

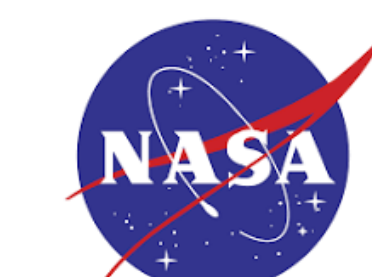
OVSA for space weather

Exploiting High sensitivity, Low-Latency,
Radio Imaging Spectroscopy for Space Weather

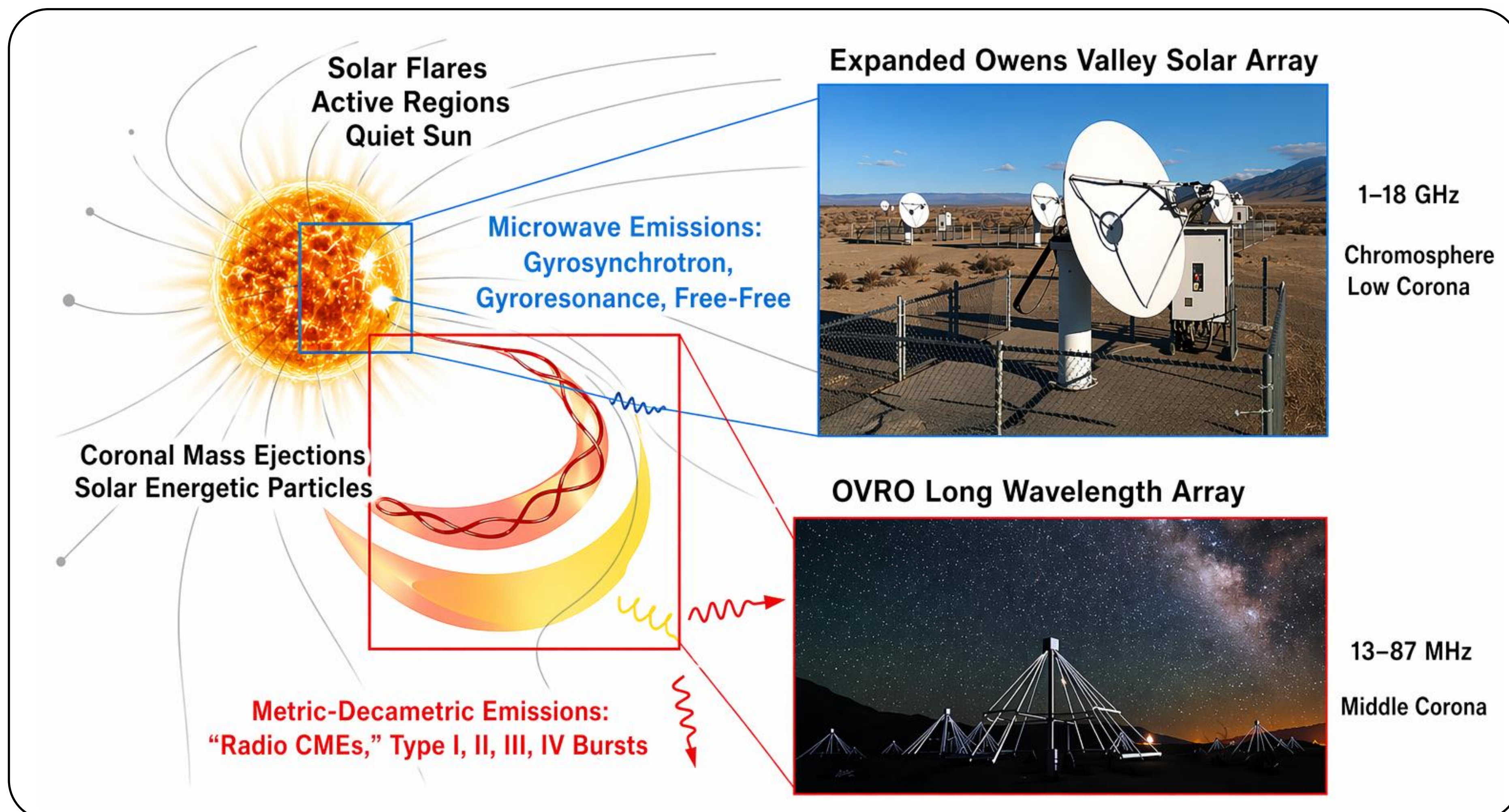
Collaborators



Funded by



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Data products

OVRO-LWA and EOVSAs combined provide complementary radio data products for space-weather diagnostics. OVRO-LWA delivers all-sky dynamic spectra and imaging from 13–87 MHz, tracing Type II/III bursts that probe CME shocks and SEP-producing electron beams.

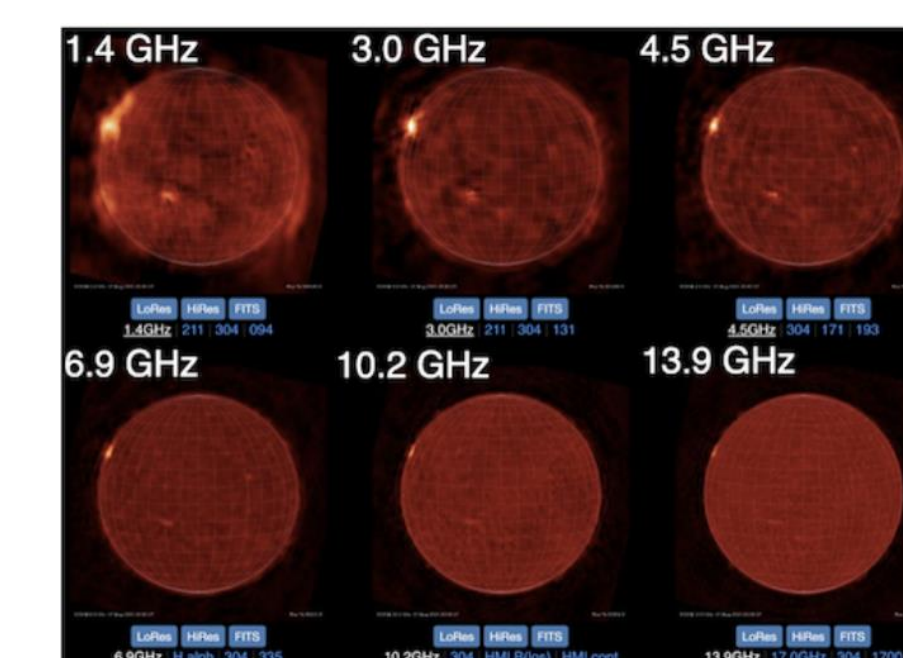
EOVSA extends to 1–18 GHz with spatially resolved microwave imaging spectroscopy. Both pipelines output calibrated FITS cubes, quick-look spectrograms, and event catalogs in near real time.

Table 1: Observing modes offered by EOVSAs and OVRO-LWA.

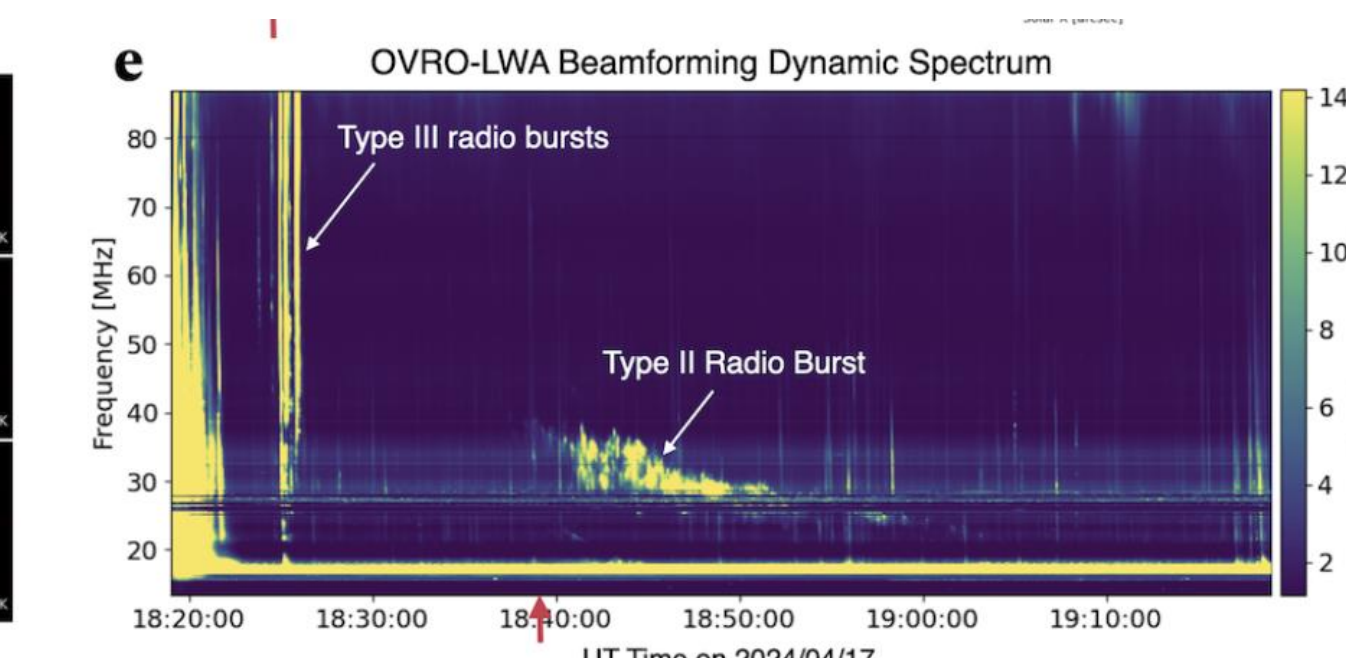
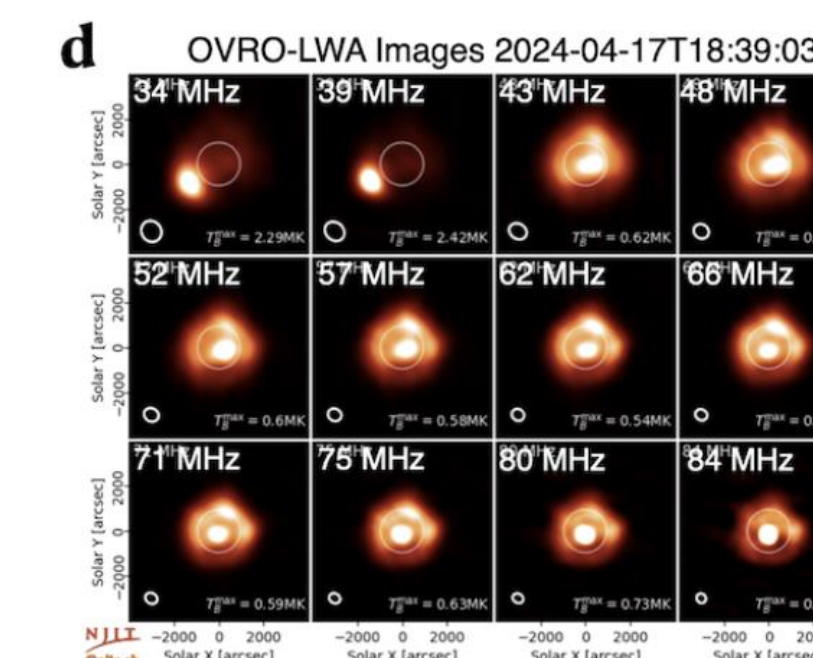
Instrument	Mode	Bandwidth	δt (s)	$\delta \nu$	$\delta \theta^{\dagger}$	N_{ant}	Objectives
EOVSA(-15)	Standard Imaging	1–18 GHz	1	~40 MHz	5''	13(15)	Quiet Sun, flares, active regions
OVRO-LWA	Standard Imaging	13–87 MHz	10	24 kHz	5'	352	Synoptic; CMEs
OVRO-LWA	Burst Imaging	13–87 MHz	0.1	96 kHz	5'	48	Metric radio bursts
OVRO-LWA	Beamforming	13–87 MHz	0.064	24 kHz	-	256	Metric radio bursts

[†]Quoted angular resolution $\delta \theta$ values for EOVSAs and OVRO-LWA are at 10 GHz and 80 MHz, respectively, which increase linearly with decreasing frequency.

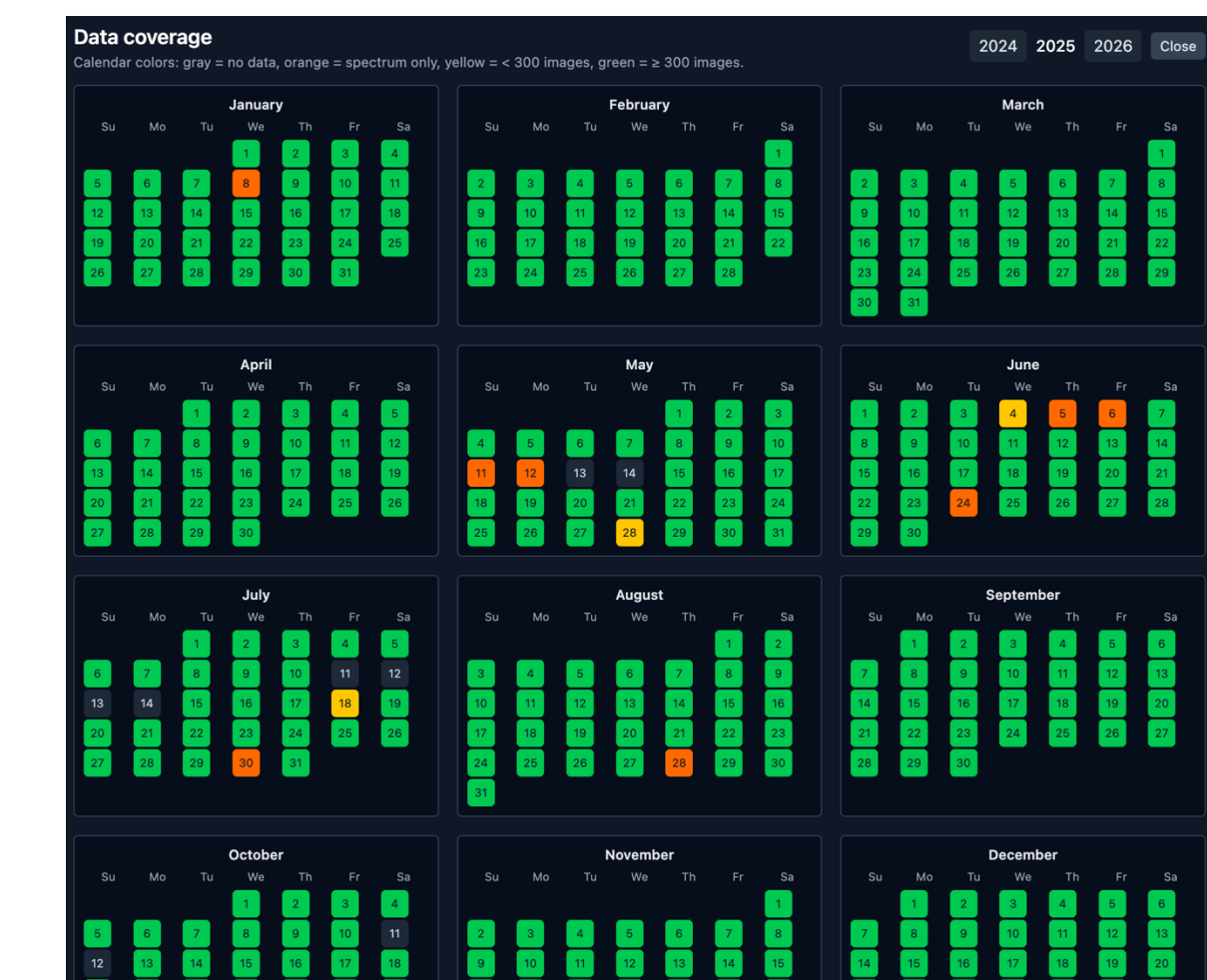
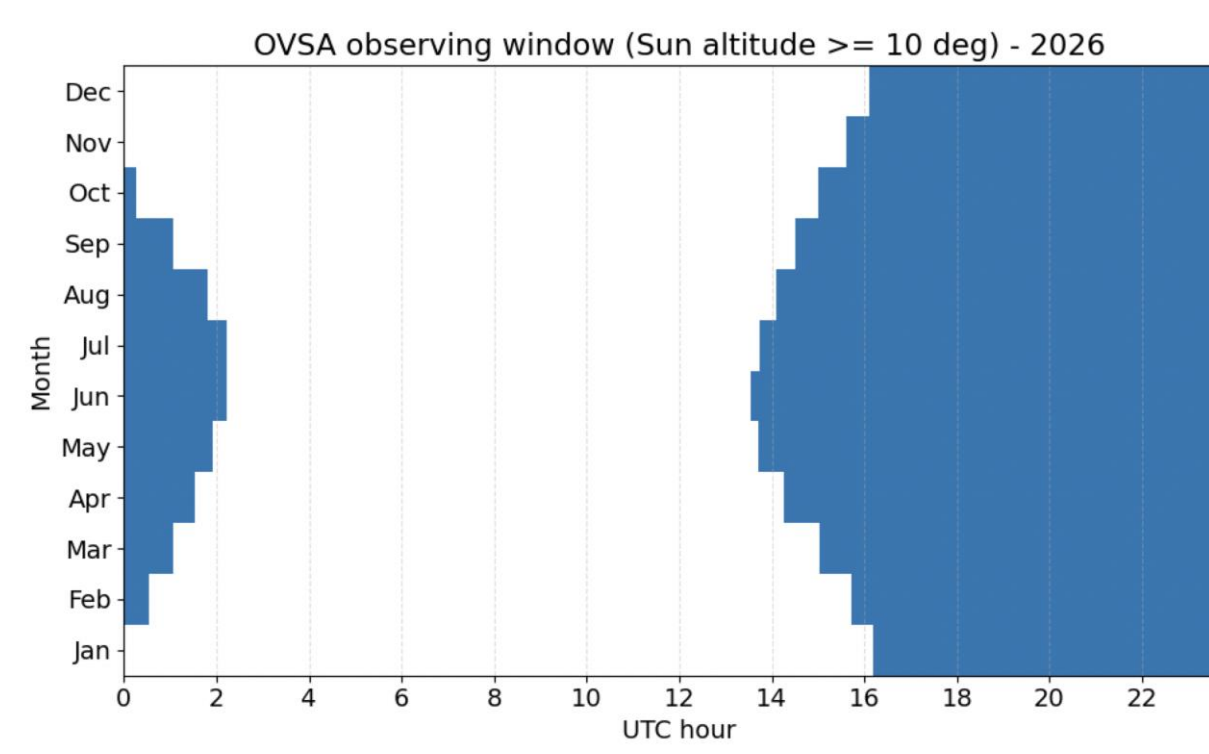
EOVSA



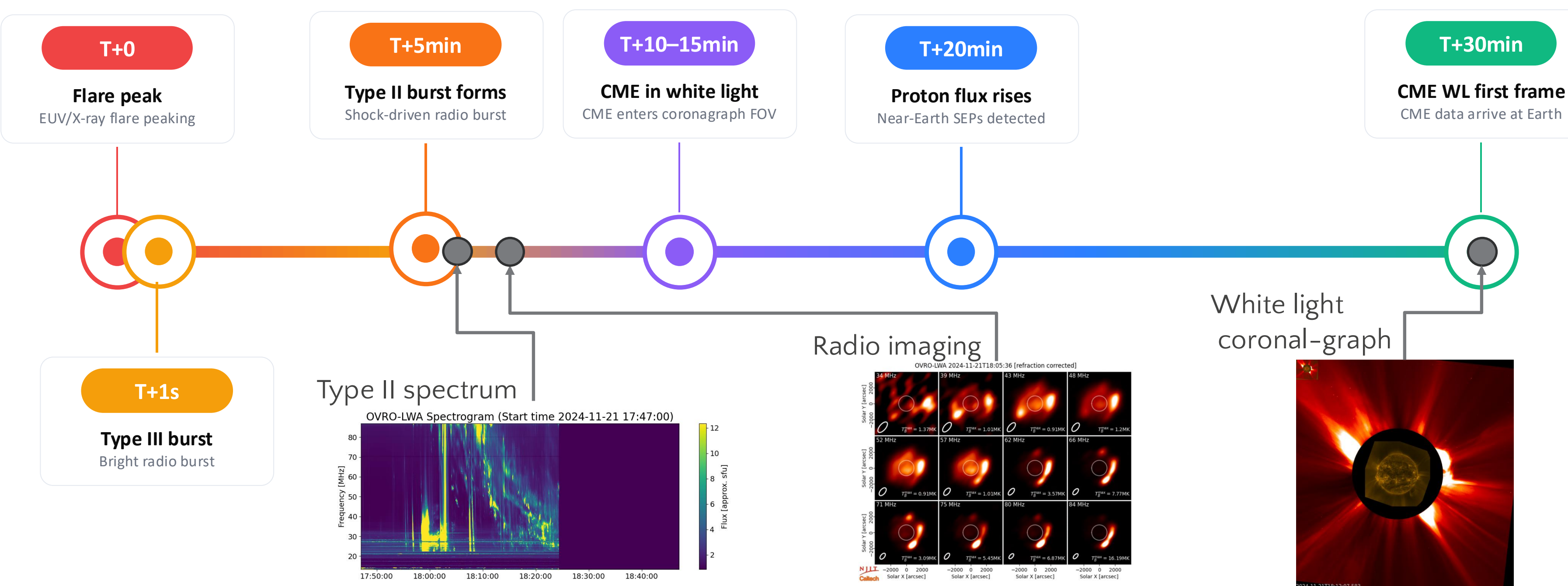
OVRO-LWA



Availability



Life cycle of an earth impacting solar eruption



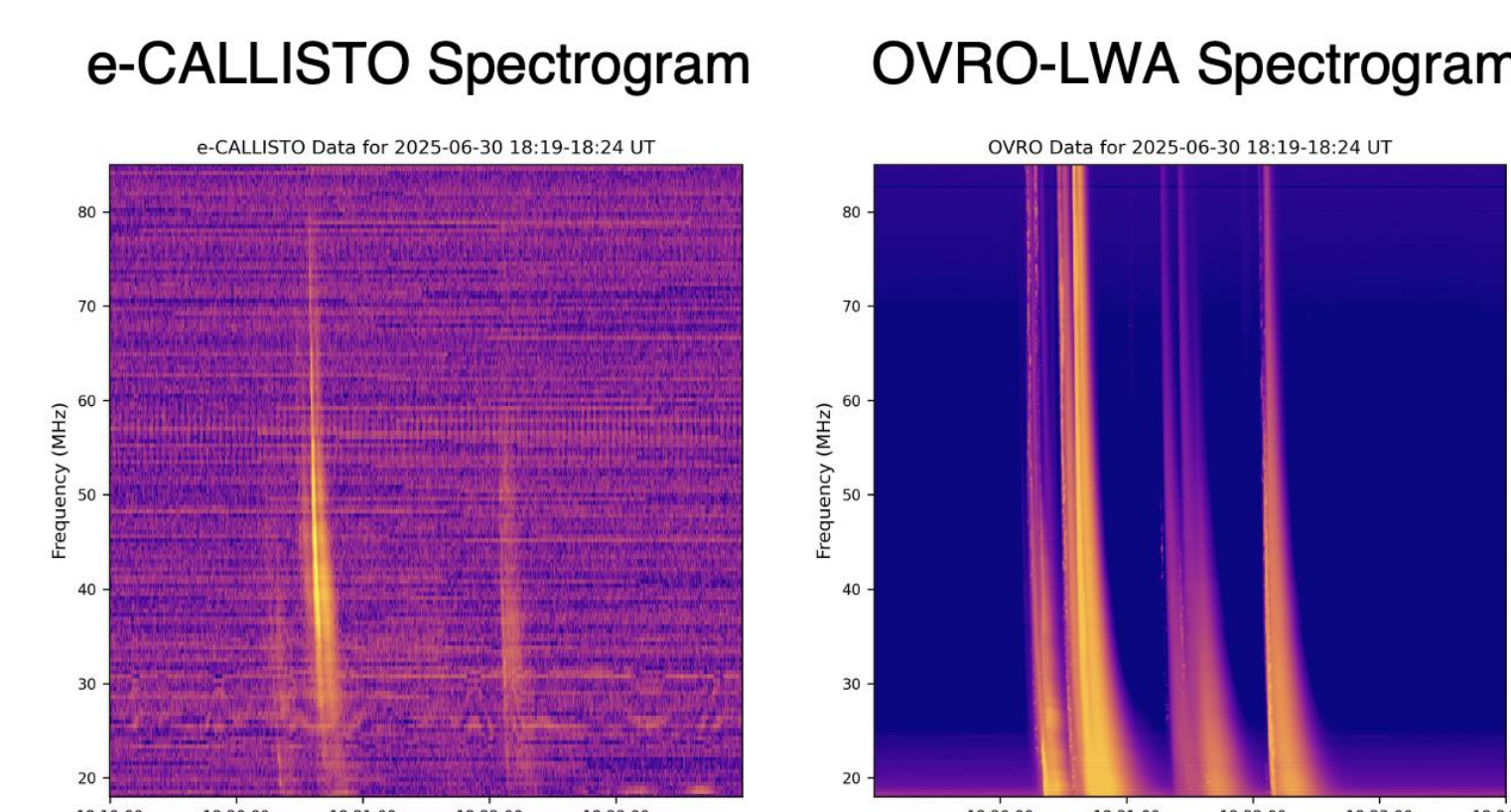
Key performance metrics for SWx

OVRO LWA

- Dynamic spectrum data stream**: 0.5 s
- Multi-frequency imaging**: 3–5 min (144 channel image, calibrated)
- Dynamic spectrum**: <0.01 s.f.u.
- Imaging brightness temperature**: 10⁵ K
- HISTORICAL AVAILABILITY**: >96%

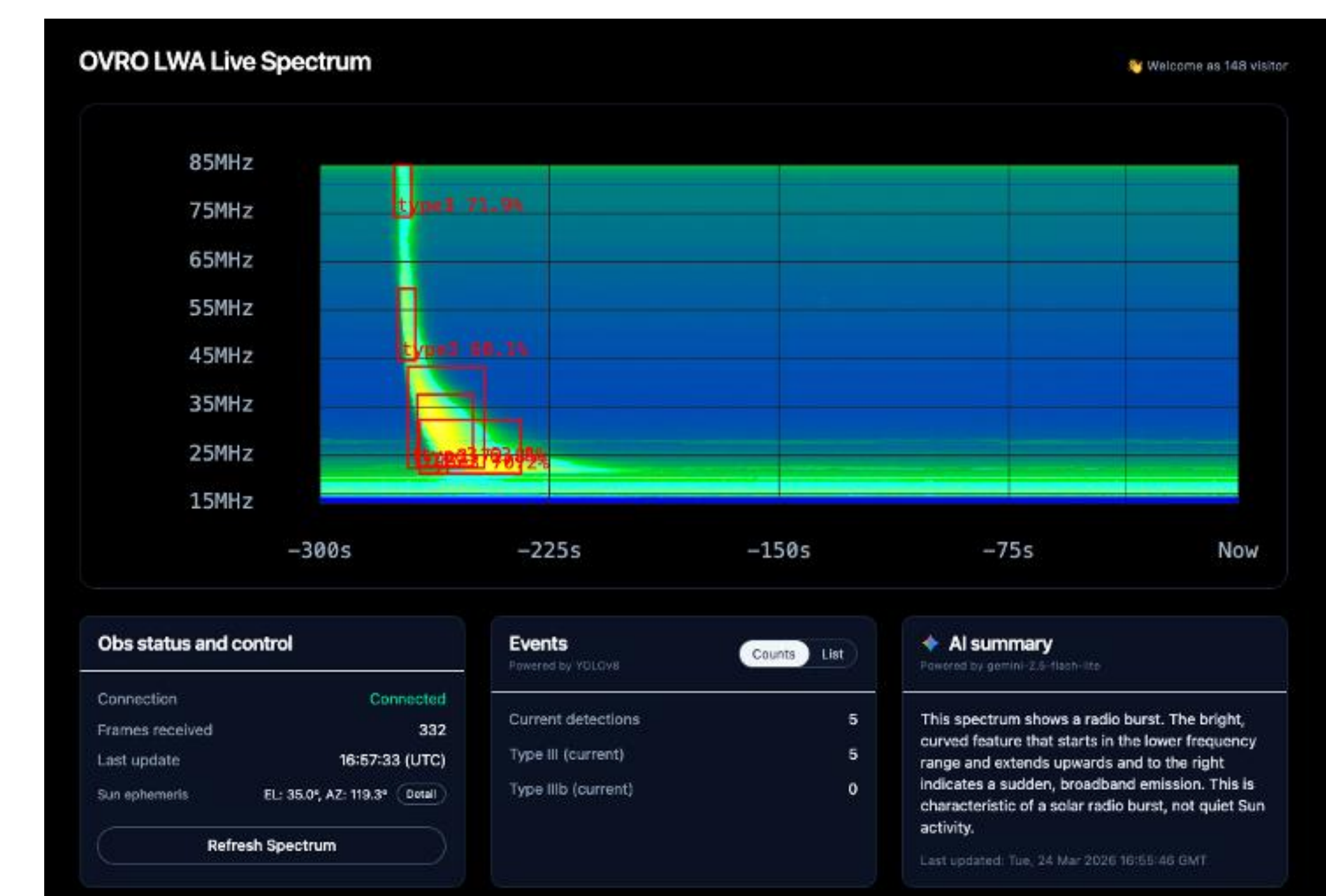
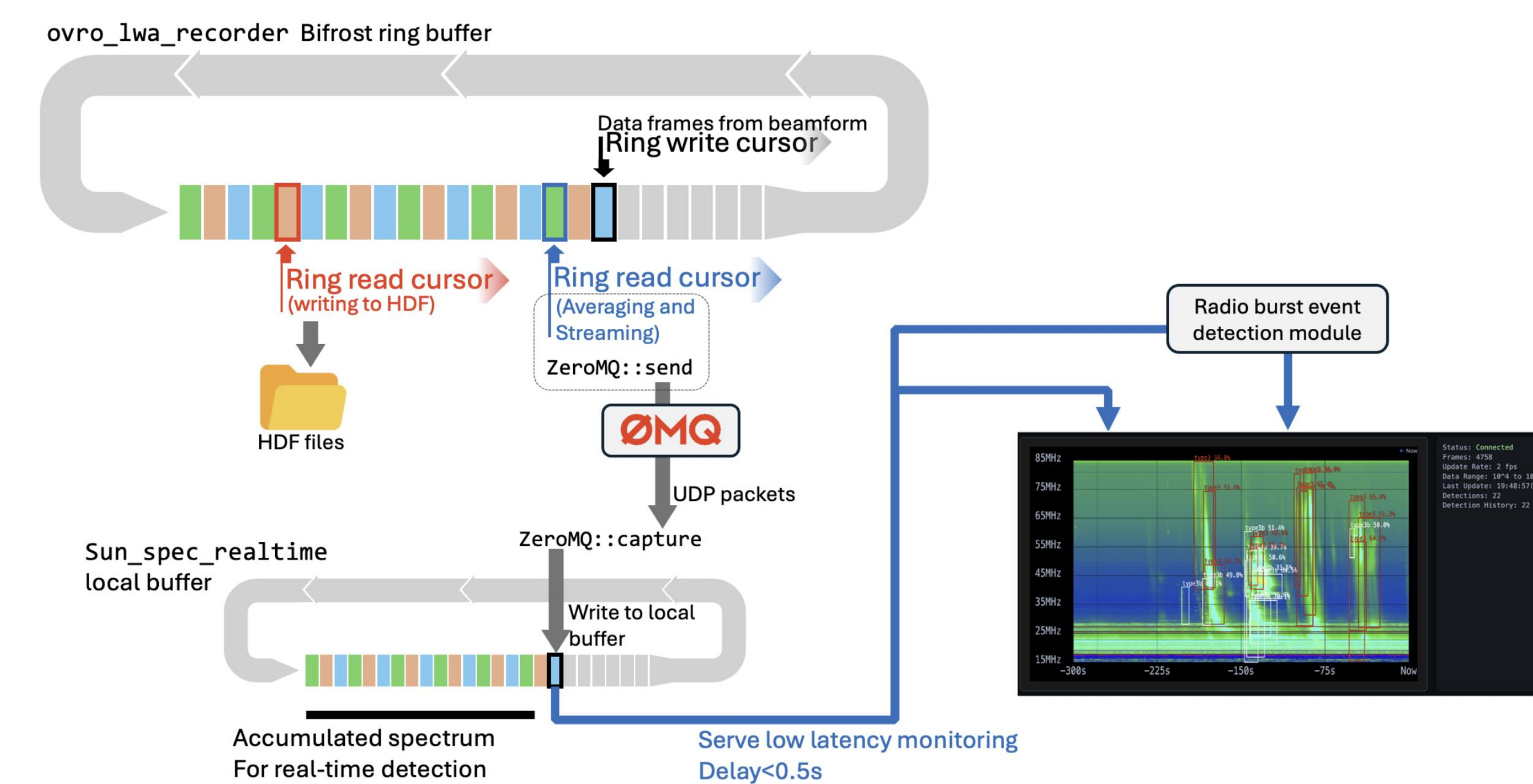
Radio observations can catch and report the early stage of the eruption first. With Type II bursts appear as soon as the CME driver steepens into a shock – typically minutes before the CME becomes visible in white-light coronagraphs and tens of minutes to hours before SEPs or geomagnetic effects arrive at Earth. This early, direct diagnostic of accelerated particles and shock formation gives forecasters a critical head start on SEP and CME impact warnings.

Beamform from 256 antenna brings high sensitivity



Realtime dynamic spectrum streaming and AI powered event detection and reporting

OVRO-LWA streams calibrated 13–87 MHz solar dynamic spectra within 0.5 of real-time, continuously monitoring the low-frequency corona and inner heliosphere where CME-driven shocks and SEP-producing electron beams emit. The low latency is achieved by directly reading from the buffer. The stream feeds a deep-learning classifier trained on historical Type II and Type III bursts, which flags candidate events in real time and auto-tags each detection with frequency drift, duration, bandwidth, and intensity. Confirmed events are pushed to a public dashboard, archived with quick-look spectrograms and FITS cubes, and delivered as machine-readable alerts (JSON/VOEvent) accompanied by an LLM-generated plain-language summary that contextualizes the burst for operational forecasters.



AI Summary (2026-04-13)

Activity level
Activity level: 2/5 The day showed low to moderate activity with several isolated Type III radio bursts of modest intensity.

Summary
The solar radio environment on 2026-04-13 was generally quiet, with background flux levels remaining near 1 sfu for most of the observing period. Tracking began at approximately 15:21 UT, and the data remained stable until the end of the session around 00:15 UT. Activity was limited to a few discrete Type III bursts. The most notable features were isolated bursts occurring at 19:19 UT and 22:00 UT, followed by a slightly more complex group of Type III emissions starting around 22:33 UT. All detected events exhibited peak fluxes between 10 and 30 sfu, with no major flares or long-lived noise storms observed.

Event #	Begin UT	Peak UT	End UT	Freq range (MHz)	Peak flux (sfu)	Type / notes
1	1918	1919	1920	20–80	15	Isolated Type III burst
2	2200	2200	2201	20–80	15	Narrow Type III burst
3	2233	2234	2236	20–80	30	Type III burst group

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Live stream



Data portal

