Observing the Ionosphere using FORMOSAT3/COSMIC and the Remote Ionospheric and Atmospheric Detection System (RAIDS)

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The Remote Atmospheric and Ionospheric Detection System (RAIDS) is a suite of three photometers, three spectrometers, and two spectrographs which span the wavelength range 55-874 nm and remotely sense the thermosphere and ionosphere by scanning and imaging the limb. RAIDS was launched to the Japanese Experiment Module—Exposed Facility (JEM-EF) aboard the International Space Station (ISS) September 10, 2009. The scientific objectives of the new RAIDS experiment are to study the temperature of the lower thermosphere (100–200 km), to measure composition and chemistry of the lower thermosphere and ionosphere, and to measure the initial source of OII 83.4 nm emission. RAIDS provides the opportunity to measure global-scale temperature variations in the lower thermosphere associated with atmospheric tides, which are thought to influence the development of the F-region ionosphere and produce longitudinal modulation of the low latitude ionosphere observed by COSMIC. The lower thermosphere temperatures and day/night electron densities measured by RAIDS can be combined with COSMIC GPS Occultation Experiment and Tiny Ionospheric Photometer data to explore tidal effects in the thermosphere and ionosphere system and validate dayside ionospheric remote sensing methods. Opportunities and approaches to coordinated observations will be discussed.