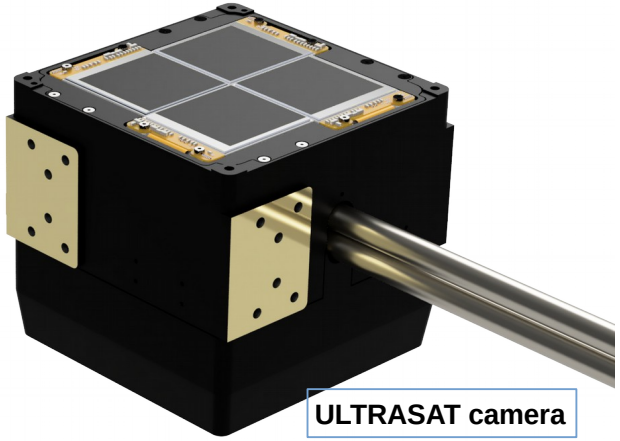
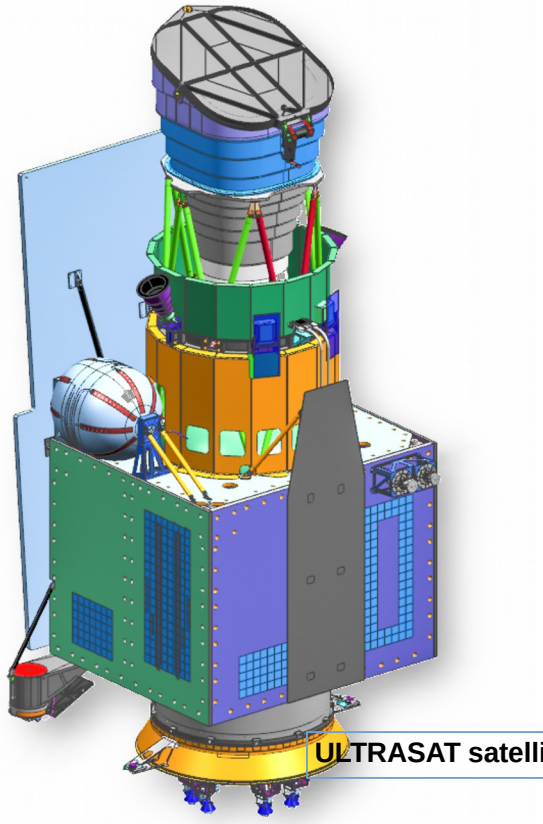
Total Ionizing Dose effects on CMOS Image Sensor for the ULTRASAT space mission

Vlad Berlea - ULTRASAT mission



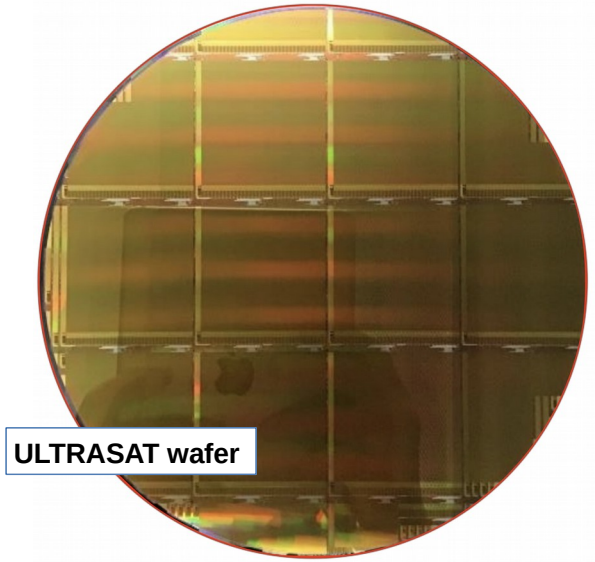
ULTRASAT camera



ULTRASAT satellite

ULTRASAT

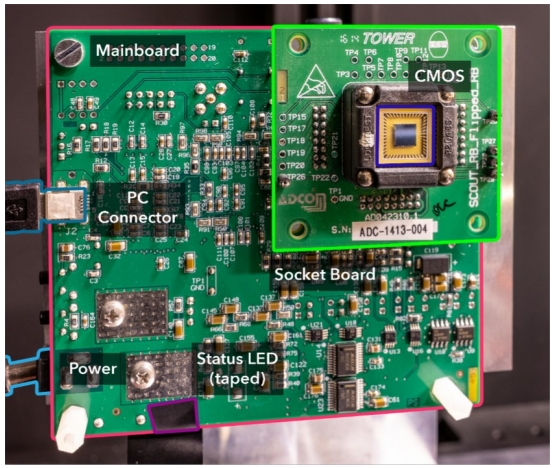
- **Ul**traViolet **Tr**ansient **A**stronomical **Sat**telite is a wide-angle space telescope that will perform a deep time-resolved all-sky survey in the near-ultraviolet. The 90 Megapixel camera will operate at -70°C.
- The science objectives are the detection of counterparts to gravitational wave sources and supernovae.
- The launch is expected in early 2025 and 3 years of orbit operations are planned as a minimum. DESY will provide the UV camera, composed by the detector assembly located in the telescope focal plane and the remote electronics unit.



ULTRASAT wafer

Total Ionizing Defects on Tower test structures

- In order to predict the radiation effects on the final sensors, preliminary studies on Tower test structures (Scouts) with similar pixels have been performed.
- Both the Flight ULTRASAT sensors and the Scout test structures are 4T Back Side Illuminated Sensors, built in the Tower 180 nm architecture, with similar photo-diode geometries.
- The Total Ionizing Dose effects on the test structure pixels is presented. An important component from Random Telegraph Signal is observed.



Tower test structures