Imaging observation of the Earth's upper atmosphere by ISS-IMAP mission

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ISS-IMAP (Ionosphere, Mesosphere, upper Atmosphere, and Plasmasphere mapping) mission is a scientific mission that installs two imaging instruments on the Exposed Facility of Japanese Experiment Module on the International Space Station (EF of ISS-JEM). It will make imaging observation of the Earth's upper atmosphere with visible-light and infrared spectrum imager (VISI) and extra ultraviolet imager (EUVI). It is one of the scientific and engineering missions that will share one port of EF of ISS-JEM. The objective of this mission is to clarify the physical mechanism of the following three processes: (1) energy transport process by the atmospheric structures whose horizontal scale is 50-500km in the upper atmosphere (2) process of the plasma transport up to 20,000km altitude (3) effect of the upper atmosphere on the space-borne engineering system. ISS-IMAP will measure the following three parameters in the lower latitude region than 50 degrees: (1) distribution of the atmospheric gravity wave in the mesopause (87km), the ionospheric E-region (95km), and the ionospheric F-region (250km) (2) distribution of the ionized atmosphere in the ionospheric F-region (3) distribution of O+ and He+ ions in the ionosphere and plasmasphere. VISI will observe the airglow of 730nm (OH, Alt. 85km), 762nm (O2, Alt 95km), 630nm(O, Alt.250km) in the Nadir direction. Its field-of-view is two slits that have 90-degree width perpendicular to the trajectory of ISS, and direct forward and backward. The vertical structure of the airglow will be determined by stereo observation with these two slits. EUVI will measure the resonant scattering of 30.4nm [He+] and 83.4nm [O+]. Its field-of-view is 15 degrees, and points the limb of the Earth to observe the vertical distribution of the ions. The outline and the current status of the ISS-IMAP mission will be introduced in the presentation.