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# Novel Anti-Scatter Grid Improves Image Quality in CBCT Imaging

### Category

Cone Beam Computed Tomography

### Problem

Poor image quality of CBCT due to scattered radiation intensity.

### Technology Overview

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

### IP Status

- Provisional Patent Filed
- Available for collaborative development, or Exclusive or Non-Exclusive Licensing

### Value Proposition

- Increased low contrast object visualization
- Enabling technology for novel quantitative CBCT imaging applications
- Customization possible for different CBCT systems

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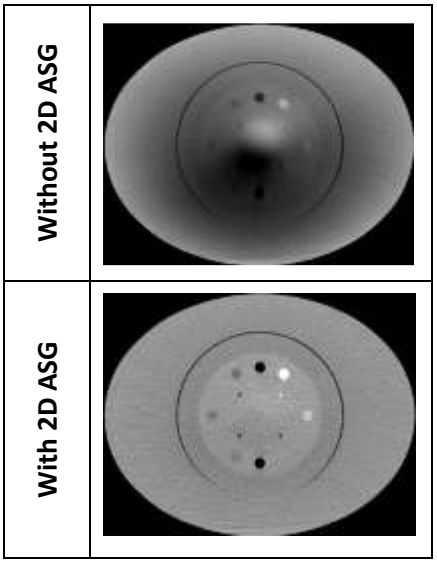
**Problem**: Cone beam computed tomography (CBCT) is a compact 3D imaging technology that has been utilized in a broad set of medical and industrial imaging applications including dentistry, orthopedics, and interventional radiology, among others. While CBCT provides cost efficient volumetric imaging capability, its main drawback is its relatively poor image quality due to a large volume of x-ray illumination and scattered radiation.

In recent years, antiscatter grids have been a focus of research to reduce X-ray scattering in CBCT imaging. However, the benefits offered by commercially-available antiscatter grids do not sufficiently improve quality of soft tissue images for quantitative measurement. In clinical applications, poor soft tissue visualization and reduced quantitative accuracy in CBCT impacts clinical decision-making. There exists a need to improve upon the antiscatter grid technology to increase CT number accuracy and contrast sensitivity in soft tissue imaging.

**Technical Solution and Key Value Propositions:** To reduce the scatter intensity in CBCT projections, Dr. Cem Altunbas at the University of Colorado introduces a novel design of a two-dimensional antiscatter grid ("2D ASG"). 2D ASG can reduce scatter intensity by a factor of 3 to 6 times, and transmits 20% more primary, or useful, x-rays to the image receptor. CBCT image quality is drastically improved due to superior scatter rejection and primary x-ray transmission capability. Additionally, low contrast object visualization and CT number accuracy is significantly enhanced (see figure).

Additional advantages for implementing the 2D ASG technology are:

1. It is capable of retrofitting with existing flat panel detector based CBCT systems.
2. 2D ASG is fabricated using a unique metal additive manufacturing process, which allows customization of 2D ASG for different imaging tasks and CBCT systems.
3. High image quality at a lower radiation dose to the patient.




**Research Update**: Currently, the 2D ASG is under development with funding from the NIH for CBCT guided radiation therapy to provide better localization of soft tissue targets, monitoring of treatment response and CBCT-based treatment dose calculations.

**Key Documents and Sources:**

"A Hybrid Flat Panel Detector for Cone Beam CT Systems" Provisional Patent filed April 20, 2017, available under CDA

Altunbas, Cem, et al. "Transmission characteristics of a two dimensional antiscatter grid prototype for CBCT." *Medical Physics* Vol 44, 8, 2473 (2017)