

## **Next Generation Ionosonde (NEXION), (DPS 4-D). FAC: 1341**

CATCODE: 149XX7

OPR: AFWA/A5/A8, MAJCOM/A3W

OCR: MAJCOM/A6

1.1. **Description.** NEXION is an unmanned ionosonde facility that supports activities to sense and report ionospheric information for comprehensive and ongoing environmental analysis and mission impact assessment. NEXION is vertical incidence radar used to obtain information about the ionosphere directly overhead and consists of 30 systems worldwide and one test system. NEXION provides a 24/7 remote monitoring capability of the ionosphere by analyzing the signals reflected from the ionosphere and providing data to AFWA via the NIPRNet to be ingested into the new generation of Global Assimilation of Ionospheric Measurements (GAIM).

1.2. **Requirements Determination.** This facility supports activities and equipment to sense and report ionospheric information 24/7 to support and maintain battlespace awareness. Obtain further information through AFWA/A5/8 or MAJCOM/A3 weather staff.

1.3. **Scope Determination.** A NEXION site consists of a support building consisting of approximately 5 m<sup>2</sup> (50 ft<sup>2</sup>), four receiving antennas placed in a triangular 60 degree configuration 60 m (197 ft) apart with #2 and #3 antennas aligned to magnetic north, and the #1 antenna centered between antennas #2 and #3 but physically located 34.64 m (114 ft) to the west of antenna #4. See [Figure 1.2](#) for alignment and placement. Distance between the transmit tower and receiver antennas is 30 m (98.4 ft) minimum separation. The transmit antenna requires 15.24 m (50 ft) clearance between the transmit antenna and potential obstructions such as trees, shrubs, etc. The transmit antenna is approximately 100 ft high. NEXION collects local ionosphere measurements using a transmitter that sweeps through the medium and high frequency radio bands (0.5-30 MHz). Each NEXION system consists of one desktop 4-D system (with monitor and key board), four active crossed loops turnstile receive antennas, and one transmit tower with two orthogonal radiating elements.

1.4. **Dimensions.** A NEXION antenna field requires approximately one acre of land for the system. The support building requires environmental controls with a Heating, Ventilating, and Air Conditioning (HVAC) system and contains a desktop 4-D system with keyboard and monitor and a UPS with associated system equipment.

### **1.5. Design Consideration.**

1.5.1. **Communications Requirements.** NEXION requires NIPRNet connections to the GIG and DSN Class A phone lines.

1.5.2. **Power Requirements.** Locate a master power switch or emergency cut-off switch for the NEXION unit near the main entrance that is labeled and protected by a cover to prevent accidental shut-off. The system also requires automatic voltage control for the power source feeding the NEXION DPS-4D unit with a UPS system. The requirement for emergency power is determined under AFI 32-1063.

1.5.3. **Special Features.** NEXION sites require non-metallic fencing to preclude electronic interference. Site/facility security ensures only authorized personnel with a need-to-know are granted physical access to computing facilities that house the NEXION DPS-4D unit. The facility requires controlled access during working hours and should be locked during non-work hours. A fire suppression system is necessary with a local and remote fire activation and alarm capability.

Figure 1.2. NEXION Antenna Layout.

