

SUITS/SWUSV: A Solar-Terrestrial Space Weather & Climate Investigation

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We present the SUITS/SWUSV microsatellite mission investigation: "Solar Ultraviolet Influence on Troposphere/Stratosphere, a Space Weather & Ultraviolet Solar Variability" mission. SUITS/SWUSV was developed to determine the origins of the Sun's activity, understand the flaring process (high energy flare characterization) and onset of CMEs (forecasting). Another major objective is to determine the dynamics and coupling of Earth's atmosphere and its response to solar variability (in particular UV) and terrestrial inputs. It therefore includes the prediction and detection of major eruptions and coronal mass ejections (Lyman-Alpha and Herzberg continuum imaging) the solar forcing on the climate through radiation and their interactions with the local stratosphere (UV spectral irradiance measures from 170 to 400 nm). The mission is on a sun-synchronous polar orbit 18h-6h (for almost constant observing) and proposes a 7 instruments model payload of 65 kg - 65 W with: SUAVE (*Solar Ultraviolet Advanced Variability Experiment*), an optimized telescope for FUV (Lyman-Alpha) and MUV (200–220 nm Herzberg continuum) imaging (sources of variability); SOLSIM (*Solar Spectral Irradiance Monitor*), a spectrometer with 0.65 nm spectral resolution from 170 to 340 nm; SUPR (*Solar Ultraviolet Passband Radiometers*), with UV filter radiometers at Lyman-Alpha, Herzberg, MgII index, CN bandhead and UV bands coverage up to 400 nm; HEBS (*High Energy Burst Spectrometers*), a large energy coverage (a few tens of keV to a few hundreds of MeV) instrument to characterize large flares; EPT-HET (*Electron-Proton Telescope – High Energy Telescope*), measuring electrons, protons, and heavy ions over a large energy range; ERBO (*Earth Radiative Budget and Ozone*) NADIR oriented; and a vector magnetometer. Complete accommodation of the payload has been performed on a PROBA type platform very nicely. Heritage is important both for instruments (SODSIM and PREMOS on PICARD, LYRA on PROBA-2, SOLSPEC on ISS, ...) and platform (PROBA-2, PROBA-V, ...), leading to high TRL levels (>7). SUITS/SWUSV was designed in view of the ESA/CAS AO for a Small Mission; it is now envisaged for a joint opportunity CNES/NASA with Europeans and Americans partners for a possible flight in 2021.