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Overview of the Next Generation Air/Ground Communication System Program

The purpose of this program is to provide air/ground (A/G) communications in support of safety-critical Air Traffic Control (ATC) services. These services are provided on line-of-sight based systems from approximately 2500 sites. Specific needs addressed include the following:

- Provide Air Traffic (AT) controllers the capability to accommodate the growing number of sectors and services using the available, limited radio frequency (RF) spectrum.
- Reduce logistical costs (supplies, maintenance, training, etc.), i.e., replace expensive to maintain VHF and UHF radios that have exceeded their life expectancy by 10 years.
- Provide new data link communications capability to all classes of users.
- Reduce A/G RF interference and provide security mechanisms to identify unauthorized users (e.g., "phantom controllers").

A principal part of the program will be the replacement of approximately 54,000 existing VHF and UHF transmitters and receivers. The planned capability is to provide a next-generation A/G communications system to satisfy the current and identified future functional requirements that cannot be met using the current voice communications system. The capabilities of the planned system would include the following:

- Ensure the available radio frequency (RF) spectrum can meet efficient utilization for voice and data requirements;
- Reduce susceptibility to radio frequency interference (RFI);
- Improve communications systems security;
- Support remote maintenance monitoring;
- Reduce user workload;
- Provide consistent voice quality over a range of operating conditions.

The current VHF system operates in the 118 to 137 megahertz band using double sideband amplitude modulation (DSBAM). The new system to be deployed under this program will use digital modulation and time division multiple access (TDMA) to provide a flexible mix of voice and data channels within 25 kilohertz channels in the existing band. International Civil Aviation Organization (ICAO) Standards and Recommended Practices (SARPs) are being prepared for the new system. RTCA, Inc., Special Committee 172 is developing U.S. standards. All VHF radios purchased under this program will be able to operate in either the AM or TDMA mode.

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It is clear that the TDMA system will operate most efficiently within a digital network environment. To that end, interface standards and related design details are being worked in conjunction with the program Modernization of Voice Switching Systems (MNS-136).

The current UHF system operates in the 225 to 400 megahertz band DSBAM. The new system to be deployed under this program is currently expected to use a UHF radio architecture system operating in the 25 kHz DSBAM voice only mode. Study of possible alternate support methods for UHF services is ongoing.¹

Key milestones for the program are:

KDP-2 Approval - First Quarter 1996

KDP-3/4 Approval - 1997

ICAO SARPs Validated - 1998

RFP Issued and Contract Award - 1999

Initial Operational Capability - 2000

High-Sector System Complete - 2003 - Provides digital VHF radio coverage for all high-altitude sectors, sectors that are normally used only by commercial and military aircraft, and constitutes approximately one-third of the system.²

Low-Sector System Complete - 2010 - The remaining two-thirds of the system.

Work is underway on formulation of operational requirements; a preliminary set of requirements will be posted in the Nex_Gen_Radio directory in December, 1995.

1 Study being undertaken by FAA and DOD.

2 Equipage of UHF capability subject of ongoing study.