SunRISE: Sun Radio Interferometer Space Experiment

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We present a space-based array, composed of six 6U CubeSats, designed to localize the radio emission associated with coronal mass ejections (CMEs) from the Sun. Radio emission from CMEs is a direct tracer of the particle acceleration in the inner heliosphere and potential magnetic connections from the lower solar corona to the larger heliosphere. Furthermore, CME radio emission is quite strong such that only a relatively small number of antennas is required, and a small mission would make a fundamental advancement. This type of Heliophysics mission would be inherently cost prohibitive in a traditional spacecraft paradigm. However, the use of CubeSats, accompanied by the miniaturization of subsystem components, enables the development of this concept at lower cost than ever before.

We present the most recent updates on this mission concept, starting from the science and driving technical requirements. The presentation then focuses SunRISE architecture, which is composed of six 6U CubeSats placed in a GEO graveyard orbit for 6 months to achieve the aforementioned science goals. The spacecraft fly in a passive formation, which allows them to form an interferometer while minimizing the impact on operations complexity. We provide an overview of the most challenging mission and spacecraft design aspects, as well as an overview of the concept of operations.