# The Sun Radio Interferometer Space Experiment (SunRISE)

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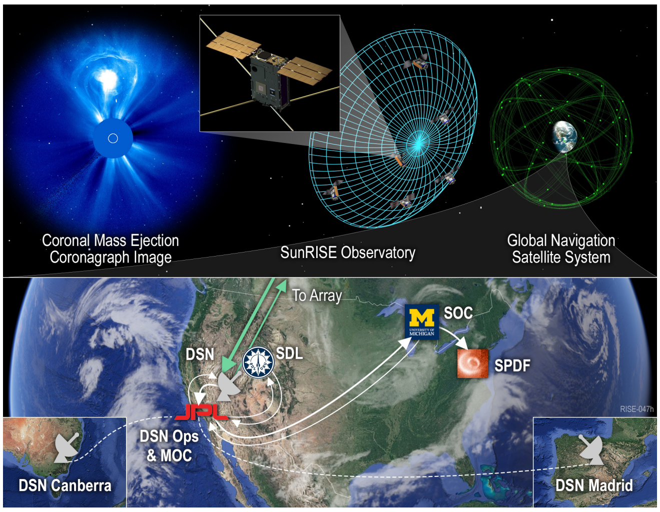
The Sun Radio Interferometer Space Experiment (SunRISE) will provide an entirely new view on particle acceleration and transport in the inner heliosphere by creating the first low radio frequency interferometer in space to localize heliospheric radio emissions. By tracking the location of decametric-hectometric (DH) radio bursts from 0.1 MHz to 25 MHz, SunRISE will provide key information on particle acceleration mechanisms associated with coronal mass ejections (CMEs), via DH Type II bursts, and the magnetic field topology from active regions into interplanetary space, via DH Type III radio bursts.

Six small space vehicles, of a 6U form factor (10 cm $\times$ 20 cm $\times$ 30 cm volume), will fly, in a passive formation, in a supersynchronous geosynchronous Earth orbit (GEO) within about 10 km of each other, in order to form a very long baseline interferometer (VLBI). SunRISE will image the Sun and inner heliosphere in a portion of the spectrum that is blocked by the ionosphere and cannot be observed from Earth. Kasper et al. (1) provide additional details about the science case and implementation of SunRISE.




Key aspects that enable this mission are that only position knowledge of the space vehicles is required, not active control, and that the architecture involves a modest amount of on-board processing coupled with significant ground-based processing for navigation, position determination, and science operations.

The six space vehicles are identical, each carrying an identical science payload. We describe key elements of the design of both the science payload and the space vehicles, then describe how the data from the science payloads will be combined on the ground to track the DH Type II and Type III bursts. At the time of the URSI GASS, the SunRISE space vehicles are planned to be in storage, awaiting launch.

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## References

[1] J. Kasper, T. J. W. Lazio, A. Romero-Wolf, J. P. Lux, and T. Neilsen. "The Sun Radio Interferometer Space Experiment (SunRISE) Mission." 2022 IEEE Aerospace Conference (AERO), Big Sky, MT, USA. 2022, pp. 1–8, doi: 10.1109/AERO53065.2022.9843607.