Volume Graphics Reconstruction Geometry and Coordinate System Conventions

The axes referred to in this documentation are as follows: the z-axis is the “vertical” axis, i. e., the upwards direction of the (optimum) rotation axis. The x-axis is perpendicular to the detector plane, going from x-ray source to detector. The y-axis is, therefore, the “horizontal” detector axis.

Fig. 1:

Geometric setup (top view)

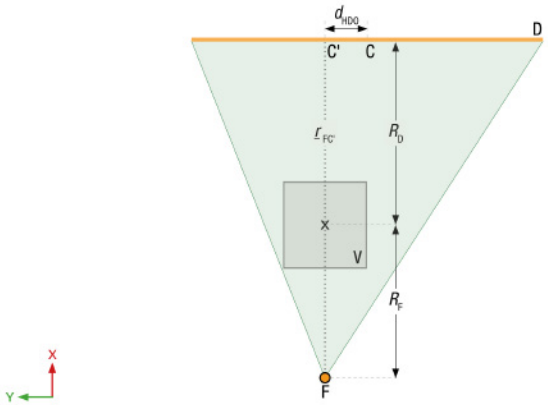


Fig. 2:

Geometric setup with reconstruction volume cube at zero angle

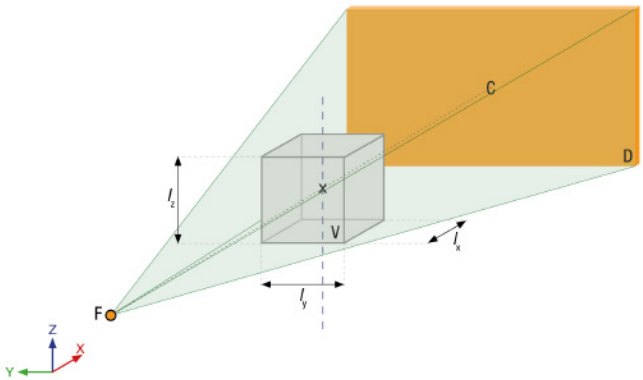


Fig. 3:

Geometric setup, detector (frontal)

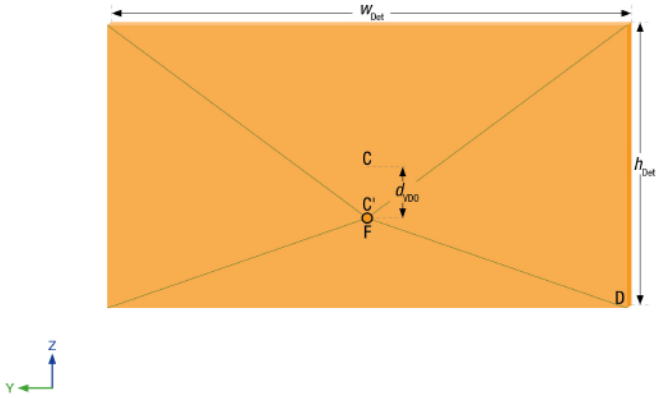
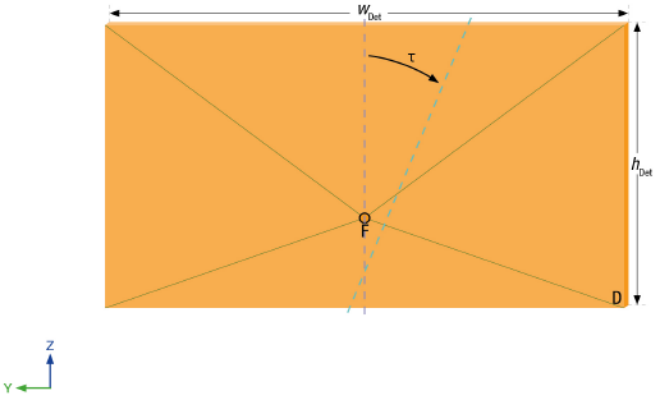


Fig. 4:

Geometric setup, detector (frontal)



Legend:

R_F	distance focus — isocenter
R_D	distance isocenter — detector
C	center of the misaligned detector
C'	isocenter projected on the detector plane
d_{HDO}	horizontal detector offset
V	volume to be reconstructed
$r_{FC'}$	center ray
D	detector
F	focus of the source
d_{VDO}	vertical detector offset
w_{Det}	detector width (corresponding number of pixels x pixel width)
h_{Det}	detector height (corresponding number of pixels x pixel height)
l_{xyz}	volume edge length (result physical size)
τ	rotation axis tilt angle

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