

Design and Preliminary Results for Ionosphere Photometer on FengYun-3(D) Meteorological Satellite

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Far Ultraviolet Ionospheric PhotoMeter (IPM) is a innovation optical payload on Fenyun-3(D) meteorological satellite which was launched in Nov.15,2017. IPM contributes to the space weather science objectives by providing far ultraviolet remote sensing measurements of the daytime and nighttime atmosphere/ionosphere with high sensitivity. During sunlit atmospheric conditions, IPM measure the nadir irradiation at 135.6 nm and the N2 Lyman-Birge-Hopfield(LBH) Bands to retrieve the atmospheric O/N2 ratio. In conditions of atmospheric darkness, IPM measures the 135.6 nm recombination emission of O+ ions used to compute the nighttime ionosphere F layer peak electron density (NmF2) and integrated electron content (IEC). IPM is a high sensitivity photometer with 5-channel on the filter wheel, and the incidence light pass through the channels sequentially into the photomultiplier tube (PMT). Detecting ultraviolet emissions in the presence of bright visible light is one of the most difficult challenges for Earth pointing ultraviolet instrument, the integrated visible-to-IR albedo is on the order of 10^{11} R, the long wavelength continuum must be reduced by at least a factor of 10^9 , IPM use an innovation technology to depress and measure the stray light. In this paper, we introduce the design of the IPM and the preliminary result on orbit.

Keywords: Far Ultraviolet , ionosphere, innovation photometer, NmF2, O/N2

