

The Joint Polar Satellite System's (JPSS) Common Ground System (CGS) in Antarctica
An International and Inter-Agency Partnership Success

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International and inter-agency partnerships can powerfully leverage the strengths of the participants to the benefit of all. But when both types of partnerships are realized by one system, the benefits reach worldwide. This presentation highlights the successful implementation of the Joint Polar Satellite System (JPSS) Common Ground System (CGS) fielded at the United States Antarctica Program (USAP) McMurdo Station, Antarctica. The JPSS CGS at McMurdo is a combination of satellite reception and communications projects that provide an unheralded capability on/from the Antarctica continent. The JPSS CGS assets in Antarctica consisting of the McMurdo Multi-Mission Communications System (MMCS) and two JPSS 4-meter Ka/S-band receptors in concert with the NASA MG-1 antenna, brought together a unique collection of partnerships between five participants: The European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) along with four United States (US) agencies – the National Oceanic and Atmospheric Administration (NOAA), the National Aeronautics and Space Administration (NASA), the United States Air Force (USAF) and the National Science Foundation (NSF, the executive manager of the USAP and the principal funding agent for US Antarctic science research.)

This collaborative success, accomplished in two phases, use the strength of the McMurdo Multi-Mission Communications System (MMCS) to move data off the continent. In the first phase, EUMETSAT, NOAA, NASA and the NSF partnered to implement EUMETSAT's Antarctica Data Acquisition (ADA) capability for EUMETSAT's Metop series of polar-orbiting environmental satellites. These four organizations efficiently implemented a new capability connecting McMurdo Station, Antarctica to EUMETSAT's Darmstadt, Germany control centre for the purpose of improving (decreasing) the latency of Metop satellite data by fifty percent, from 130 minutes to 65 minutes. The ADA capability was achieved by integrating organizationally independent components to form a working system for high-latitude southern hemisphere data acquisition and delivery. The ADA utilized the framework of existing cooperative relationships between EUMETSAT, NOAA, NASA, and NSF to the fullest extent possible, with new cooperative elements added where required. EUMETSAT declared ADA operational for Metop on schedule in June 2011 and Metop became the first polar-orbiting environmental satellite to achieve 65-minute data latency operationally. The second phase brought NASA, NOAA, NSF and the USAF together to send the data from the Defense Meteorological Satellite Program (DMSP) satellite downlinked in Antarctica to the Air Force Weather Agency in Omaha, Nebraska. Through USAF funding, JPSS modified their Ka-band antennas with a S-band capability prior to installation in Antarctica, allowing for the half-orbit DMSP data to be downlinked at McMurdo. Using the MMCS, these data are sent to AFWA where it's rapidly processed and provided freely to the worldwide meteorological community without artificial delay via the National Geophysical Data Center (NGDC) in Boulder, Colorado. This capability decreased the receipt time for DMSP data from 110 minutes to 55 minutes. The USAF declared the McMurdo DMSP project an Initial Operational Capability (IOC) in March 2012.

The improved latency from both of these efforts provides both US and European weather services more frequent environmental observations for near-real-time mesoscale and mid/long-range global weather forecasts. The unique nature of this international partnership was made possible through the cooperation of the National Science Foundation (NSF), the controlling agency for all United States

activities on Antarctica. The NSF is responsible for the base infrastructure and provides the microwave link and the Black Island Telecommunications Facility (BITF) that are integral parts of the MMCS architecture. Together the international partners overcame many obstacles to establish a capability that will serve mankind worldwide for many years to come.