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National Polar-orbiting Operational Environmental Satellite System Interface Data Processing Segment Architecture

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Abstract

The National Oceanic and Atmospheric Administration (NOAA), Department of Defense (DoD), and National Aeronautics and Space Administration (NASA) are jointly acquiring the next-generation weather and environmental satellite system; the National Polar-orbiting Operational Environmental Satellite System (NPOESS). The National Polar-orbiting Operational Environmental Satellite System replaces the current Polar-orbiting Operational Environmental Satellites (POES) managed by the National Oceanic and Atmospheric Administration and the Defense Meteorological Satellite Program (DMSP) managed by the Department of Defense. The National Polar-orbiting Operational Environmental Satellite System satellites carry a suite of sensors that collect meteorological, oceanographic, climatological, and solar-geophysical observations of the earth, atmosphere, and space. The National Polar-orbiting Operational Environmental Satellite System design allows centralized mission management and delivers high quality environmental products to military, civil and scientific users. The ground data processing segment for the National Polar-orbiting Operational Environmental Satellite System is the Interface Data Processing Segment (IDPS), developed by Raytheon Intelligence and Information Systems. The Interface Data Processing Segment processes the National Polar-orbiting Operational Environmental Satellite System data to provide environmental data products to the National Oceanic and Atmospheric Administration and Department of Defense processing centers operated by the United States government. The Interface Data Processing Segment will process environmental data products beginning with the National Polar-orbiting Operational Environmental Satellite System Preparatory Project (NPP) and continuing through the lifetime of the National Polar-orbiting Operational Environmental Satellite System. The National Polar-orbiting Operational Environmental Satellite System Preparatory Project (NPP) is a planned, joint NPOESS Integrated Program Office and National Aeronautics and Space Administration (NASA) early flight opportunity and risk-reduction mission intended to fly primary NPOESS sensors, test the NPOESS ground system and provide continuity for data currently provided by the NASA Earth Observation System (EOS).

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Within the overall the National Polar-orbiting Operational Environmental Satellite System processing environment, the Interface Data Processing Segment must process a data volume nearly 1000 times the size of current systems -- in one-quarter of the time. Further, it must support the calibration, validation, and data quality improvement initiatives of the National Polar-orbiting Operational Environmental Satellite System program to ensure the production of atmospheric and environmental products that meet strict requirements for accuracy and precision. This presentation will illustrate and describe the architecture approach to hardware and software that is necessary to meet these challenging, and seemingly exclusive, National Polar-orbiting Operational Environmental Satellite System Interface Data Processing Segment design requirements. In addition, it will illustrate the processing relationships required to generate the National Polar-orbiting Operational Environmental Satellite System Preparatory Project products.

The Interface Data Processing Segment is designed to provide high-quality environmental and meteorological data to the National Polar-orbiting Operational Environmental Satellite System Users with very low latency. It leverages highly flexible and expandable, robust IBM hardware to maximize data availability, operational availability, and assured delivery. The Interface Data Processing Segment software architecture provides an efficient solution for National Polar-orbiting Operational Environmental Satellite System Preparatory Project and provides a scalability to meet future National Polar-orbiting Operational Environmental Satellite System needs.