### Algorithms and Software for Improved CT Imaging: Promotional slides for Industrial Clients

**Title:** Algorithms and Software for Improved CT Imaging: Promotional slides for Industrial Clients  
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**Abstract:** Viewgraphs/Briefing Charts

**For presentation for Promotional slides for Industrial Clients (September 2015)**  
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Algorithms and Software for Improved CT Imaging

Promotional slides for Industrial Clients

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x-ray detector array

Axial scan

x-ray source
tower

4 ½ ft

distribution

motor

x-axis ball-screw bellows

turntable

x-ray source

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3D ANDES Viewer, showing a 3D phantom, which simulates an aerospace component, overlain with graphics that indicate locations of potential defects. The 3D viewer, with other analysis tools enable the capability to evaluate true positive detections from false positive detections.
Traverse mismatch correction

Example of the data corrections using an aerospace component. (a) The artifactual streaks are due to unavoidable geometric misalignments, called traverse mismatch. (b) Image resulting from the automatic detection and correction of the data for these misalignments.
Traverse mismatch correction

corrected

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Traverse mismatch correction

corrected

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Traverse mismatch in the sinogram
Example of the data corrections, using a small ROI of an aerospace component. (a) The artifactual streaks are due to high-Z and beam hardening. (b) Image resulting from the corrections. Other data corrections have similar remarkable impact on image fidelity.
Railroad track correction

corrected

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railroad track  corrected

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Frequency spectrum of the columns of the sinogram

oscillations due to mechanical resonances and other effects
Aliasing

corrected
better -
linear interpolation
best -

directional interpolation

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Aliasing

corrected
Aliasing

corrected
Railroad Track Artifact
How it affects the sinogram

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Resolving power enhancement
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Filtered backprojection

EM

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~ 8 mm

FBP

FEMOS
SR=1

FEMOS
SR=3

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~13 mm

FBP

FEMOS
SR=2
~13 mm

FBP

FEMOS
SR=3
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FBP

FEMOS
SR=1

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~20 mm
Low photon flux due to high attenuation

Filtered backprojection  EM

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