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(A7)Science Goals and Drivers for Future Exoplanet, Space Astronomy, Physics, and Outer Solar System
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A MISSION TO SUN-EARTH TRIANGULAR LIBRATION POINT FOR WEATHER FORECAST

Abstract

Coronal mass ejections (CMEs) create major disturbances in the interplanetary medium, and trigger severe magnetic storms while colliding with Earth. Large geomagnetic storms can cause electrical power outages and damage communication satellites. STEREO mission for the first time helps scientists fully understand their origin and evolution. But STEREO's angle with the Sun-Earth line is changing constantly, so only a limited number of Earth-directed CMEs were observed in profile. A L5 mission will provides the most suitable perspective view of the Sun-Earth system which is believed to an ideal platform for early stage CMEs detection and Corotating Interaction Regions (CIRs) observation, and provide advanced warning. In addition, L5 is a very attractive point for in-situ scientific measurements that can clarify some of the unknown questions about CMEs and CIRs. The Solar-Terrestrial Relationship And Space Weather Investigation mission STRASWI is a proposed mission to be deployed at the Sun-Earth L4 or L5, which would unprecedentedly track the disturbances propagating towards the Earth with high accuracy. Therefore, it allows scientists to further understand the CMEs structure and role in interplanetary science. STRASWI provides up to 5 days of advanced warning of solar storms before hitting the earth. In addition to studying above, this mission will allow searching for Earth Trojan Asteroid that may be located at the Sun-Earth triangular points. With a series of studies, we indicate that such a mission is in fact feasible. This paper describes the science objects and requirements for STRASWI and mission design including optimization for both the transfer trajectory and the Trojan orbit around L5, configuration analysis of payload to accommodate spacecraft bus platform resolution such as the effective-propulsion system, the precise altitude control, the high capacity communications etc. Finally we will for the first time attempt to launch three explorers flying to L3, L4 and L5 separately with one launcher to achieve tridimensional measurement and try the feasibility of searching for Earth Trojan Asteroid.