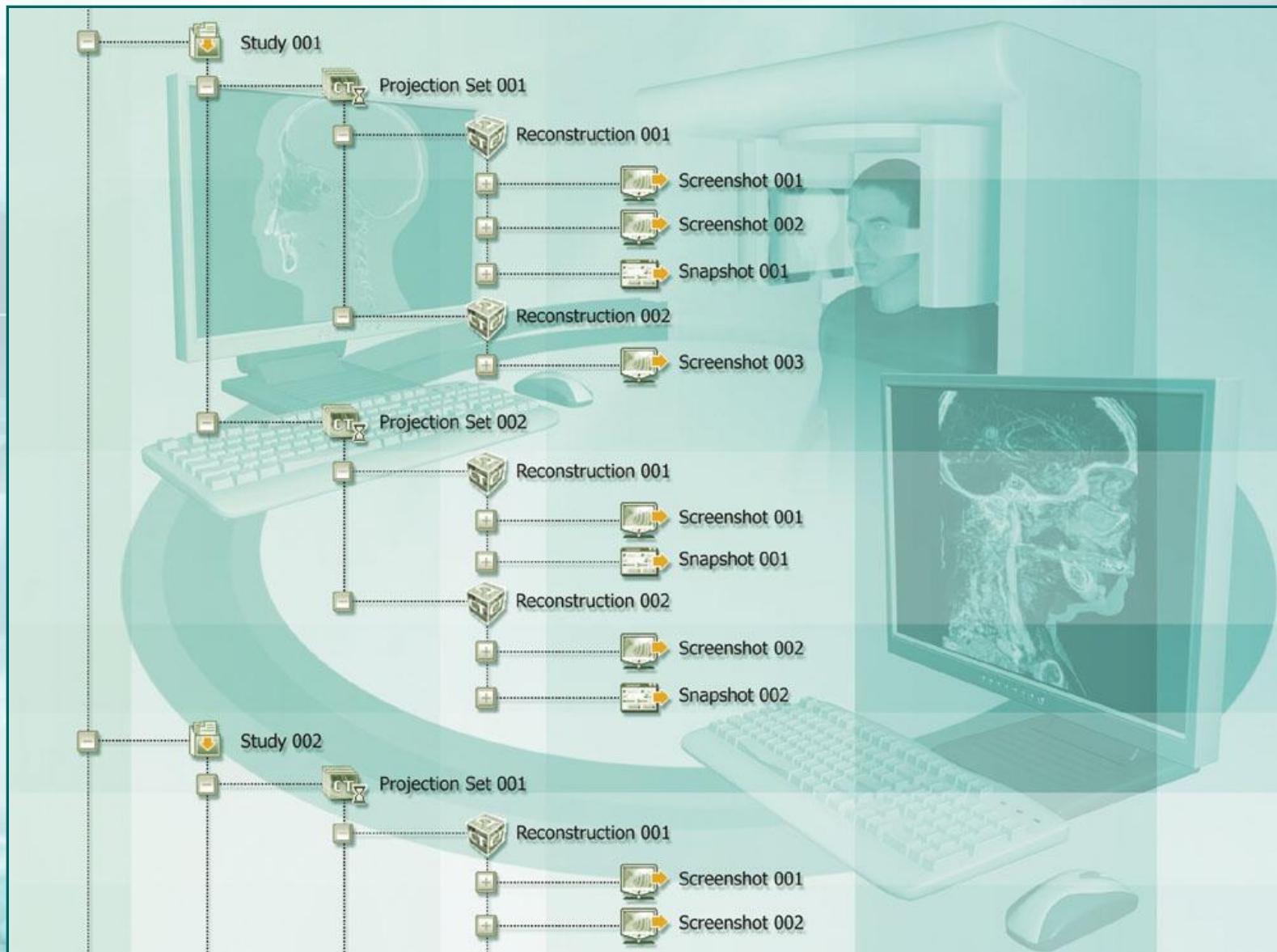
DWORD result = 0;

// *****          Init          *****
result = CobraDispatcher_Init(company, serialNumber);
result = CobraDispatcher_Communicate();
result = CobraDispatcher_SetReconMode(
        BPMODETAG_CONEBEAM | MODE_OFFLINE);

// *****          Set parameters from file          *****
CobraDispatcher_SetParametersByFile(cParFileName);

// *****          Reconstruct          *****
result = CobraDispatcher_TerminateReconstruction();
result = CobraDispatcher_ResetReconstruction();
result = CobraDispatcher_StartReconstruction();
```





Exxim is dedicated to continuous improvement of Volume CT software

- Increase performance**
- Add functionality**
- Mitigate artifacts**
- Open for the future**



Founding of Animage, LLC in 1/2008

Serves the veterinary radiology market with a multi-modality x-ray imager

- Volume CT
- Digital Radiography
- Digital Fluoroscopy





Only Animage: Veterinary CT, DR/CR, and fluoroscopy in one machine



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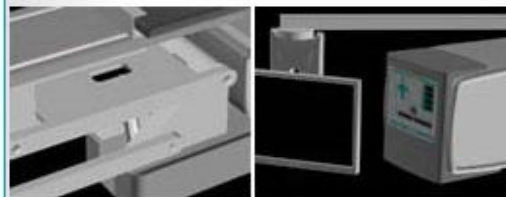
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NEWS

AAHA Phoenix, March 26 – 28, 2009

We would like to thank all visitors to our booth for their interest in FIDEX. Your comments, suggestions and encouragement are invaluable to our team. FIDEX will be available at the end of Q3, 2009.



Conclusions

- Personal goals
- Deep expertise in at least one field
- Sufficient knowledge of all other fields of the corporate world
- Access to venture capital questionable
- A bit of luck