

CTA Camera Mechanics

Design Review

Argonne May 9, 2014



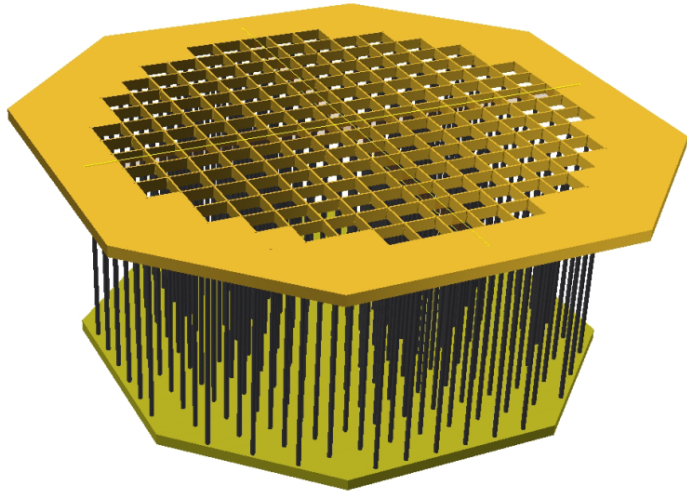
Rich Northrop

University of Chicago

Camera Mechanics

Crate / Camera Assembly

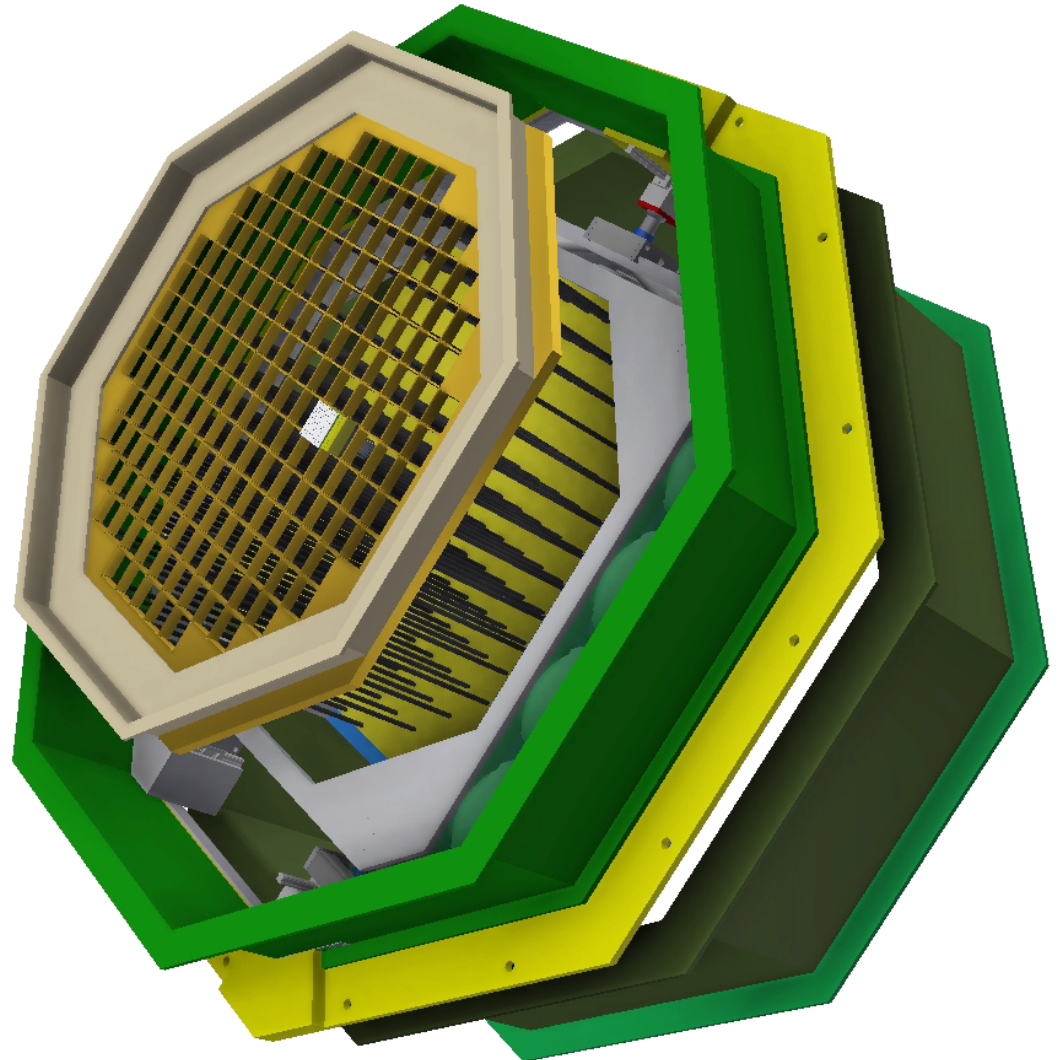
(OSS Mount Ring Not Shown)



Crate –
Top Lattice, Carbon Fiber Posts, & Bulkhead

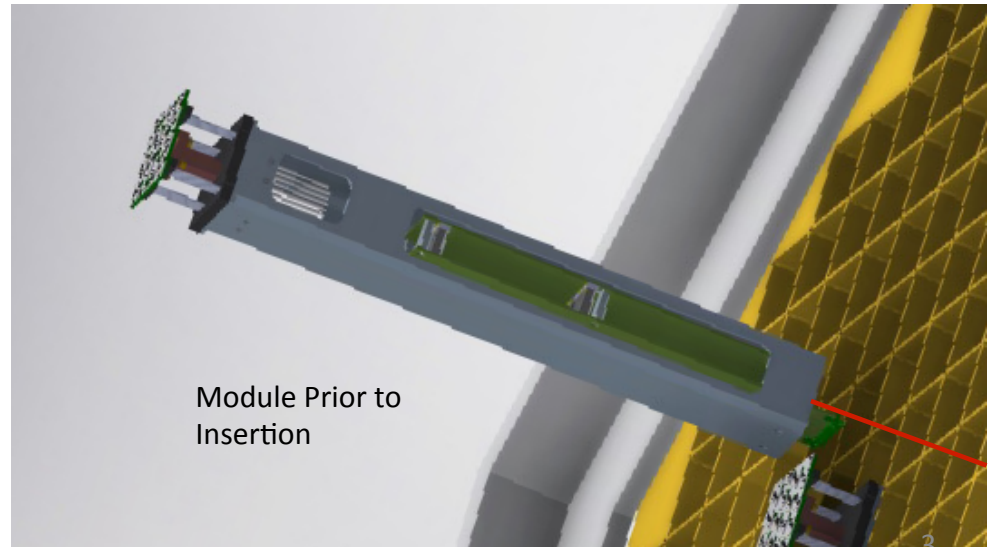
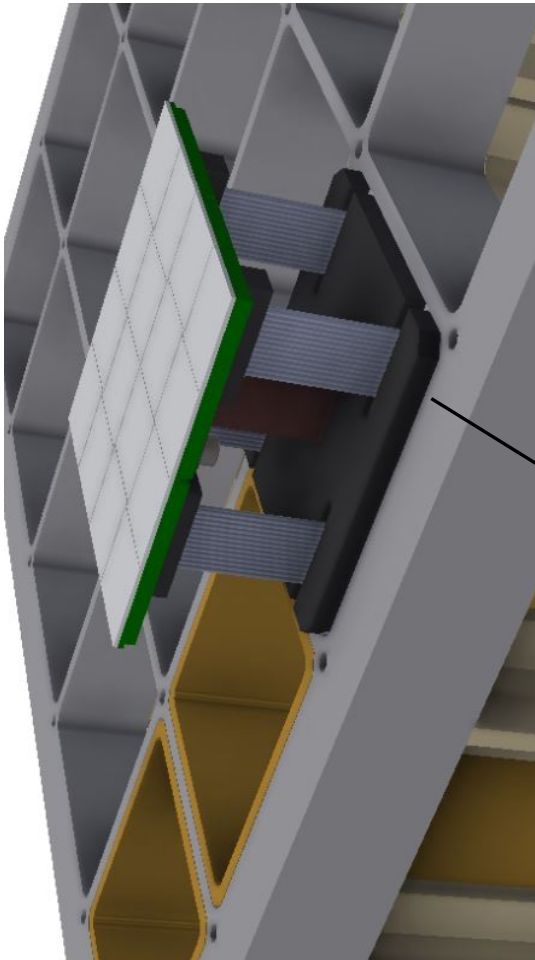
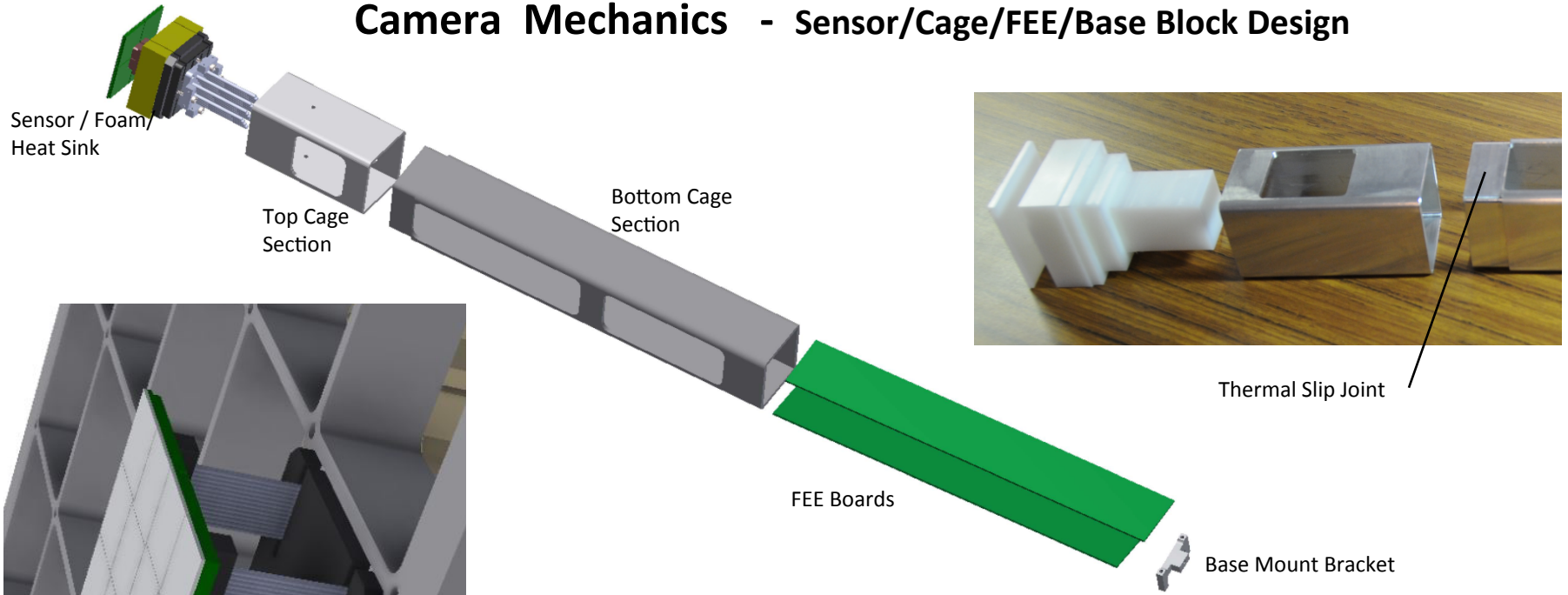
Weight of empty Crate (as shown) - 118.8 kg (262 lbs.)

Weight of Crate with 177 Modules - 264.0 kg (582 lbs.)



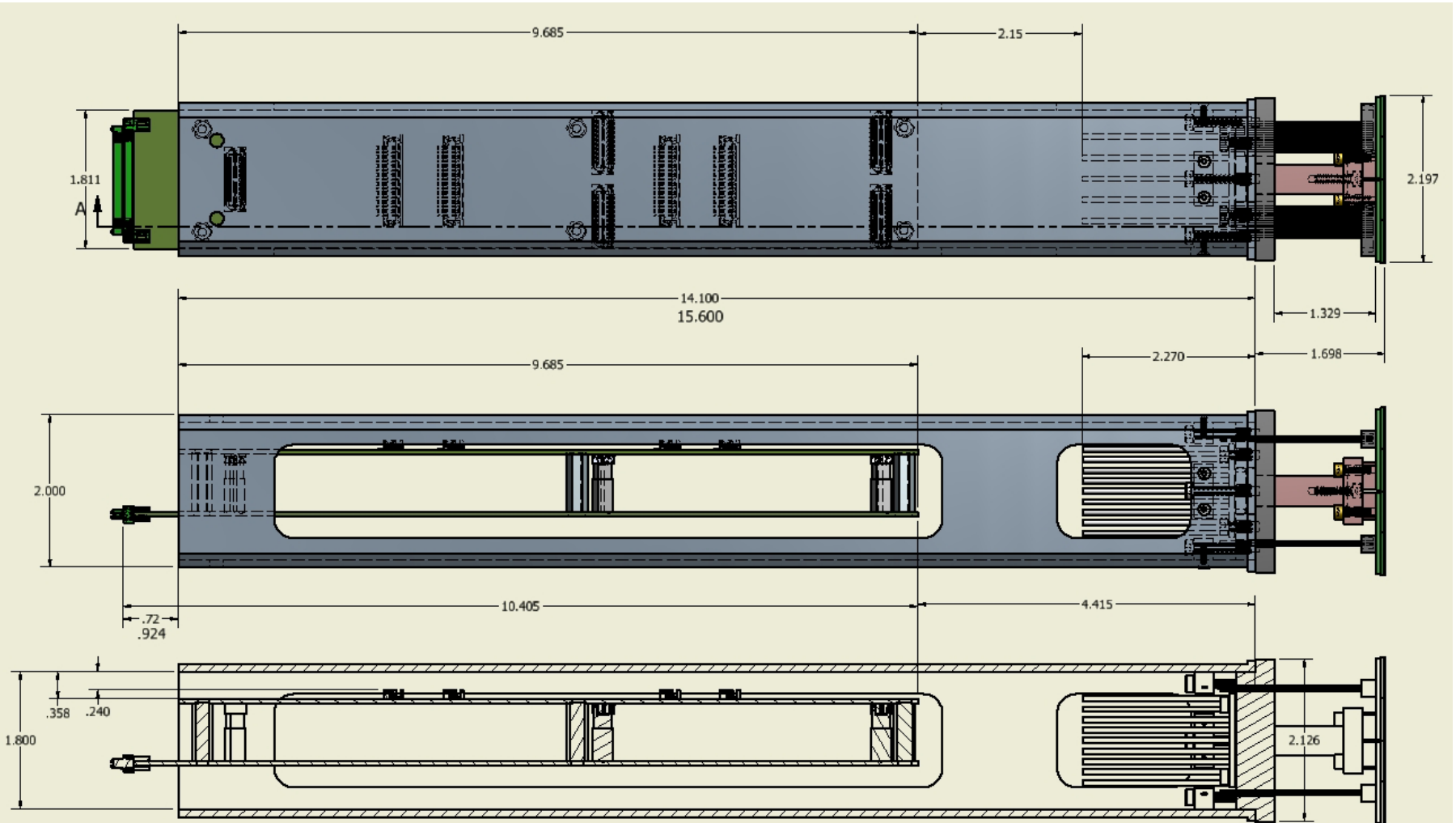
Crate with Focal Plane Box being installed into Inner Frame

Camera Mechanics - Sensor/Cage/FEE/Base Block Design



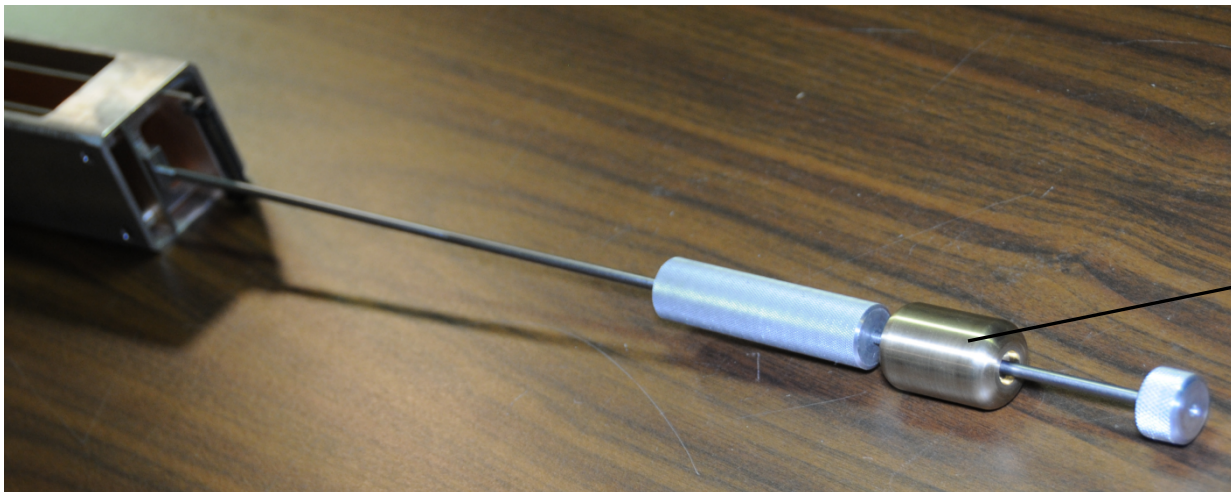
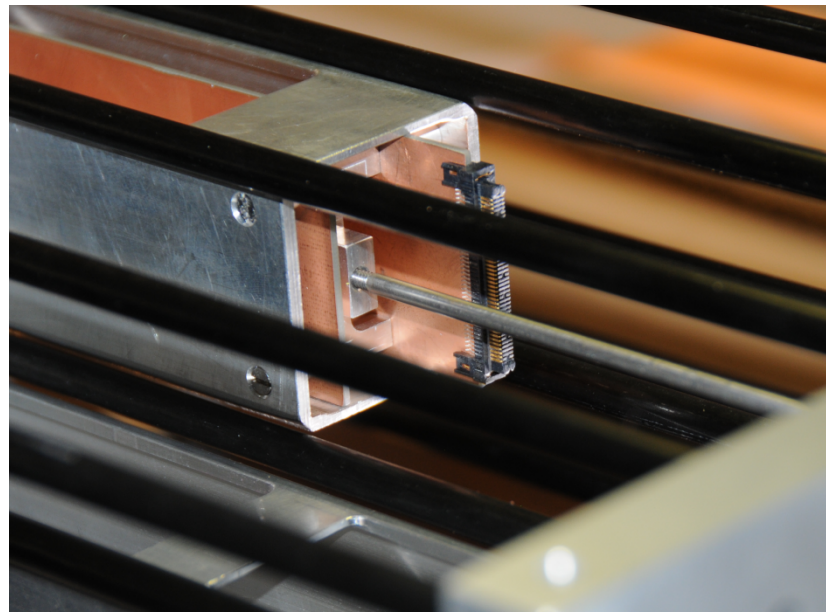
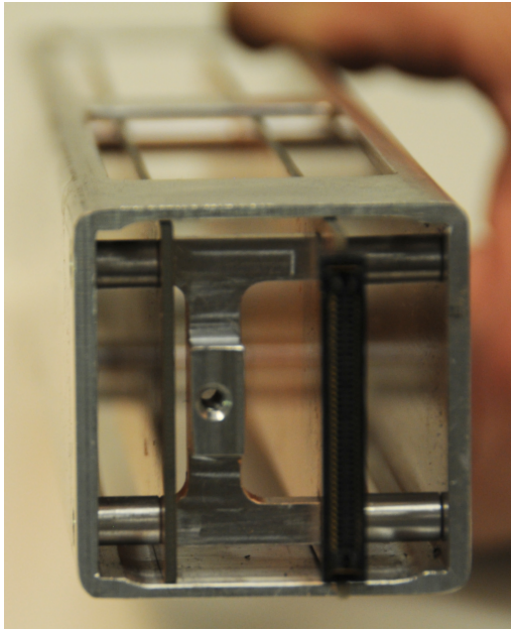
Camera Mechanics

Cage / FEE / Sensor



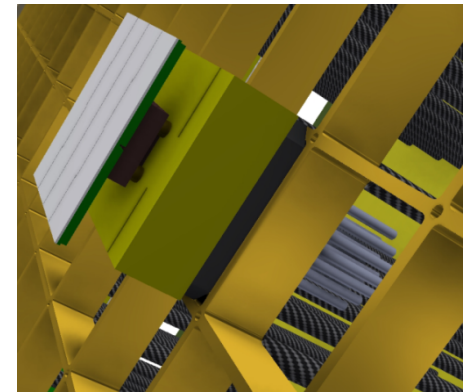
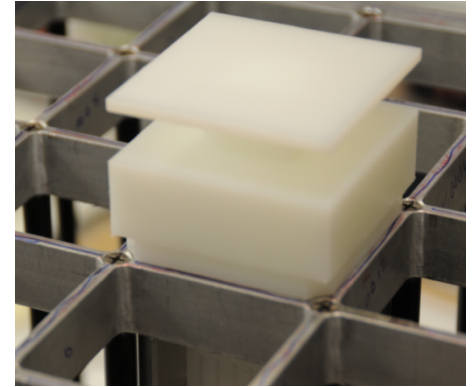
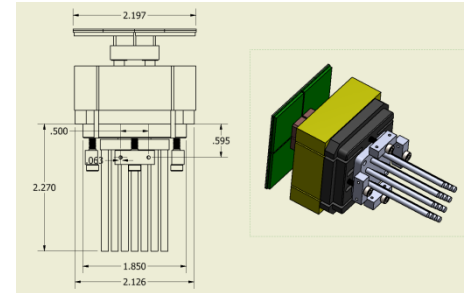
Major Revision Pending FEE Final Design

Camera Mechanics Mount Bracket / Injector-Ejector tool



Sliding Weight

Camera Mechanics 5 x 5 Test Crate / Sensor



Test Module thermal cycling tests

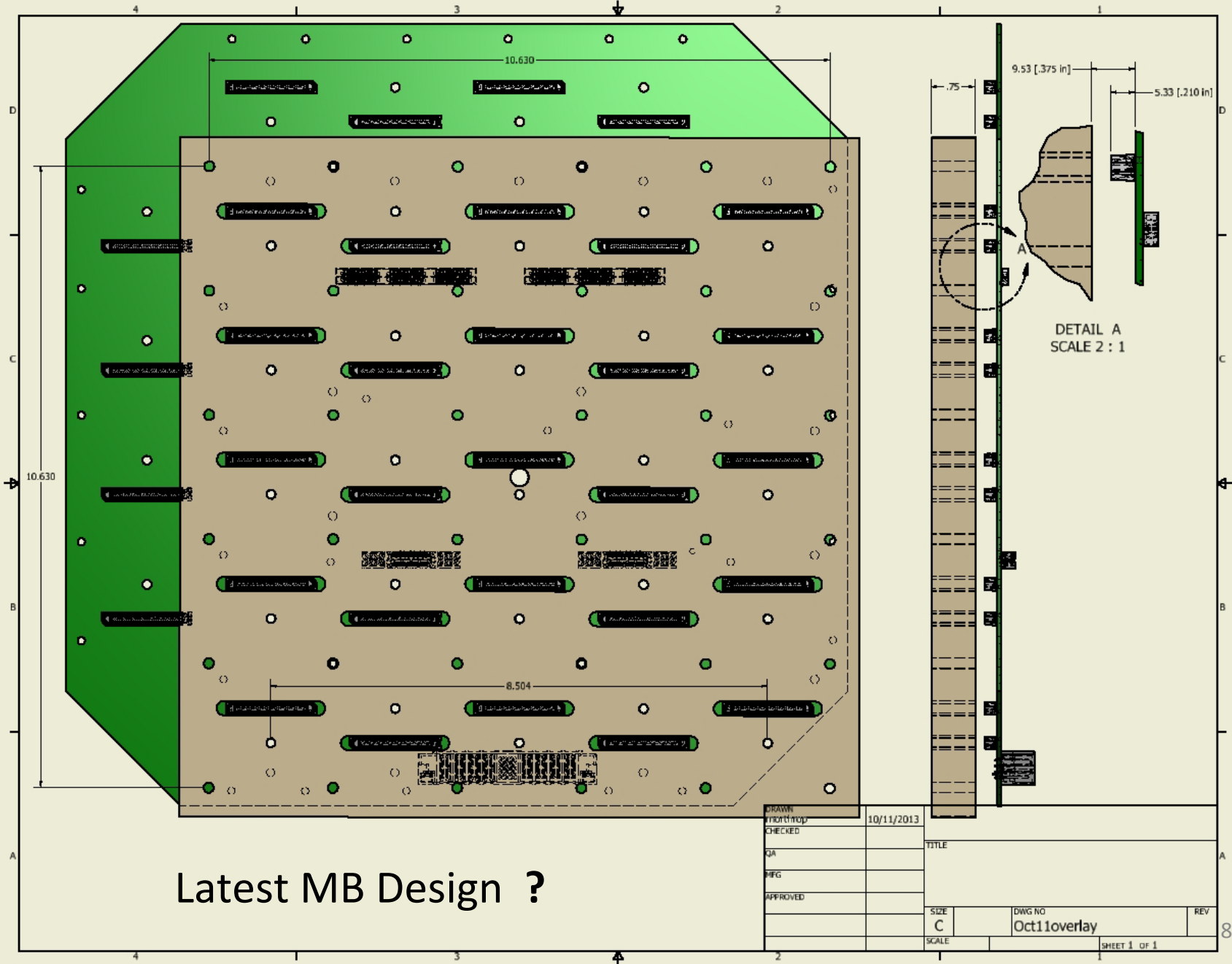
Test Module Vibration tests

Flatness

Hardware Show and Tell

Post ends - inserts - Locktite

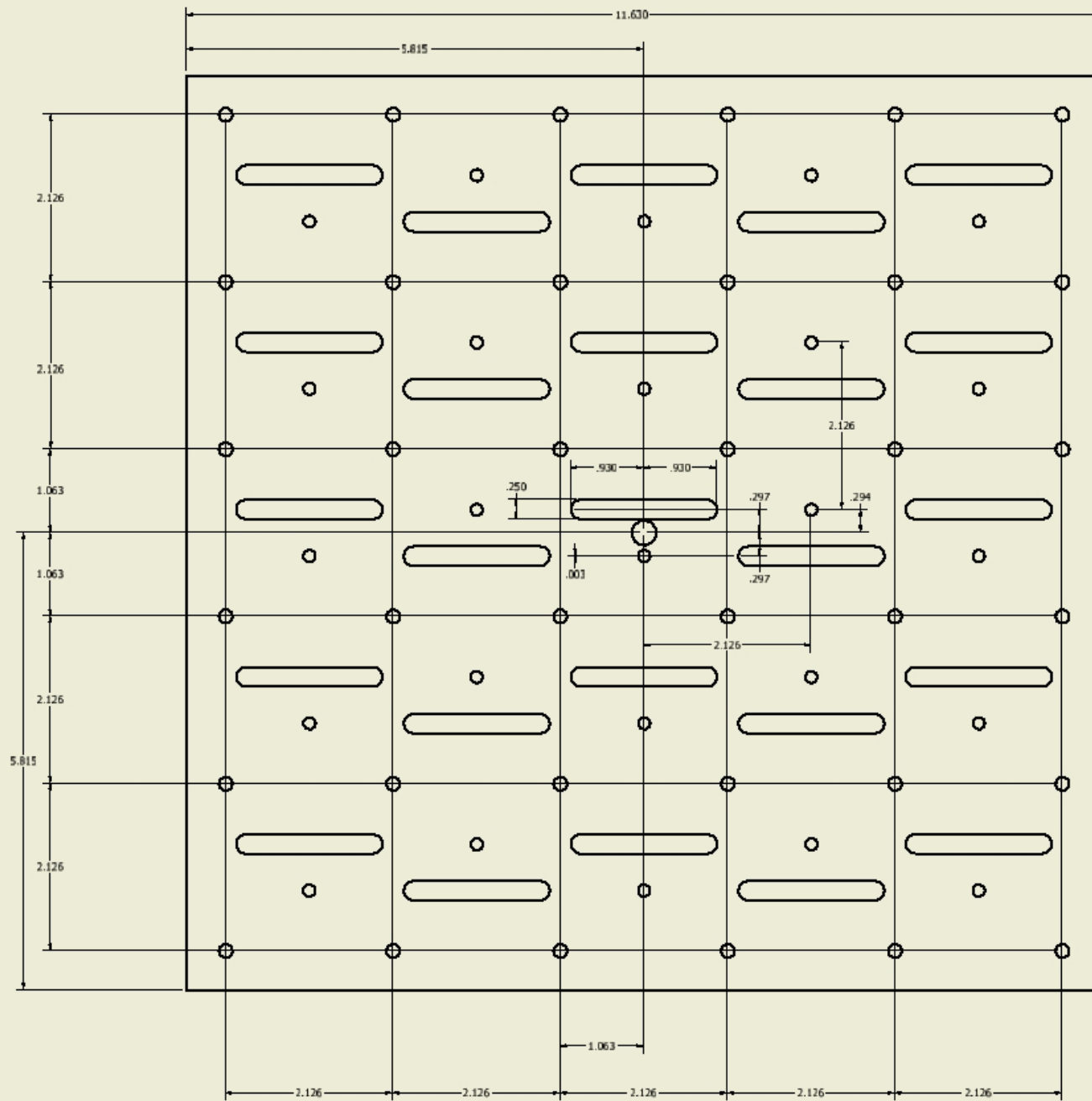
Camera Mechanics 5 x 5 Bulkhead – Motherboard



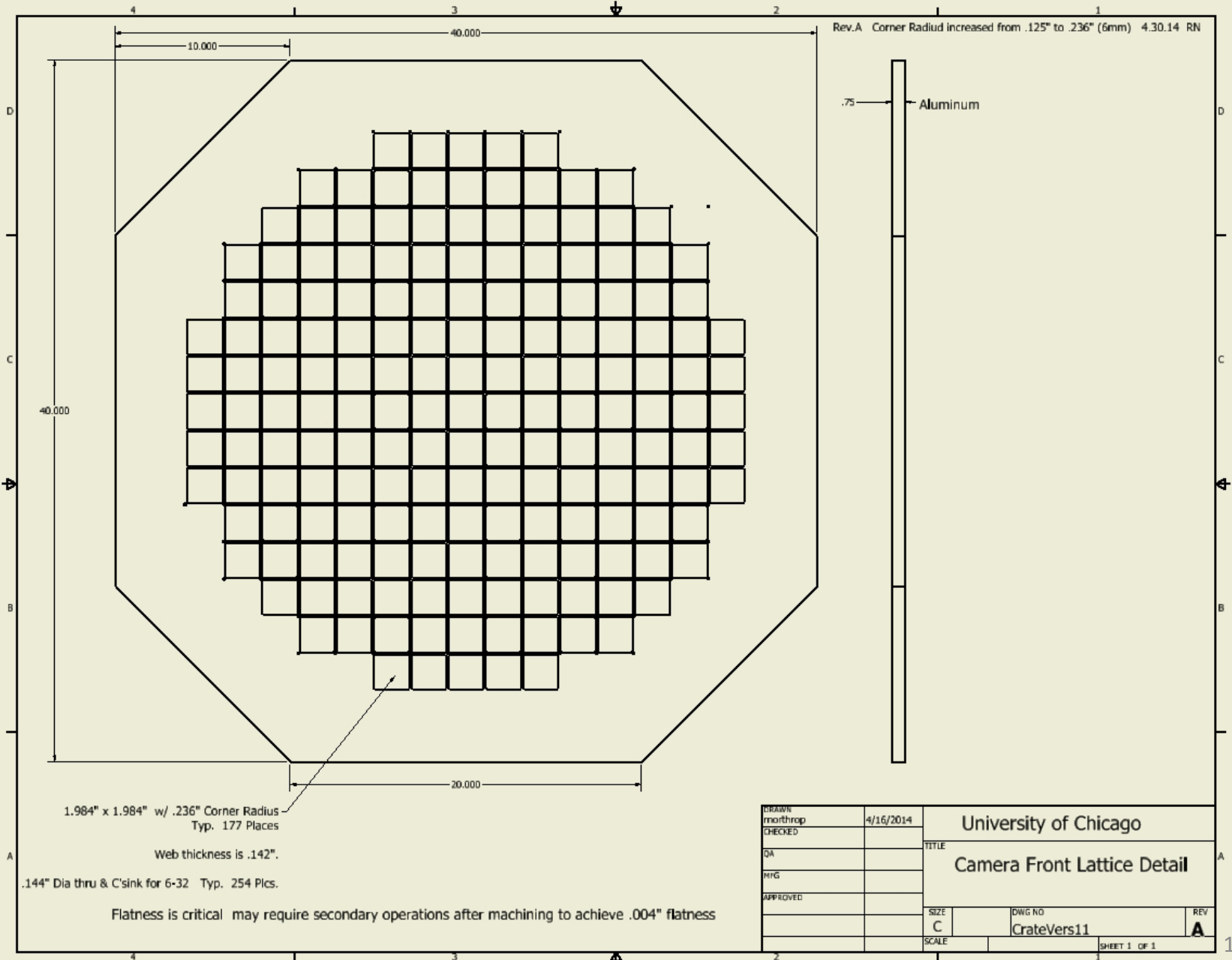
Latest MB Design ?

DRAWN	10/11/2013	TITLE	
Frontrop			
CHECKED			
QA			
MFG			
APPROVED			
		SIZE	DWG NO
		C	Oct11overlay
		SCALE	REV
			8
			SHEET 1 of 1

Camera Mechanics 5 x 5 Bulkhead Detail



Camera Mechanics Lattice



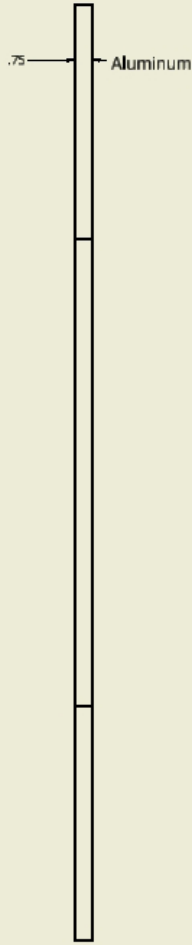
1.984" x 1.984" w/ .236" Corner Radius
Typ. 177 Places

Web thickness is .142".

.144" Dia thru & C'sink for 6-32 Typ. 254 Plcs.

Flatness is critical may require secondary operations after machining to achieve .004" flatness

Rev.A Corner Radiud increased from .125" to .236" (6mm) 4.30.14 RN



DRAWN morthrop	4/16/2014	University of Chicago	
CHECKED		TITLE	
QA		Camera Front Lattice Detail	
MFG			
APPROVED			
		SIZE C	DWG NO CrateVers11
		SCALE	REV A
		SHEET 1 OF 1	

Camera Mechanics

Selected Design Issues

Final FEE configuration , Mounting , & Rear Connector mate

Surface treatment for Lattice or Cage

Lattice Flatness (.004" TIR) vs. costs (\$23,285)

Crate Mounting to Inner Frame details (hard mount to top - float/pin (Z)

Final Cooling Design & Testing

Inner & Outer covers - Access - component mounting

CMM ?