

Mars observation by space telescope, TOPS

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In situ measurements using orbiting spacecraft are absolutely necessary to understand the dynamics of atmosphere and surrounding environment in Mars. It is one of the most preferable planet to send scientific equipments due to the moderate conditions in the solar system, as similar to the earth. However, it is still important to monitor this planet with a telescope located on or near the Earth. Only an in-situ planetary orbiting spacecraft would not be enough in the roadmap of planetary science, considering risks, time and cost effectiveness. We propose a space telescope mission, TOPS, which is customized for planet observation, including Mars. Two telescopes with diameter of 30 cm are installed at a small satellite bus of about 200kg. The telescopes cover in the wavelength range from 100 nm to 1 μ m with interference filters and liquid crystal variable filters. Four imaging sensors are used according to spectral range and the scientific purpose. TOPS would be a powerful tool for the targets listed below as examples. 1. global distribution of cloud and water vapor in a fixed local time zone, 2. dust distribution and information on its particle size, 3. ionospheric and outflowing atmosphere, 4. aurora and airglow detection, 5. distribution of hydrogen corona.