Innovations
UNIVERSITY OF COLORADO
ANSCHUTZ MEDICAL CAMPUS

# Sharpening CBCT Images by Diminishing Scatter

## Product

A novel antiscatter grid for CBCT that allows for quantitative assessments and improved visualization

## Indication

Broad applicability in fields such as dentistry, orthopedics, interventional radiology, and diagnostic imaging

## Value Propositions

- Enabling technology for novel quantitative CBCT imaging applications
- Improved low contrast object visualization
- Reduce scatter intensity up to 6x
- 20% more primary x-rays transmit to the image receptor
- Customizable for different CBCT systems

## Market – CBCT Systems

- $693.5 million in 2030*
- CAGR: 4.6%*

*based off 256-320 slice CT Systems

## Intellectual Property

- US Patent 11,224,389
- US Patent 17/572,718

## Key Documents

- "A Hybrid Flat Panel Detector for Cone Beam CT Systems" Provisional Patent filed April 20, 2017
- Altunbas, Cem, et al. "Transmission characteristics of a two dimensional antiscatter grid prototype for CBCT."Medical Physics Vol 44, 8, 2473 (2017)

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## Cone Beam Computed Tomography X-ray Scattering

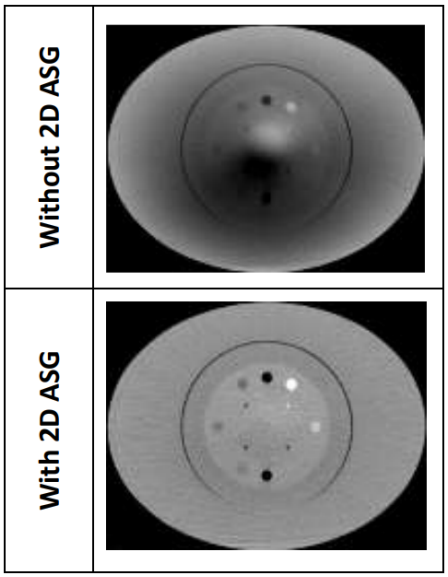
Cone beam computed tomography (CBCT) is a compact 3D imaging technology that finds applications in various medical and industrial fields, such as orthopedics, dentistry, and interventional radiology. Despite its cost efficiency and volumetric imaging capabilities, CBCT suffers from a significant drawback – its image quality is relatively poor due to the substantial volume of x-ray illumination and scattered radiation involved.

To address this issue, researchers have been focusing on antiscatter grids in recent years as a means to reduce X-ray scattering during CBCT imaging. However, the currently available commercially-produced antiscatter grids have not proven to be sufficiently effective in enhancing the quality of CBCT images for accurate quantitative measurements. This limitation impacts clinical decision-making where precise visualization of soft tissue and reliable quantitative accuracy are crucial.

## 2D Antiscatter Grid

Dr. Cem Altunbas from the University of Colorado has introduced a groundbreaking solution to mitigate scatter intensity in CBCT projections – the innovative two-dimensional antiscatter grid ("2D ASG"). This new design exhibits remarkable results by reducing scatter intensity by a factor of 3 to 6 times, while also transmitting 20% more primary (useful) x-rays to the image receptor. As a result, CBCT image quality experiences a significant improvement due to its superior scatter rejection and enhanced primary x-ray transmission capabilities, as demonstrated in the figure.

Furthermore, this advancement in technology not only enhances the visualization of low-contrast objects but also greatly improves CT number accuracy. The overall outcome is a considerable improvement in image quality while simultaneously reducing the radiation dose to the patient – a crucial advantage for maintaining patient safety during CBCT procedures.




**Advantages:**

- High image quality with reduced radiation dose to the patient
- Seamless retrofitting capabilities allowing compatibility with existing flat panel detector-based CBCT systems
- Uses a unique metal additive manufacturing process, allowing for customization to suit different imaging tasks and CBCT systems precisely



Updated: 07/21/2023