



# Joint Polar Satellite System (JPSS) Common Ground System (CGS)



A flexible, cost-effective global common ground system designed to support current and future weather and environmental sensing satellite missions.

## Key Features and Benefits

- Operational -- supported successful NPP launch
- Flexible architecture designed to quickly adapt to evolving mission needs
- Unique integration of new and legacy technologies
- Available to support diverse civil, military and scientific environmental needs
- Fully integrated global ground system providing very low-latency data delivery
- Enterprise management ensures high system and data availability
- Extensive command & control system operational heritage provides proven reliability
- Flexible data-delivery subscription tailored to the user
- Optimal human-machine mix delivers low operational costs

## The JPSS Program Overview

Joint Polar Satellite System (JPSS) is designed to monitor global environmental conditions in addition to collecting and disseminating data related to the weather, atmosphere, oceans, land and near-space environment. The new system represents a major upgrade to the existing Polar-orbiting Operational Environmental Satellites (POES), which have successfully served the operational weather forecasting community for nearly 50 years. To be operated by the National Oceanic and Atmospheric Administration (NOAA), the new JPSS will support NOAA's requirements by providing global environmental data for NOAA's missions to monitor the earth, manage resources, support the Nation's economy, and protect lives and property.

The JPSS program will also integrate future civilian and military (Defense Weather Satellite System – DWSS) polar-orbiting environmental satellite space and ground segments with a single ground system.

## JPSS Top Level Architecture

JPSS is an “end-to-end” system that includes sensors; spacecraft; command, control and communications; data routing; and ground based processing. JPSS and DWSS spacecraft will carry improved imaging and sounding sensors, thereby increasing NOAA and Department of Defense capabilities to monitor atmospheric, climatic, oceanic, cryospheric, and near-Earth space weather phenomena and perform respective weather and oceanographic forecasting missions. JPSS CGS employs an innovative data collection and processing system to accomplish the task.

The polar orbiters which are able to monitor the entire planet and provide data for long-range weather and climate forecasts, will carry a complement of advanced imaging and sounding sensors that will acquire data at a much higher fidelity and frequency than heritage systems available today.

The JPSS CGS Distributed Receptor Network (DRN) architecture will provide frequent downlinks to maximize contact duration at low cost. JPSS CGS will deliver 95 percent of all Environmental Data Records (EDRs) in less than 30 minutes across the full operating environment.

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## The Raytheon Solution

The JPSS CGS is a mature, tested solution for supporting operational weather and storm forecasting for civil, military, and international partners as well as climate research. It features a flexible design that handles order-of-magnitude increases in data over legacy satellite ground systems' volumes and meets demanding science accuracy requirements.

Developed by Raytheon Intelligence and Information Systems under contract to the JPSS Program Office (PO), the CGS provides the full JPSS common ground capability, from design and development through operations and sustainment.

## The JPSS CGS consists of three main components:

The Command, Control and Communications Segment (C3S) manages the operational mission including mission planning, resource scheduling, satellite command & control, active reception and accounting of mission data, global communications networks, enterprise management, anomaly resolution, system security, and reliable delivery of data to and from central users. A key feature of the C3S is the 15 unmanned global ground stations that receive JPSS and DWSS mission data, termed

the Distributed Receptor Network (DRN). The receptors, linked with high-bandwidth commercial fiber, can quickly transport the data to four U.S. data processing centers. Most data will ultimately be completely processed and delivered to the Weather Centrals in less than 30 minutes from the time of collection.

The Mission Management Center provides accurate, high-performance tools that precisely manage JPSS and DWSS missions. The C3S tools give crews keen insight, comprehensive operational oversight, detailed mission planning capability, full control of space and ground assets, continuous monitoring and assessment of overall system performance.

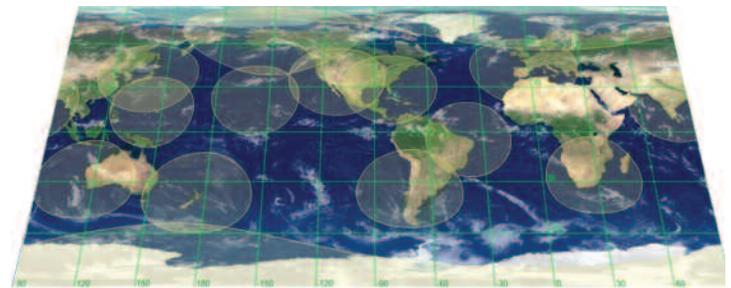
The Interface Data Processing Segment (IDPS) features high-speed, symmetric, multi-processing computers that will rapidly convert large streams of JPSS and DWSS sensor data that are 100 times the volume of legacy data, providing numerous Environmental Data Records (EDR) at four weather Centrals in the United States. These vital EDRs range from atmospheric to land and ocean surface products. The EDRs detail cloud coverage, temperature, humidity and ozone distribution, as well as snow cover, vegetation, sea surface

temperatures, aerosols, space environment and earth radiation budget information. This wealth of information enables numerous users to monitor and predict changes in weather, climate, and ocean conditions. JPSS and DWSS products will also be available to the scientific community to expand our knowledge of the environment.

The Field Terminal Segment, equipped with specially configured IDPS software, will permit worldwide fixed and mobile field terminals deployed aboard ships, at military bases, in theaters of operation, and at educational and scientific institutions to receive and process the continuous broadcasts of JPSS and DWSS sensed data as the satellites pass overhead.

## JPSS and Related Organizations

NOAA, under the Department of Commerce, is the prime customer and funding agency for JPSS. As such, NOAA develops and approves the requirements for the JPSS program and requests JPSS funding from Congress. The National Aeronautics and Space Administration (NASA), via its JPSS Program Office at Goddard Space Flight Center (GSFC), Greenbelt MD, is the developing agency performing day-to-day program management. NASA's JPSS Program Office is the contracting agency for the CGS as well as for the spacecraft and instruments contracts and the integration of DWSS spacecraft, sensors and algorithms into CGS. The NPOESS Preparatory Project (NPP), is an early flight and risk-reduction opportunity for prime JPSS instruments and the CGS.



Distributed Receptor Network Sites



JPSS System Architecture

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