CENTRALIZED WEATHER ANALYSIS AND FORECASTING CENTERS

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Weather operations require significant amounts of data and complex information technology infrastructures to ingest, process, and disseminate data. Numerical weather prediction models also require large and expensive high-performance computing centers. These requirements drive the need to centralize certain weather capabilities, including climate services and space weather analysis and prediction. Centralized weather analysis and forecasting centers perform the weather *analysis and forecasting* function primarily using the *collection*, *processing*, *analysis*, *prediction*, *tailoring*, and *dissemination* processes.

NUMERICAL WEATHER PREDICTION

Department of the Air Force (DAF) numerical weather prediction support includes traditional, physics-based environmental models used to simulate and predict the total atmosphere, including the near-Earth space environment as well as specialized models to predict operationally significant parameters such as clouds, land surface, and volcanic ash. This capability requires the use of a sophisticated high-performance computing center to process terabytes of raw environmental observations and run computationally intensive numerical weather prediction schemes to deliver forecast data and products. The size and cost of this computing center precludes operating multiple centers at forward locations.

CLIMATE SERVICES

DAF weather climate support is the authoritative source for climate data for the Department of Defense and other US Government agencies and produces specialized climate studies and assessments used to optimize military and intelligence operations and planning. Like numerical weather prediction, this capability often requires the use of sophisticated high-performance computing centers to process terabytes of raw environmental observations received daily. Climate services are available to weather operators and other DOD users via reachback operations.

AIR FORCE WEATHER WING

DAF weather delivers worldwide weather information to joint warfighters, combatant commands, and national programs through a specialized mission wing (referred to hereafter as the Air Force weather wing), and subordinate weather groups, which act as the primary production centers for the weather *analysis and forecasting* function of DAF weather operations. Due to extensive processing systems, data storage capacity, and communications requirements, the weather *analysis and forecasting* function is generally performed by centralized weather analysis and forecasting centers. The Air Force weather wing is responsible for leveraging service capabilities to collect atmospheric and space weather data from commercial, civil, and military sources. The data is processed, analyzed, and used to create a four-dimensional representation of the natural environment, which are then available for use by subordinate weather units or other operational units such as air operations centers (AOC).

Operational Weather Squadrons (OWS). The OWSs form the backbone of regionally focused, centralized weather analysis and forecast operations, providing a variety of weather products and support to Air Force, Army, Air National Guard, Air Force Reserve forces, US Space Force, and other users as directed in their respective operational areas. The OWSs provide airfield weather services via reachback for locations without assigned weather personnel. OWSs' areas of responsibility are aligned with the Unified Command Plan's geographic combatant commands. Generally, the OWS focus on analysis and forecasting, delivering products for use by an AOC and weather organizations integrated at Army and Air Force locations.

Space Weather Support. Weather personnel providing space weather support to the DOD use space weather data collections from a global network of ground and space-based sensors to provide mission-tailored analyses, forecasts, warnings, and strategic level products. These products are used for mission planning and environmental situational awareness.

Space Launch and Test Operations Support. Weather squadrons (and units below squadron level) supporting space launch and test operations provide upper air observations, forecasts, launch probabilities of violation, and additional unique or specialized weather support as required. These units provide general weather information for launch sites, specified ranges, and abort landing sites as well as dedicated weather team integration with range operations crews. Units supporting tests provide staff meteorologists to perform or support basic research, development, acquisition, and testing of DAF weapon systems and capabilities through identifying, documenting, and helping resolve environmental sensitivity issues to support acquisition programs.

National Intelligence Community Support. Environmental support to the national intelligence community is provided using data collected from various sensors and sources across all enclaves to provide mission-tailored forecasts and impacts to operations. These weather products are used for mission planning and environmental situational awareness.
