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5/24/2011

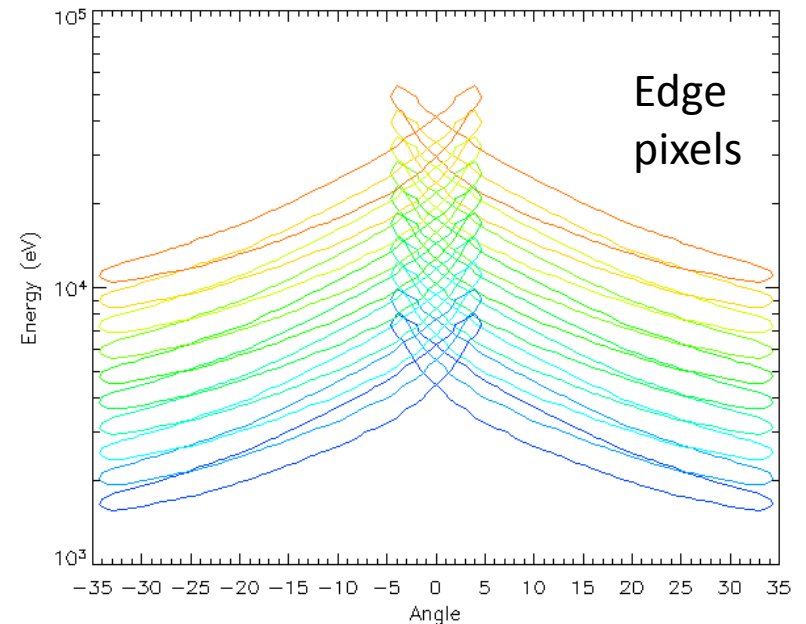
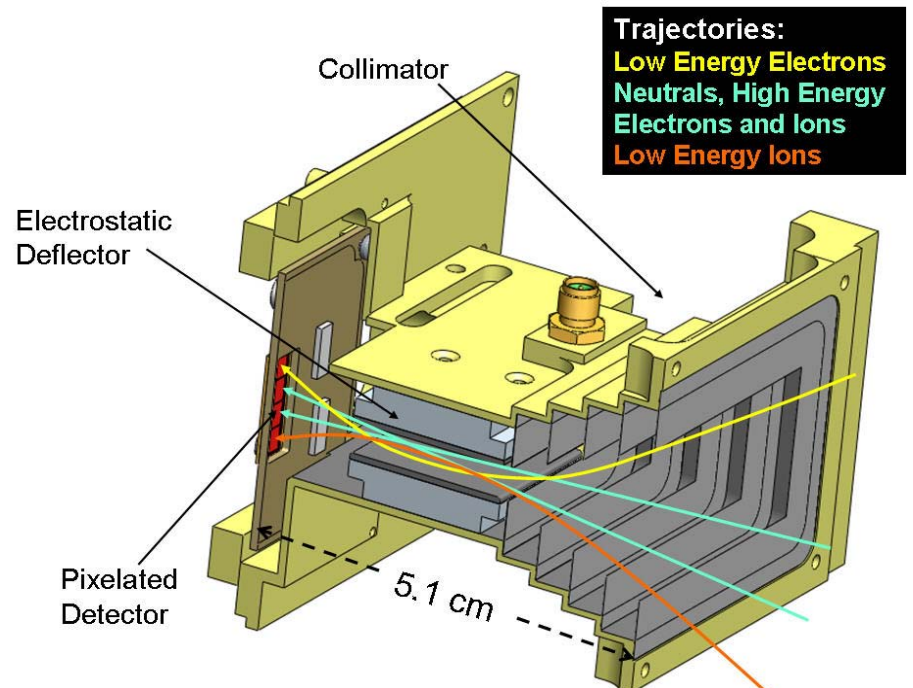
CINEMA

- Cubesat for Ions Neutrals Electrons and MAgnetic fields
- CINEMA is currently expected to deliver December 2011 with launch June 2012
- Orbit of $\sim 470\text{km} \times 770\text{km}$ at $60^\circ - 65^\circ$
 - the ambiguity of launching as a piggyback
- 6 month nominal mission
 - Lots of off the shelf parts, very little radiation tolerance design
- 10cm x 10cm x 30cm
 - $\sim 0.2\%$ RBSP mass,
 - less than 0.2% cost,
 - 3.75W Orbit Avg.
 - 9 kbps orbit avg.
- Ecliptic normal spin axis
 - Maintained within 10 deg. by torque coils every few days

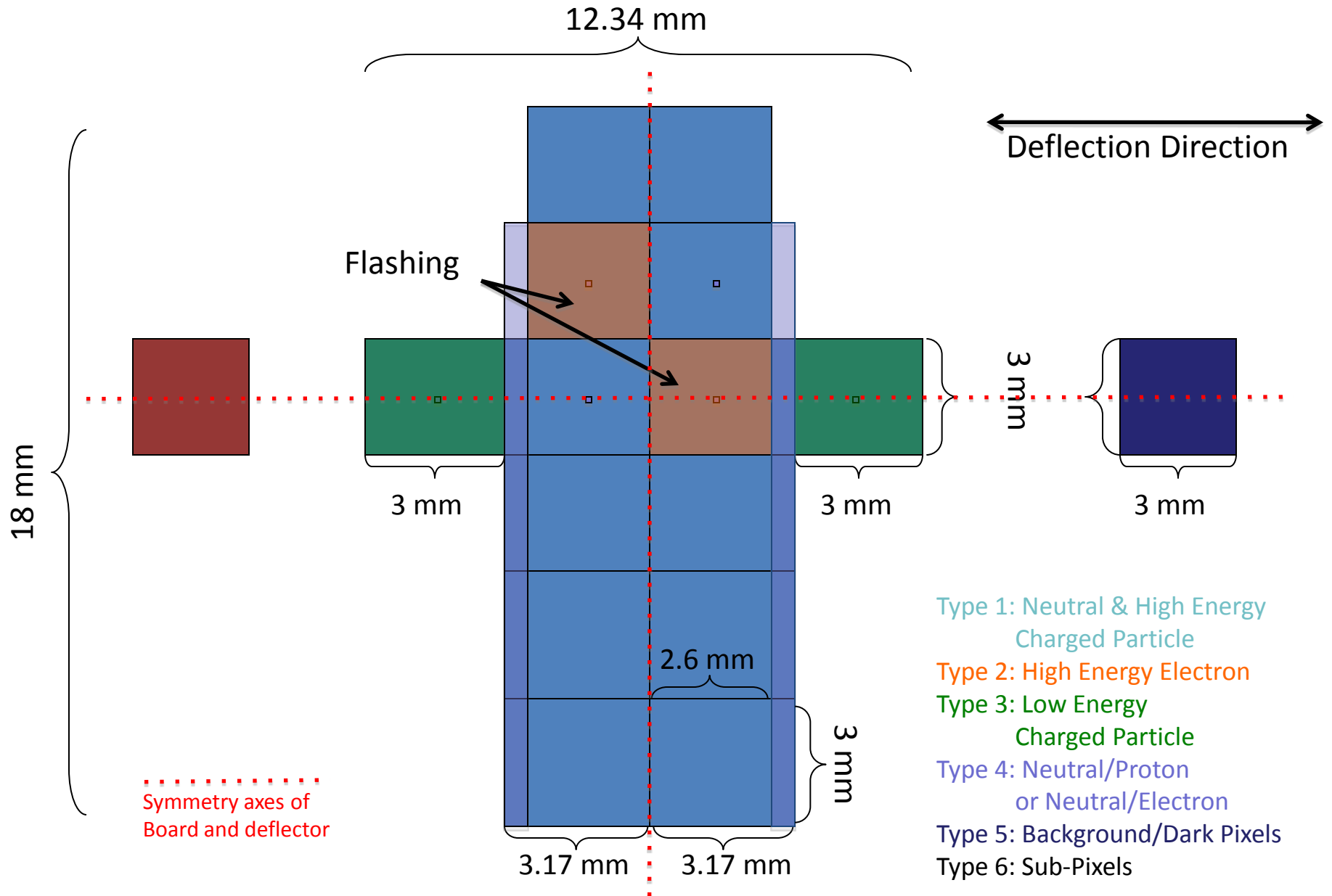


STEIN

- Supra-Thermal Electrons Ions and Neutrals
 - Electrons from $<4\text{keV}$ to several hundred keV with $\sim 1\text{keV}$ resolution
 - Ions from $\sim 6\text{keV}$ up
 - Energetic Neutrals clearly identified below $\sim 30\text{keV}$ at max deflection voltage
 - Uses 4kV of electrostatic deflection in front of a 32 pixel thin window Si detector
 - $30^\circ \times 70^\circ$ field of view, but better angular resolution can be achieved by stepping deflection voltage
 - Mechanical attenuator allows for expanded dynamic range
 - Looking at crude O^+ identification in large events

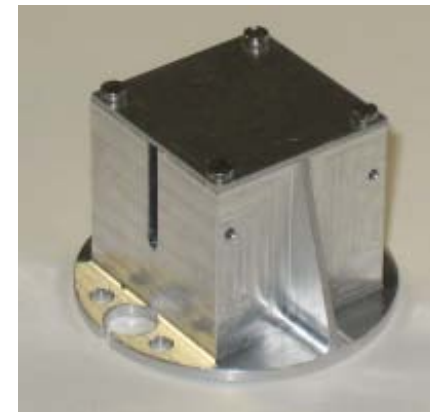
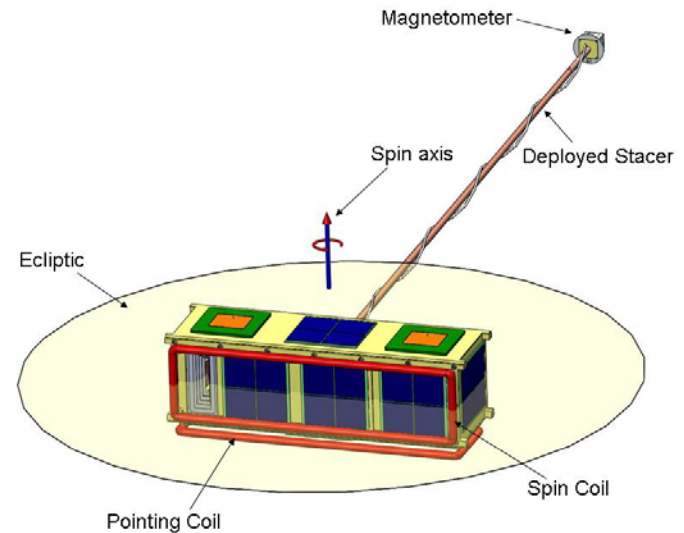


CINEMA STEIN pixel Layout



MagIC

- Supplied by Imperial College
- Magnetoresistive 3 axis with $\sim 10\text{nT}$ resolution
- 1m rigid boom with ~ 20 gram sensor
- Normal 4Hz operation, up to 20Hz
- Inboard magnetometer as well



Data overlap

- If...?
 - ENA imaging involves Line-of-Sight integration
 - from LEO we may be able to provide MLT resolved ENA spectral imaging of ~ 10 s of keV ions, but no information along LOS
 - combine that with L-resolved *in situ* measurements
 - Time resolution of imaging \sim minutes depending on storm intensity
 - We'll be observing low energy precipitation conjugate to RBSP, above BARREL? depends on final orbits
 - Multiple CINEMAs (4 total in the pipeline) may provide resolution along LOS with parallax, or at least extend the mission duration

View of STEIN aperture

