REMOTE OBSERVATION OF VOLCANOS BY SMALL SATELLITE FORMATIONS

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Volcanic eruptions, severe storms, or desert dust can seriously jeopardize the safety of the air traffic. To prevent encounters of airplanes with such clouds it is necessary to accurately monitor the cloud top heights, which is impossible using currently operational satellites. The most commonly used method for satellite cloud height estimation compares brightness temperature of the cloud with the atmospheric temperature profile. Because of its many uncertainties we propose to exploit the formation of four satellites providing images for photogrammetric analysis. Simultaneous observations from multiple satellites is necessary, because clouds can move with velocities over several m/s. With the proposed mission, we propose a formation of nano-satellites that simultaneously observe the clouds from different positions and orientations. The proposed formation of four satellites will fly in the same orbit with a distance between each satellite of 100 km on the height of 600 km. There are autonomous reaction capabilities realized to focus all satellites on the same surface point for joint observations, enabling by postprocessing 3D surface images. Each satellite will carry a camera operating in visible spectrum providing data with 35 m spatial resolution. Such data will make possible to monitor multilayer clouds with a vertical accuracy of 200 m.