

ULTRASAT: NASA's role in mission development and science

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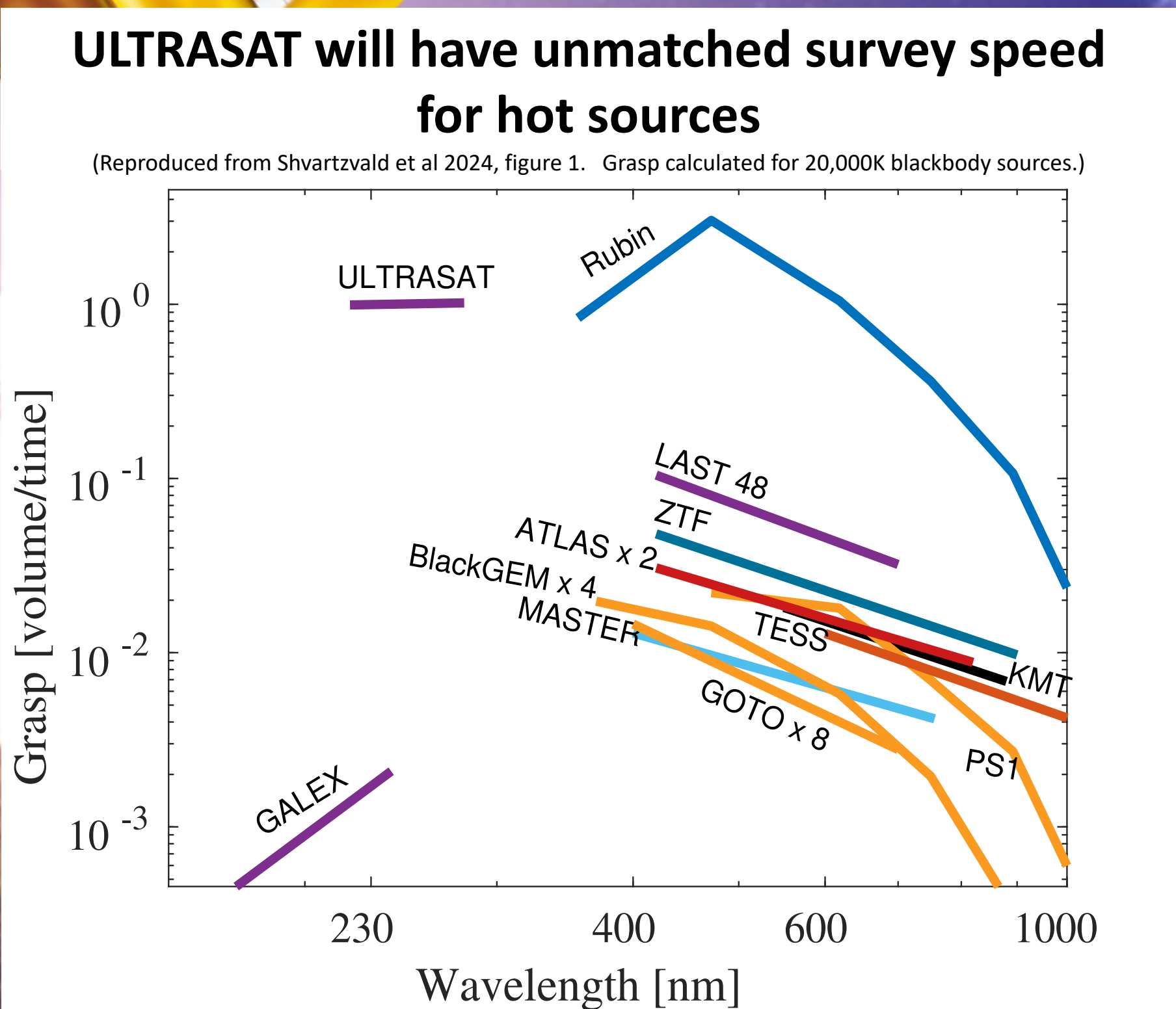
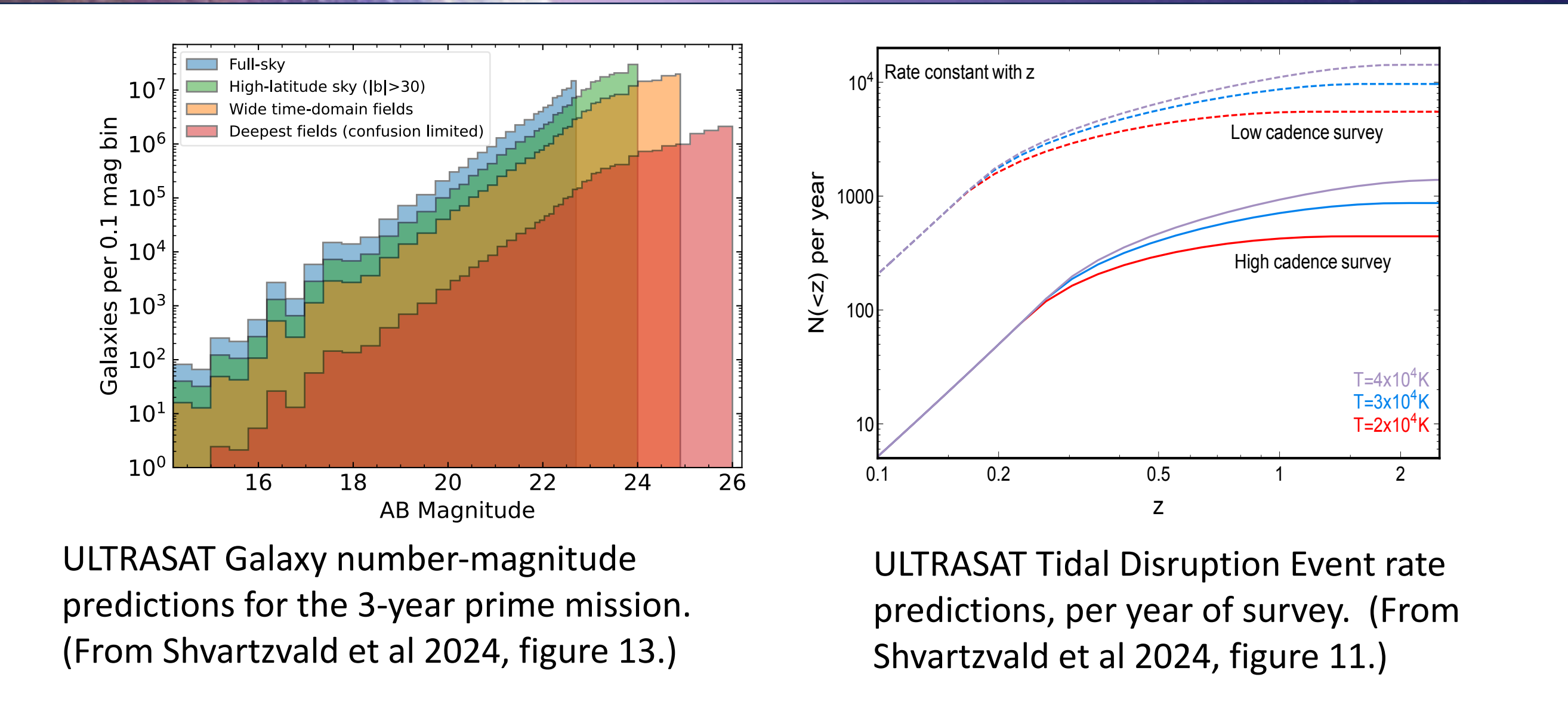
ULTRASAT is a near-ultraviolet imaging satellite with a wide field of view (200 square degrees) and an anticipated launch in late 2027. It is an international partnership led by Israel (Israel Space Agency & Weizmann Institute of Science) in partnership with the United States (NASA) and Germany (DESY). ULTRASAT will provide high cadence observations and rapid target-of-opportunity response, providing a powerful capability for time-domain and multimessenger astrophysics (TDAMM), and will have scientific applications from solar system studies to cosmology.

Field of view	204 deg ²
Effective Aperture	33cm
Bandpass	230 – 290 nm
Mean limiting magnitude (AB, 900s, 5 σ)	22.5

ULTRASAT Science:
Driving TDAMM science goals include studying the physics of core collapse supernovae, and of gravitational wave sources, through early time UV light curves.

Additional time-domain applications include stellar flares, active galactic nuclei, and tidal disruption events.

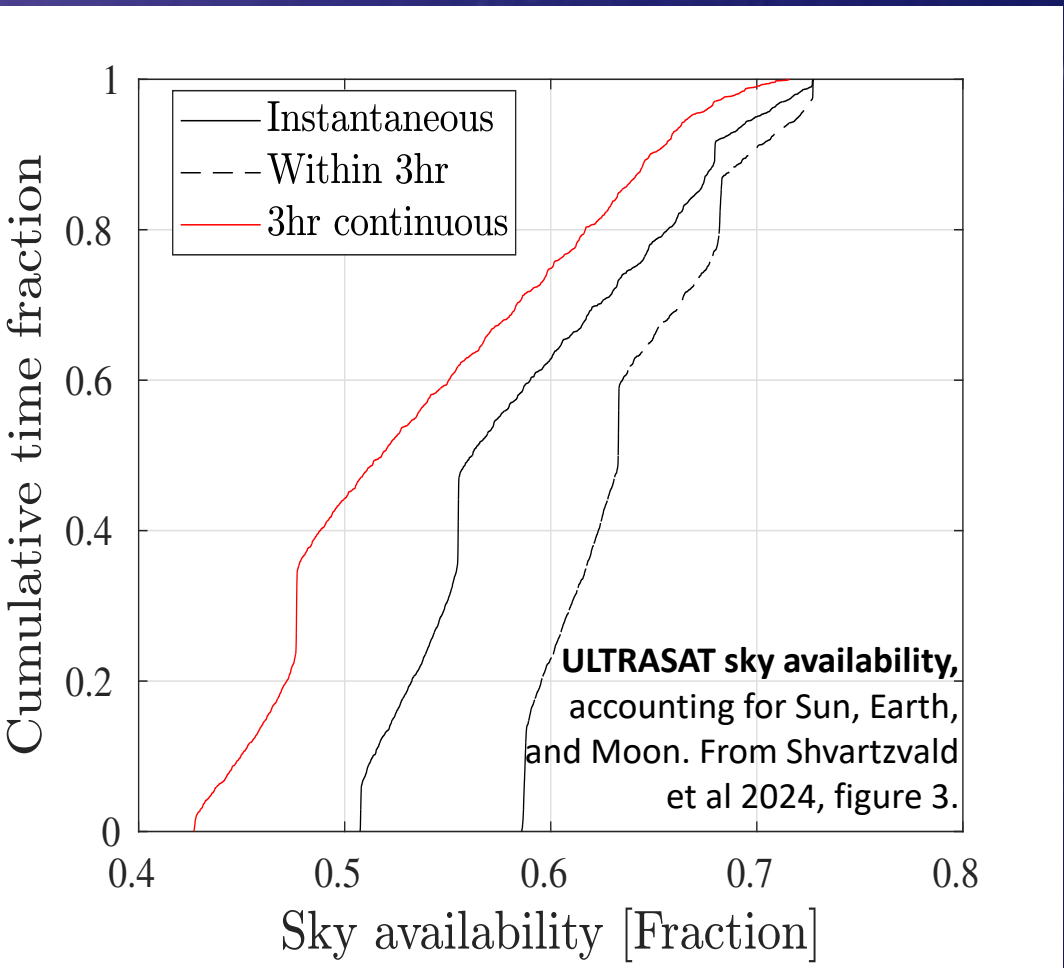
Further applications range from Cosmology, to Galaxies (both distant and nearby), to Exoplanets.



ULTRASAT's roles in NASA's mission portfolio include critical Time Domain and Multimessenger Astrophysics (TDAMM) capabilities endorsed by the 2020 Decadal Survey, as well as widely field access to a unique near-UV bandpass for a broad range of applications.

- NASA's roles in ULTRASAT include**
- Launching the spacecraft to geosynchronous transfer orbit
 - Participation in ULTRASAT science:
 - Working group membership for a set of US based astronomers
 - Participation in planning for ULTRASAT alerts
 - A US based archive of ULTRASAT data

- Operations Concept / Surveys:**
- ULTRASAT will be operated at geostationary Earth orbit, with 24/7 communications and with access to > 50% of the sky at all times.
 - 21 hours/day will be devoted to high-cadence survey
 - 300 second exposures on a single 204 deg² field.
 - Choice of field changes every 6 months
 - 3 hours / day will be devoted to wide-area surveys
 - All-sky survey during first 6 months of mission
 - Wide-area survey of 40 pointings with 4-day cadence during remaining 2.5 years of prime mission.
 - Target-of-opportunity observations for gravitational wave events or other transients can be triggered in < 15 minutes at any time.



ULTRASAT science is organized by topical working groups.

	Topic	Lead(s)
WG1	Transient Stellar Explosions	Avishay Gal-Yam
WG2	Gravitational Wave Sources	Eran Ofek
WG3	Exoplanets and Star-Planet Connection	Yossi Shvartzvald & Sagi Ben-Ami
WG4	Cosmology	Marek Kowalski
WG5	Stars	Mukrem Kilic
WG6	Galaxies	James Rhoads
WG7	Active Galactic Nuclei	Benny Trakhtenbrot
WG8	Tidal Disruption Events	Iair Arcavi & Nick Stone
WG9	Solar System	David Polishook
WG10	Gamma Ray Bursts	Brad Cenko & Anna Ho
WG11	Data Analysis	Eran Ofek, Yossi Shvartzvald, & Alexander Krassilchikov
WG12	Transient Alerts	Eran Ofek & Yossi Shvartzvald
WG13	Followup	Avishay Gal-Yam

References:
Shvartzvald, Y., et al 2024, *The Astrophysical Journal* 964, 74.
DOI 10.3847/1538-4357/ad2704
Ben-Ami, S., et al 2024, paper 13093-112 of these proceedings.

For additional information: see
<https://www.weizmann.ac.il/ultrasat/> and
<https://apd440.gsfc.nasa.gov/ultrasat/>