The Application of Remote Sensing Instrument (RSI) Simulator

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Abstract: The FORMOSAT-5 is an optical remote sensing satellite with 2 m resolution, which is being developed by the National Space Program Organization (NSPO/NARL) in Taiwan. There are one Panchromatic (PAN) band with 12,000 pixels and four Multi-Spectrum (MS) bands with 6000 pixels in the remote sensing instrument. This paper presents the rationale of remote sensing instrument (RSI) simulator design. The objectives of RSI simulator are to support the development of mission operation and BUS interface control software validation. Also, generating simulated image data to provide image processing system (IPS) for testing utilization before real RSI hardware is not available. The function of RSI simulator consists of two parts, one is camera control simulation including all operational commanding and telemetry processing, and the other one is RSI on-board image data processing chains simulation including compression, ciphering, source formatting, CCSDS packetization and channel coding for image data generation in PAN and MS processing chain.

Camera control simulation is used to validate the interface protocol between RSI electronic unit and BUS on-board computer (CDMU). Image data processing chains simulation is used to study image data compression/de-compression, encryption/decryption algorithm, bit-error analysis and support the validation of image processing system development.

Keywords：RSI, PAN, MS , IPS, CDMU