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UNIFIED FACILITIES CRITERIA (UFC)

DESIGN AND O&M:
MASS NOTIFICATION SYSTEMS

UNIFIED FACILITIES CRITERIA (UFC)

MASS NOTIFICATION SYSTEMS

AIR FORCE CIVIL ENGINEER SUPPORT AGENCY (Preparing Activity)

NAVAL FACILITIES ENGINEERING COMMAND

U.S. ARMY CORPS OF ENGINEERS

Record of Changes (changes are indicated by **1**\.../**1**/).

Change No.	Date	Location

This UFC supersedes UFC 4-021-01, *Design and O&M: Mass Notification Systems*, dated 18 December 2002.

FOREWORD

The Unified Facilities Criteria (UFC) system is prescribed by MIL-STD 3007 and provides planning, design, construction, sustainment, restoration, and modernization criteria, and applies to the Military Departments, the Defense Agencies, and the DoD Field Activities in accordance with USD(AT&L) Memorandum dated 29 May 2002. UFC will be used for all DoD projects and work for other customers where appropriate.

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CHAPTER 1

INTRODUCTION

1-1 **BACKGROUND.** Mass notification is the capability to provide information and instructions to people, in a building, area, site, or Installation using intelligible voice communications including visible signals, text, and graphics, and possibly including other tactile or other communication methods. This capability is intended for the protection of life by indicating the existence of an emergency situation and instructing people of the necessary and appropriate response and action.

This UFC was developed by collecting and refining criteria from Department of Defense (DoD) anti-terrorism guidance, examining previous mass notification system evaluation reports, and reviewing the capabilities of representative, commercially available mass notification systems and products.

1-2 **PURPOSE.** To provide mass notification in compliance with the DoD requirements.

1-3 **SCOPE.** This Unified Facilities Criteria (UFC) provides the design, operation and maintenance requirements of Mass Notification Systems (MNS) for DoD facilities. The requirement for a MNS is established by UFC 04-010-01 *Minimum Antiterrorism Standards for Buildings*. This document is intended to assist in the design of systems that meet an established requirement and to give guidance to Commanders, architects, engineers, and end users on design, operation and maintenance of MNS.

1-3.1 **Applicability**. This UFC applies to new construction, major renovations, and leased buildings and must be utilized in accordance with the applicability requirements of UFC 4-010-01 or as directed by Service Guidance. See UFC 4-010-01 for facilities that must be considered.

1-3.2 **Service Exception.** Where one or more Service's criteria vary from the other Services' criteria, it is noted in the text with the  (Service Exception) symbol.

1-3.3 **Compliance with Criteria.** Do not deviate from these criteria without prior approval from the component office of responsibility:

- U.S. Air Force: Air Force Civil Engineer Support Agency, Engineering Directorate (HQ AFCESA/CES)
- U.S. Army: U.S. Army Corps of Engineers, Directorate of Civil Works, Engineering and Construction (HQ USACE/CECW-E)
- U.S. Navy: Naval Facilities Engineering Command, Headquarters Chief Engineer Organization (NAVFACENGCOM HQ Code CHE)
- U.S. Marine Corps: (HQMC Code LFF-1)
- Defense Logistics Agency Director (HQ DLA-D) through Support Services (DLA-DSS-IP)

- National Geospatial-Intelligence Agency (NGA), Security and Installations
- Other DoD components: the Office of the Deputy Under Secretary of Defense (Installations & Environment) (DUSD [I&E]) via the DoD Committee on Fire Protection Engineering.

The component office of responsibility is also referred to in this UFC as the authority having jurisdiction.

1-3.4 **Waivers.** The authority having jurisdiction may approve waivers. Requests must include justification, risk analysis, cost comparisons, criteria applied, and other pertinent data. Lack of funds or cost savings do not justify a waiver. Waivers are granted on a case-by-case basis and do not extend to cases with similar circumstances.

1-3.5 **Implementation.** Implementation of an effective mass notification system will require the coordinated efforts of engineering, communications, and security personnel. Fire protection engineering personnel are needed for the successful implementation of this UFC because they bring a special expertise in life safety evaluations, building evacuation systems, and the design of public notification systems. Coordination with communications personnel is required when the MNS is connected to the DoD Installation's communications infrastructure. Security personnel are ultimately responsible for the protection of building occupants, and will be the primary users of a mass notification system.

1-3.6 **Responsibilities.** DoD does not mandate which organizations are responsible for funding, operation, or maintenance of mass notification systems installed in accordance with UFC 4-010-01; each DoD component must assign those responsibilities.

1-3.6.1 **Air Force (AF).** AF Communications Squadrons are responsible for maintaining Giant Voice systems in accordance with Air Force Instruction (AFI) 21-116 on AF Installations. Civil Engineering Squadrons are responsible for maintaining Individual Building MNS on AF Installations that are designed and installed in accordance with this UFC.

1-3.7 **Retroactivity.** Existing mass notification systems installed in compliance with an earlier version of this UFC do not have to be modified to meet the requirements of the current edition of this UFC. However, any alteration or any installation of new equipment shall meet, as nearly as practicable, the requirements for new mass notification systems.

1-4 **REFERENCES.** See Appendix A.

1-5 QUALIFICATIONS OF SUPPLIERS AND CONTRACTORS

1-5.1 **System Integrators and Contractors.** Use system integrators and contractors that are able to demonstrate a full knowledge and understanding of systems used for mass notification, and that have factory-trained personnel to perform system design, installation, testing, training, and maintenance.

1-5.2 **Mass Notification System Component Products and Manufacturers.** Only accept products from manufacturers that can meet the design criteria of this UFC and can demonstrate 5 years of experience in producing products similar to those required for mass notification.

1-5.3 **Performance and Acceptance Testing.** Upon completion of the installation, the contractor must complete performance testing of the mass notification system for compliance with this UFC. Upon successful completion of performance testing, the contractor must complete a witnessed acceptance test. Performance testing will be spot-checked and acceptance testing will be witnessed by local representatives of the authority having jurisdiction.

1-5.4 **Installation Records.** The contractor must provide a complete set of record drawings and operations and maintenance manuals for the mass notification system. Record drawings and operations and maintenance manuals must provide information for troubleshooting, preventive maintenance, and corrective maintenance.

1-6 **SECURITY ENGINEERING UFC SERIES.** This UFC is one of a series of security engineering Unified Facilities Criteria documents that cover minimum standards, planning, preliminary design, and detailed design for security and antiterrorism. The manuals in this series are designed to be used sequentially by a diverse audience to facilitate development of projects throughout the design cycle. The manuals in this series include the following:

1-6.1 **DoD Minimum Antiterrorism Standards for Buildings.** UFC 4-010-01 and 4-010-02 establish standards that provide minimum levels of protection against terrorist attacks for the occupants of all DoD inhabited buildings. Those UFC are intended to be used by security and antiterrorism personnel and design teams to identify the minimum requirements that must be incorporated into the design of all new construction and major renovations of inhabited DoD buildings. They also include recommendations that should be, but are not required to be incorporated into all such buildings.

1-6.2 **Security Engineering Facilities Planning Manual.** This manual presents processes for developing the design criteria necessary to incorporate security and antiterrorism into DoD facilities and for identifying the cost implications of applying those design criteria. Those design criteria may be limited to the requirements of the minimum standards, or they may include protection of assets other than those addressed in the minimum standards (people), aggressor tactics that are not addressed in the minimum standards, or levels of protection beyond those required by the minimum standards. The cost implications for security and antiterrorism are addressed as cost increases over conventional construction for common Construction Types. The changes in construction represented by those cost increases are tabulated for reference, but they represent only representative construction that will meet the requirements of the design criteria. The manual also addresses the tradeoffs between cost and risk. The Security Engineering Facilities Planning Manual is intended to be used by planners as well as security and antiterrorism personnel with support from

planning team members.

1-6.3 **Security Engineering Facilities Design Manual.** UFC 4-020-02 provides interdisciplinary design guidance for developing preliminary systems of protective measures to implement the design criteria established using UFC 4-020-01. Those protective measures include building and site elements, equipment, and the supporting manpower and procedures necessary to make them all work as a system. The information in UFC 4-020-02 is in sufficient detail to support concept level project development, and as such can provide a good basis for a more detailed design. The manual also provides a process for assessing the impact of protective measures on risk. The primary audience for the Security Engineering Design Manual is the design team, but it can also be used by security and antiterrorism personnel.

1-6.4 **Security Engineering Support Manuals.** In addition to the standards, planning, and design UFC mentioned above, there is a series of additional UFC that provide detailed design guidance for developing final designs based on the preliminary designs developed using UFC 4-020-02. These support manuals provide specialized, discipline specific design guidance. Some address specific tactics such as direct fire weapons, forced entry, or airborne contamination. Others address limited aspects of design such as resistance to progressive collapse or design of portions of buildings such as mailrooms. Still others address details of designs for specific protective measures such as vehicle barriers or fences. The Security Engineering Support Manuals are intended to be used by the design team during the development of final design packages.

CHAPTER 2

OVERVIEW OF SYSTEMS

2-1 **SCOPE.** This chapter includes important definitions and provides an overview of mass notification systems.

2-2 **CAPABILITY.** Mass notification is the capability to provide information and instructions to people, in a building, area, site, or DoD Installation using intelligible voice communications including visible signals, text, and graphics, and possibly including tactile or other communication methods. These systems are intended for the protection of life by indicating the existence of an emergency situation and instructing people of the necessary and appropriate response and action.

2-3 **LIFE SAFETY SYSTEMS**. MNS are designated as life safety systems in a manner similar to DoD required fire protection systems.

2-4 **ACCESSIBILITY.** Compliance with Uniform Federal Accessibility Standards (UFAS) for MNS is required. Visual alarm notification devices shall be provided inside of buildings for hearing impaired persons when new MNS are installed. Providing visual alarm notification devices is required for DoD compliance with Executive Order 13347, *Individuals with Disabilities in Emergency Preparedness.*

2-5 **SYSTEM TYPES.**

2-5.1 **Wide Area MNS.** Wide area mass notification systems are installed to provide real-time information to outdoor areas of a DoD Installation. These systems are normally provided with and operated from two or more central control stations. Communications between central control stations and individual building mass notification systems is provided. Communications between the central control stations and regional or national command systems may also be provided. The requirements to install wide area mass notification systems are specific to each Department of Defense (DOD) component. A general DoD requirement to install these systems on all DoD Installations has not yet been established.

2-5.1.1 **Army Installations.** Wide area mass notification systems shall be installed on Army Installations in accordance with Army Chief of Staff anti-terrorism guidance.

2-5.1.2 **Air Force Installations.** A wide area mass notification system shall be a component of and connected to the “Installation Warning System” (IWS) that is required by Air Force Instruction (AFI) 10-2501, *Full Spectrum Threat Response (FSTR) Planning and Operations.* (See Chapter 14 of AFI 10-2501 for the definition of and requirements for IWS). The IWS typically includes a “Giant Voice” system for outdoor notification of personnel.

2-5.1.3 **Marine Corps Installations.** A wide area mass notification system is required on every Marine Corps Installation.

2-5.1.4 **Navy Installations.** Wide area mass notification systems shall be installed on Navy Installations in accordance with Chief of Naval Operations (CNO) anti-terrorism guidance.

2-5.2 **Individual Building MNS.** Individual Building mass notification systems (MNS) are installed to provide real-time information to all building occupants or personnel in the immediate vicinity of a building, including exterior egress and gathering areas. These systems are designed to operate from one or more locations in the building, and operate with or without connection to a Wide Area MNS - but must be connected to and compatible with the Wide Area MNS if one is provided on the DoD Installation. All DoD components are required to provide Individual Building mass notification capability.

2-5.2.1 **DoD Requirements.** DoD is required to provide mass notification for new and existing buildings when required by UFC 4-010-01. Beginning with the fiscal year 2004 construction program, mass notification is required in all new inhabited buildings, including new primary gathering buildings and new billeting. Mass notification is required in existing primary gathering buildings and existing billeting when implementing a project exceeding the replacement cost threshold specified in UFC 4-010-01. Mass notification is recommended in other existing inhabited buildings when implementing a project exceeding the replacement cost threshold. Mass notification is required for leased buildings, building additions, and expeditionary and temporary structures (see UFC 4-010-01).

CHAPTER 3

WIDE AREA MNS

3-1 **SCOPE.** Wide Area mass notification systems (MNS) are intended to provide real-time information to outdoor areas of a DoD Installation. Small facilities that are exempted by UFC 4-010-01 from providing Individual Building MNS could be covered by a Wide Area MNS. These buildings could include single-family and duplex military family housing, individual lodging buildings housing 10 occupants or less, shopettes, automobile service stations, storage buildings with very low density of occupancy, military family campgrounds, etc. The requirements to install Wide Area MNS are specific to each Department of Defense (DOD) component. A general DoD requirement to install these systems on all DoD Installations has not been established.

3-2 **REQUIREMENTS FOR SYSTEM DESIGNERS.** The Wide Area MNS shall be designed under the supervision of Communications, Electrical, or Fire Protection Engineer having at least Bachelor of Science degree in Engineering from an accredited university engineering program plus a minimum of 5 years work experience in engineering related to Wide Area MNS. Alternately, the Wide Area MNS may be designed by an engineering technician qualified at National Institute for Certification in Engineering Technologies (NICET) Level IV in fire alarm systems plus a minimum of 10 years work experience in engineering related to Wide Area MNS. Analysis of wind, seismic, and static and dynamic loads on speaker array platforms shall be verified by a Registered Professional Engineer with expertise in structural engineering.

3-3 **SYSTEM SIGNALS.** Wide Area MNS shall include an outdoor speaker and siren system providing voice signals, music, and alarm tones.

3-3.1 **Voice Signals.** Wide Area MNS shall be capable of providing intelligible live and pre-recorded voice signals.

3-3.2 **Music.** Wide Area MNS shall be capable of providing music, such as the National Anthem, and other musical signals such as Attention to Colors, Reveille, and Taps.

3-3.3 **Tones.** Wide Area MNS shall be provided with standard Federal Emergency Management Agency (FEMA) weather warning tones. Military specific warning tones shall be provided as specified by the DoD Installation, and should include tones for conventional attack warning, non-conventional attack warning, all clear, and a system test tone. Such tones should be similar to Civil Defense tones originally developed during World War II and the Cold War era.

3-4 **SUBSYSTEMS**

3-4.1 **Description.** Wide Area MNS includes several subsystems: central control stations; high power speaker arrays (HPSA); communication links; and ancillary equipment.

3-4.2 **Central Control Stations.** These stations operate and control the system.

3-4.3 **HPSA.** Used to provide the sound signals to the outdoor locations on the DoD Installation.

3-4.4 **Communications Links.** Used for sending signals between the central control stations and the HPSA, and between the central control stations and regional or national command centers, if provided. A primary and redundant means of communication shall be provided.

3-4.5 **Ancillary Equipment.** This equipment includes items such as aircraft obstruction lights, anti-nesting spikes, and meters to meet local DoD Installation requirements.

3-5 **CENTRAL CONTROL STATIONS.** The Wide Area MNS shall be provided with at least one primary and one redundant (backup) central control stations.

3-5.1 **Locations.** The locations of the central control stations shall be coordinated with the security forces on each DoD Installation. The primary central control station should be located at the Installation Operations Center (IOC), Command Post, or Emergency Operations Center (EOC) or similar location. The redundant central control center should be located at a physically separate location such as a security forces building, military police station, fire station, or Director for Emergency Services.

3-5.2 **On-Installation Control.** The central control stations shall control the operation of outdoor speakers on the DoD Installation. Communications shall be provided between the central control stations and individual building MNS. The Wide Area MNS shall communicate with other DoD Installation notification systems such as the telephone alerting system, paging system, commander’s channel on public access television stations, and Highway Advisory Radio and Sign Control system (used for dynamic control of radio information and traffic signs for emergency information and traffic management.)

3-5.3 **Off-Installation Interface.** Communications between the central control stations and regional or national command systems shall be provided for Navy Installations and when required for other Department of Defense (DoD) components.

3-5.4 **Central Control Station Requirements.** The Central Control Unit shall consist of the following components and features:

3-5.4.1 **Graphical User Interface.** This should be a computer interface with sufficient capability to operate the system that will allow for easy point and click operations.

3-5.4.2 **Backup Power.** Each Central Control Station shall be equipped with batteries to supply power for a minimum of 4 hours of full load operation when the central control station is provided with a backup electrical power generator. This electrical power

generator need not be dedicated solely to the central control station, but may be intended to supply other important electrical loads in addition to the central control station. If not provided with a backup electrical power generator, the batteries shall be able to supply power for a minimum of 48 hours of full load operation.

3-5.4.3 **Inputs.** The central control station must provide capability for at least the following features:

3-5.4.3.1 Total, zone, and single voice activations.

3-5.4.3.2 Total, zone, and single tone activations.

3-5.4.3.3 Total, zone, and single music activations.

3-5.4.3.4 Total, zone, and single tests.

3-5.4.3.5 Total, zone, and single signal cancellations.

3-5.4.3.6 Automatic status reporting for each HPSA, and all activations and the status of the activations.

3-5.4.3.7 Alarm Summary Report. This shall provide a historical report for, at least, all changes of status including all troubles, equipment failure, power system trouble (including normal and emergency power), unsolicited messages, door intrusion, amplifier status, last activation and synchronization error, operator log-on/ log-off and configurable reports for time-based events such as “report all troubles from 1/01/04 to 6/30/04”.

3-5.4.3.8 Communications logs in tabular format.

3-5.4.3.9 Screen displays of the customized DoD Installation maps and all general status of the speakers or remote equipment. This graphical user interface (GUI) shall provide for easy uploading of DoD Installation specific plan changes and for interactive operation.

3-5.4.3.10 Multiple levels of password protection, including at least levels for system operators, maintainers, supervisors, and military commanders.

3-5.4.3.11 The ability to record and send digital messages to the HPSA’s via primary and redundant communication links and to receive confirmation the message was received at the HPSA.

3-5.4.3.12 The capability to connect to and control road traffic signs.

3-5.4.3.13 The capability to deliver at least two concurrent voice messages: one for threatened areas or buildings and one for adjacent areas or buildings.

3-5.4.3.14 The capability to target specific messages to any individual HPSA, zone of HPSA's, or to all areas on the DoD Installation.

3-5.4.3.15 Means for dynamic or "on-the-fly" configuration of zoning.

3-5.4.3.16 Secure method for easily creating or modifying recorded messages.

3-5.4.3.17 Capable of delivering text pager messages to pager stations.

3-5.4.3.18 Capable of delivering faxes over the telephone system or Ethernet.

3-5.4.3.19 Capable of connection to "Reverse 911" systems and other telephone dialing/notification systems.

3-5.4.3.20 Microphone for live voice announcements.

3-5.4.3.21 Capable of performing silent test.

3-5.4.3.22 Capability to adjust the volume of the speakers at the HPSA. The central control station shall have the capability to control individual speakers at each HPSA.

3-5.4.3.23 Capability to store at least 60 minutes of pre-recorded messages.

3-6 HIGH POWER SPEAKER ARRAYS (HPSA)

3-6.1 **Arrangement in Zones.** HPSA shall be arranged into zones so that each zone can be individually controlled by the control station.

3-6.2 **Directional Characteristics.** HPSA shall be designed with directional characteristics that will minimize the distortion of voice signals by interface from other zones, and will minimize the transmission of voice, siren, or other sound signals into environmentally sensitive areas or off the DoD Installation.

3-6.3 **Open Outdoor Areas.** HPSA shall be designed to maintain the intelligibility of voice signals within the zone at a level no less than 0.7 on the Common Intelligibility Scale (CIS) in open outdoor areas. Intelligibility may be less than 0.7 CIS in other areas of the zone if personnel can determine that a voice signal is being broadcast and they could walk less than 50 meters to find a location with at least 0.7 CIS.

Note: Physical limitations in outdoor sound propagation limit the maximum distance of personnel from the sound system speaker to the range of about 450-550 m (1475-1800 ft) for the receipt of an intelligible voice message. Increases in speaker output power in an attempt to extend this distance will cause distortion of the voice message and decrease its intelligibility to unacceptably low values. In congested areas (such as in industrial areas with many multi-story buildings), the maximum distance of personnel from an outdoor speaker often has to be significantly reduced to retain acceptable

intelligibility of the voice message.

3-6.4 **Congested Outdoor Areas.** HPSA shall be designed to maintain the intelligibility of voice signals within the zone at a level no less than 0.9 on the Common Intelligibility Scale (CIS) in congested outdoor areas, such as those with high concentration of multi-story buildings in close proximity. Many DoD Installations contain one or more congested outdoor areas. The boundaries of congested outdoor areas shall be established by the DoD Installation. Intelligibility may be less than 0.9 CIS in other areas of the zone if personnel can determine that a voice signal is being broadcast and could walk less than 25 meters to find a location with at least 0.9 CIS.

3-6.5 **Noise Pollution.**

3-6.5.1 **Design Goals.** Use speakers designed to prevent back-plane emissions for HPSA zones where the speakers will be mounted directly to an occupiable building, or where noise pollution is a concern for off-Installation populated areas or sensitive wildlife areas.

3-6.5.2 **Speakers Attached to Buildings.** Speakers attached to occupiable buildings shall be capable of using phase shifting and filtering to help eliminate unwanted “spillover” emissions and back-plane noise.

3-6.5.3 **Measuring Noise in Buildings.** Back-plane noise transmitted inside of occupiable buildings shall be at least 15 decibels (adjusted) (dBA) below ambient noise.

Note: Preventing back-plane emissions will often require the use of planer-type speaker technology.

3-6.6 **HPSA Inside of Buildings.** HPSA zones shall not be used to provide mass notification inside any structures when UFC 4-010-01 would require an Individual Building MNS if built new or renovated.

3-6.7 **HPSA Speaker Sites.** Each HPSA site for each zone shall include a field mounted local control unit, microprocessor, amplifier, charger, power supply, radio, mounting brackets and loudspeaker assembly for pole or building mounting.

3-6.7.1 **Locations of Sites.** Locations of the HPSA sites shall be verified and recorded with Global Positioning System (GPS) coordinates. These locations shall be established prior to installation as part of a site survey conducted jointly by the installing contractor and the DoD Installation.

3-6.7.2 **Equipment Cabinets.** All equipment for each HPSA speaker site shall be housed in modular, mountable cabinets suitable for the local environmental conditions.

3-6.7.3 **Surge Suppression.** All external conductors shall be provided with surge suppression tested to Underwriters Laboratories (UL) standards as specified by UFC 3-520-01, *Interior Electrical Systems* (see Chapter 11).

3-6.8 **HPSA Performance.**

3-6.8.1 **Control Unit Features.** The HPSA control units shall provide at least the following components and features:

3-6.8.1.1 Fully addressable controller.

3-6.8.1.2 Ability to receive and store messages via the primary and redundant communication links with a confirmation signal sent back to the primary and redundant central control stations.

3-6.8.1.3 Charger/ power supply that will accept alternating current input, backup electrical power generator input, battery input, or solar power cell input.

3-6.8.1.4 Capable of storing at least 60 minutes of pre-recorded messages.

3-6.8.1.5 Capable of providing a minimum of seven (7) standard tones. In addition, the systems shall have the capability to provide custom tones.

3-6.8.1.6 Accept and play an auxiliary input from a digital recording device such as a CD player, MPEG3 player, etc.

3-6.8.1.7 Accept and play an auxiliary input from a live microphone.

3-6.8.1.8 Dual amplifier for system redundancy. The amplifier efficiency shall be not less than 90%. The amplifier shall have not more than 0.1 percent total harmonic distortion (THD). The amplifier frequency response shall be at least 50 Hz to 10,000 Hz. No more than 2 percent THD at the speaker at 1000 Hz.

3-6.8.1.9 Autonomous control capability at each HPSA. The HPSA shall be able to function independently of the central control station. The HPSA shall be furnished complete with a local microphone and autonomous controls.

3-6.8.1.10 Control of individual speakers of the HPSA at the central control stations.

3-6.8.1.11 Headphone input to permit private listening of the system broadcast at each HPSA for testing purposes.

3-6.8.1.12 USB input for connecting a laptop computer or digital device to make field changes.

3-6.8.1.13 Tamper switch that will signal the central control station that the HPSA enclosure door is open.

3-6.9 **Temperature Rating.** Speakers shall be able to operate between the temperatures of -40 to +80 C. Enclosures shall protect the HPSA control unit from

external temperatures ranging from -40 to +80 C.

3-6.10 **Battery Backup Power.** Each HPSA site shall be equipped with backup batteries to supply power for a minimum of 72 hours of electrical supervision following the loss of normal electrical power, followed by with 60 minutes of full load operation at the end of the supervisory period.

3-6.11 **Connection to Portable Electrical Power Generator.** Each HPSA site shall be provided with connectors for direct connection of a commercially available portable electrical power generator or a military-approved Mobile Electrical Power (MEP) generator, as specified by the DoD Installation.

3-6.12 **Platforms**

3-6.12.1 **Required.** Platforms shall be provided at each HPSA site other than those attached directly to a building.

3-6.12.2 **Loading, Wind and Seismic Design.** The platforms shall be designed for effective projected area, base yield strength, anchor bolts yield strength, and foundation size to accept the total static and dynamic load of the sound system and all attachments. The platform shall be designed for the design wind load at the DoD Installation, but no less than a velocity wind pressure at 86.8 knots (100 miles per hour). The platform shall be designed to meet the design seismic conditions at the location of the DoD Installation.

3-6.12.3 **Mounting Height**. The HPSA shall be mounted at the top of the platform. The minimum mounting height shall be based on the rated output of HPSA at a distance of 1 meter and shall prevent hearing damage to persons directly below the platform. The maximum height shall not be less than 9 meters (30 feet) or greater than 18 meters (60 feet) above ground level.

3-6.12.4 **Mounting of Cabinets.** HPSA equipment cabinets shall be mounted on the platform with the bottom of the enclosure no less than 3 meters (10 feet) above ground level.

3-7 HPSA ATTACHED TO BUILDINGS

3-7.1 **Mounting Height.** The HPSA shall be mounted at a minimum mounting height that is based on the rated output of HPSA at a distance of 1 meter (3 feet) and shall prevent hearing damage to persons directly below the assembly.

3-7.2 **Sound into Building.** If attached to an occupiable building, the HPSA shall not permit noticeable levels of sound into the building. (See 3-6.5.3.)

3-8 COMMUNICATIONS LINKS

3-8.1 **Primary Communications Link.** Primary communications shall use radio

frequency-type communications systems that comply with National Telecommunications and Information Administration (NTIA) requirements. The systems shall be designed to minimize the potential for interference, jamming, eavesdropping, and spoofing.

3-8.1.1 **Licensed Radio Frequency Systems**. An approved DD Form 1494 for the system is required prior to operation.

Note: Receiving a new radio frequency assignment often takes a relatively long period of time. Be sure to request the frequency assignment early in the design process.

3-8.1.2 **Non-licensed Radio Frequency Systems.** The NTIA permits the use of non-licensed radio frequency-type devices that conform with Federal Communication Commission (FCC) Rules and Regulations (47 CFR 15) in CONUS without submission of a DD Form 1494. In OCONUS locations, confirm that the devices conform to host-country regulations. In all cases, obtain approval from the DoD Installation Commander prior to using non-licensed radio frequency-type devices. Also inform the Spectrum Manager for the local area.

Note: Non-licensed devices operate at very low power levels, have no vested or recognized right to any part of the radio frequency spectrum, and are not required to provide any immunity to interference. If a non-licensed system is selected, be sure the system compensates for these limitations by providing suitable radio signal modulation features (e.g., “spread spectrum and frequency hopping”).

3-8.2 **Redundant Communications Link.** Redundant communication means shall be accomplished by using the DoD Installation’s communications backbone network (e.g., optical fiber cable). The central control units shall accomplish this by being directly connected to the backbone network.

3-8.3 **Off-the-Shelf Equipment.** Communications equipment furnished as part of the Wide Area MNS shall be commercial-off-the-shelf (COTS). All programming codes or passwords required to access, update, modify, and maintain the communications equipment shall be provided to the DoD Installation.

3-8.4 **Supervision.** Full system supervision shall be provided. Notification of system alarm, supervisory, and trouble signals shall be provided to the central control consoles within a time period not to exceed 60 seconds.

3-8.5 **Diagnostics.** The communications systems shall provide self-test and diagnostics capabilities. Local diagnostics information shall be transmitted to the central control stations.

3-8.6 **Interface with Other Systems.** The communications systems shall be capable of interfacing with existing fire alarm reporting systems in accordance with NFPA 72, existing public address systems, and existing telephone dialing systems on the DoD Installation. The communications systems shall be designed with an established protocol that is provided to the DoD Installation to allow existing and future

Individual Building MNS from other manufacturers to interface with the Wide Area MNS. At a minimum, the Wide Area MNS shall be able to provide an audio line level input to the Individual Building MNS.

CHAPTER 4

INDIVIDUAL BUILDING MNS FOR NEW CONSTRUCTION PROJECT

4-1 **SCOPE.** Individual Building MNS are intended to provide real-time information to personnel within and in the immediate vicinity of buildings on a DoD Installation. These systems are required by UFC 4-010-01 requirements for new construction and renovation of existing building. This chapter provides the design criteria for new construction projects.

4-2 **REQUIREMENTS FOR SYSTEM DESIGNERS.** The Individual Building MNS shall be designed under the supervision of Fire Protection Engineer having at least Bachelor of Science degree in Engineering from an accredited university engineering program plus a minimum of 5 years work experience in engineering related to fire alarm systems or Individual Building MNS. Alternately, the Individual Building MNS may be designed by an engineering technician qualified at National Institute for Certification in Engineering Technologies (NICET) Level IV in fire alarm systems plus a minimum of 10 years work experience.

4-3 SYSTEM OVERVIEW

4-3.1 **Subsystems.** An Individual Building MNS for new construction projects includes several subsystems: autonomous control unit (ACU); local operating consoles (LOC); notification device network; and interface with the Wide Area MNS on the DoD Installation. System design and wiring is designed to meet NFPA 72 requirements for MNS and fire alarm systems.

4-3.2 Autonomous Control Unit (ACU)

4-3.2.1 **Functions.** The ACU is used to monitor and control the notification appliance network. At the ACU personnel in the building can initiate delivery of pre-recorded voice messages, provide live voice messages and instructions, and initiate visual strobe and alphanumeric message notification appliances.

4-3.2.2 **Combined System.** For new construction, the ACU shall be interfaced with the building fire alarm control panel (FACP) to form one combined system that performs both functions. The building Public Address (PA) system should also be interfaced with the combined system so that all three functions – mass notification, fire alarm, and PA – are provided by one building system. Combined systems shall meet the requirements of NFPA 72, *National Fire Alarm Code.*

4-3.3 **Local Operating Console (LOC).** LOC is a unit designed to allow emergency response forces and building occupants to operate the Individual Building MNS, including initiating delivery of pre-recorded voice messages, providing live voice messages and instructions, initiating visual strobe and alphanumeric message notification appliances, override external voice announcements, and terminate mass notification functions. LOC is usually contained in a small, wall-mounted enclosure. Not

all functions that could be performed at the ACU are necessarily available at a LOC.

4-3.4 **Notification Appliance Network.** A notification appliance network consists of a set of audio speakers, strobes, and text signs located to alert occupants and provide intelligible voice and written instructions.

4-3.4.1 **Audio Appliance Network.** Speakers and strobes are provided at all locations in the building and provided around the building at entrances/exits and other outdoor areas (such as courtyards) commonly used by the building occupants. Important design considerations for the audio speakers include intelligibility and audio intensity.

4-3.4.1.1 Intelligibility is defined in National Fire Protection Association (NFPA) 72, *National Fire Alarm Code*. Commercially available test instrumentation shall be used to verify intelligibility

4-3.4.1.2 Effective voice communication within buildings occurs by using a system design of many speakers, each with low audio intensity.

4-3.4.1 **Visual Appliance Network.** Strobes are provided at all locations inside the building to meet accessibility requirements of the Uniform Federal Accessibility Standards (UFAS) for persons with hearing disabilities. Strobes are provided at the same locations in a building that would be required for a fire alarm system notification device. Combined MNS/FACP systems may use either one strobe (white/clear) or two strobes (white/clear for fire and amber for MNS) as specified by the AHJ. Text signs are required at each egress stairway and exit door for systems that use one white/clear strobe.

4-3.4.1.1 Navy and Marine Corps Installations shall use one white/clear strobe and also shall provide text signs.

4-3.4.1.2 Army and Air Force Installations shall use a white/clear strobe for fire and an amber strobe for MNS. Use of text signs are optional and at the discretion of the DoD Installation.

4-3.5 **Interface with the Wide Area MNS**. If a Wide Area MNS is provided on the DoD Installation, the Individual Building MNS communicates with the central control units of the Wide Area MNS to provide status information, receive commands, activate pre-recorded messages, and originate live voice messages. At a minimum, the Individual Building MNS shall be able to receive an audio line level input

4-3.6 **Logical Block Diagrams.** Figures 4-1 and 4-2 show the logical black diagrams for acceptable configurations of the Individual Building MNS for new construction.

Figure 4-1. Individual Building Mass Notification System – Combination Fire Alarm System and MNS (Navy and Marine Corps)

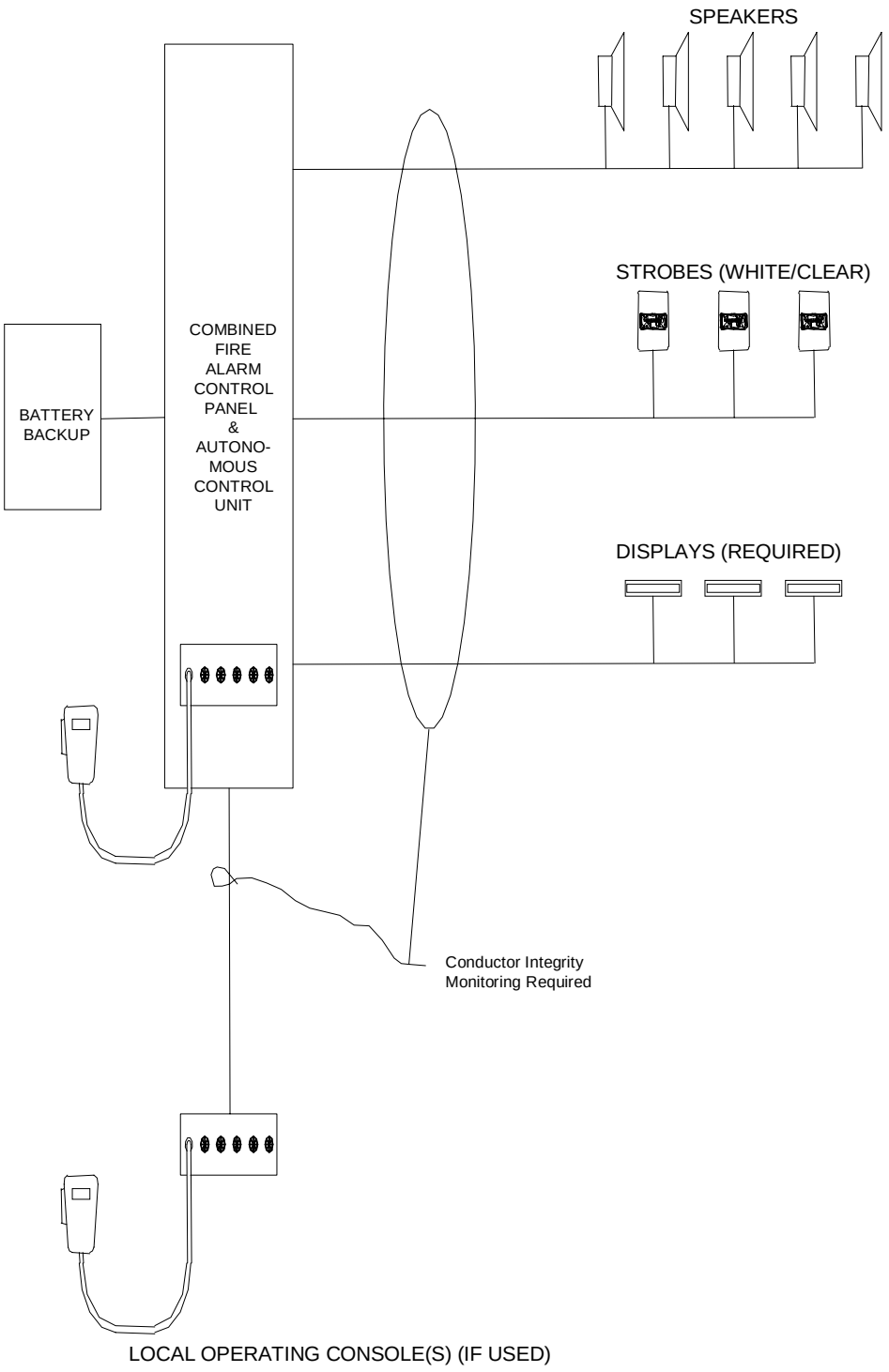
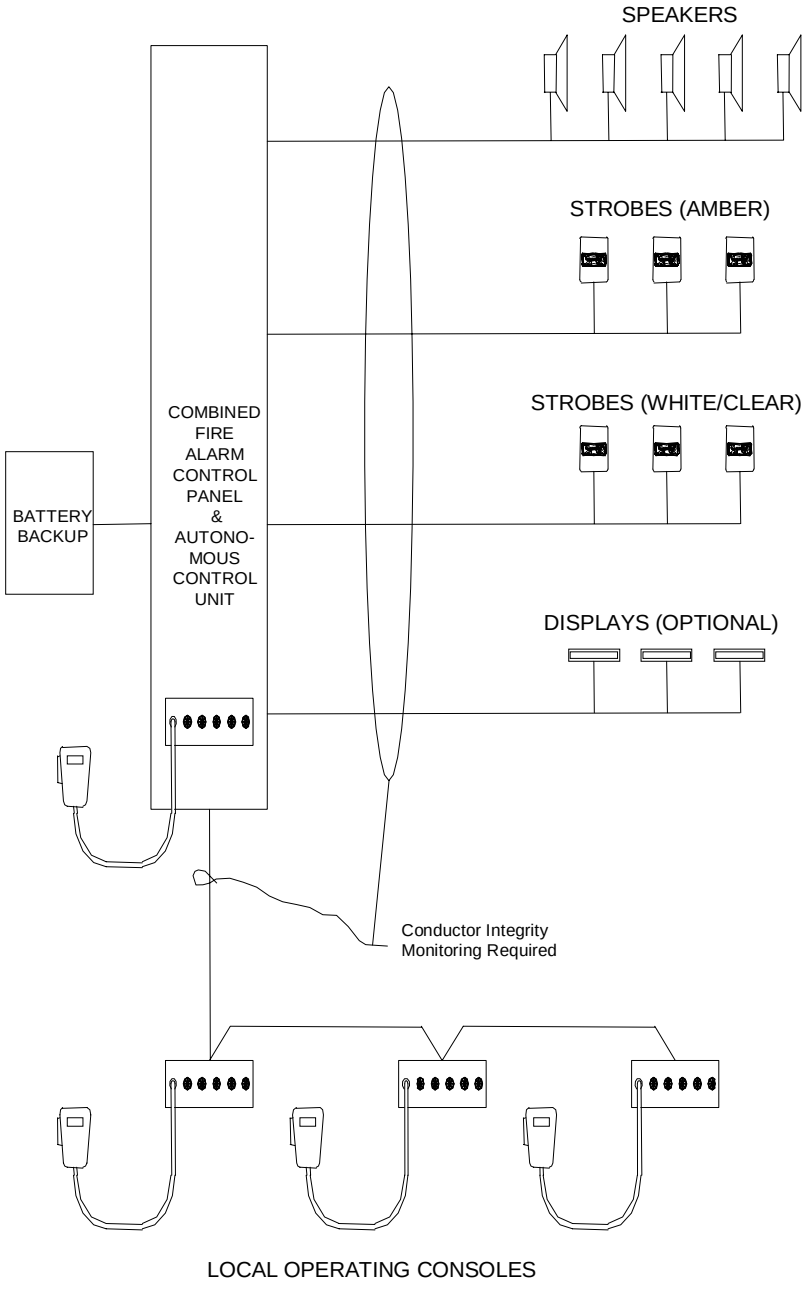


Figure 4-2. Individual Building Mass Notification System – Combination Fire Alarm System and MNS (Army and Air Force)



4-4 AUTONOMOUS CONTROL UNIT (ACU)

4-4.1 **Locations.** The ACU shall form a combined system with FACP. These control panels may be co-located in the same enclosure or may be physically separated. If physically separated, provide fire detection at each location as required by NFPA 72 for the protection of fire alarm system control panels. If located in the same enclosure, install the enclosure at the location normally specified by the DoD component AHJ for a stand-alone FACP.

4-4.2 **Design Features.** The ACU shall provide the following general features:

- Able to function independently upon failure of the Wide Area MNS (if provided on the DoD Installation).
- The ACU design shall be a listed combination system with the fire alarm system as described in NFPA 72, *National Fire Alarm Code,* and meeting UL Standard 864.
- Able to activate strobes and text signs.
  - Navy and Marine Corps: Energize one set of white/clear strobe lights marked “ALERT” along with LED-type text signs provided at every exit door and stairway.
  - Army and Air Force: Energize either one set of white/clear strobe lights marked “FIRE” for the fire alarm system or a separate set of amber strobe lights marked “ALERT” for the mass notification system as appropriate for the emergency. Energize LED-type text signs if required by the DoD Installation.
- Available for use for general paging or other non-emergency messages without the activation of strobes.
- Ability to interrupt public address system announcements and to silence building background music while delivering voice messages.
- Conductor connections comply with NFPA 72. Use of Ethernet or Internet Protocol (IP) does not meet NFPA 72 requirements and is not acceptable.
- Conductor integrity monitoring for strobes, speaker wiring, power supplies, and connections to LOC.
- Able to switch between MNS and fire alarm notification functions without generation of trouble alarms in either system.
- Capacity for multiple prerecorded messages. Prerecorded messages shall be passed in the English language and, for OCONUS locations, also in the predominant language(s) used by the host nation. Messages should address at least the following:
  - Bomb threat or actual bomb within/around the building
  - Intruder/hostile person sighted within/around the building
  - Occupants directed to take cover within the building
  - Evacuation of the building using exits other than the normal main entrance/exit (since the front entrance/exit is often a location targeted by terrorists)
  - Emergency weather conditions appropriate for the local area
  - “All Clear” message

  - A test message intended for verifying functionality of the system.
- Ability to deliver messages quickly.
- Ability to automatically repeat prerecorded messages until terminated.
- Microphone for delivering live voice messages.
- Adequate discrete outputs to initiate text signs and initiate strobes.
- Interfaces to LOC for initiating recorded messages and delivering live voice messages from locations in the building other than at the ACU.
- Establishes priority for passing messages to prevent interference between the ACU, LOC, and the Wide Area MNS on the DoD Installation.
- Allows the MNS to temporarily override fire alarm audible messages and provide intelligible voice commands during simultaneous fire and terrorist events. All other features of the fire alarm system, including the transmission of signals to the fire department, shall function properly.
- Provide a supervisory signal if the MNS is used to override fire alarm audible messages during simultaneous fire and terrorist events. The supervisory signal shall be annunciated at the FACP and any remote fire alarm annunciators, and be transmitted to the fire department. The visual annunciation of the separate supervisory signal shall be distinctly labeled or otherwise clearly identified. The Army requires that this supervisory signal be separate from other fire alarm system supervisory signals.
- Provide a single switch or operating mechanism capable of temporarily disabling MNS functions during simultaneous fire and terrorist events. Amber strobes shall be de-energized and white/clear strobes energized in those systems using two sets of strobe visual notification devices. Text signs shall display fire evacuation messages. The system shall automatically return to normal priority after completion of the fire event.
- Provide a supervisory signal if MNS functions have been temporarily disabled during simultaneous fire and terrorist events. The supervisory signal shall be annunciated at the FACP and any remote fire alarm annunciators, LOC, central control units of the Wide Area MNS, and be transmitted to the fire department. The visual annunciation of the separate supervisory signal shall be distinctly labeled or otherwise clearly identified.
- Provide a single switch or operating mechanism capable of turning off or on the system's white/clear strobes. The switch shall function as a "dead-man" type to turn off the strobes.
- Provide a single switch or operating mechanism capable of turning off or on the system's amber strobes. The switch shall function as a "dead-man" type to turn off the strobes.
- Provides a single switch or operating mechanism capable of shutdown all heating, ventilating, air conditioning (HVAC) equipment in the facility in accordance with requirements of UFC 4-010-01.
- Complete set of self-diagnostics for the controller and appliance network.
- Local diagnostic information display.
- Local diagnostic information and system event log file.

4-4.3 **Off-the-Shelf Equipment.** ACU equipment furnished as part of the Individual

Building MNS shall be commercial-off-the-shelf (COTS) and tested to standards of Underwriters Laboratories.

4-4.4 **Programming Codes.** All programming codes or passwords required to access, update, modify, and maintain the ACU shall be provided to the DoD Installation.

4-4.5 **Power Supply Features.** Requirements include:

- Capable of accepting 110 to 240 volts, alternating current (AC), 50 to 60 hertz (Hz).
- Combination MNS/FACP systems shall meet at least the minimum NFPA 72 requirements for standby power capacity. In addition, provide secondary (standby) power as follows:
    - Supply standby power for all loads for a minimum of 48 hours. At the end of the standby period, the secondary source of power shall provide a minimum of 30 minutes of mass notification at the maximum connected load.
    - Immediately upon loss of normal AC power, the standby source of power shall provide a minimum of 60 minutes of mass notification at the maximum connected load.
- When operating on standby power, mass notification strobes and prerecorded messages shall automatically turn off after 10 minutes of operation, but may be manually reinitiated for subsequent periods of 10 minutes each.
- Provides remote monitoring of trouble, supervisory, and alarm functions to a constantly occupied location. This may be the same location that receives fire alarm system signals or to the central control units of the Wide Area MNS on the DoD Installation.
- Provides conformance to applicable sections of NFPA 72.
- Uses only commercial off the shelf (COTS) components.
- Provides surge protection in accordance with UFC 3-520-01, *Interior Electrical Systems.*
- Provides fault-tolerance with major component redundancy.

4-5 LOCAL OPERATING CONSOLE (LOC)

4-5.1 **Locations.** Provide LOC to allow emergency response forces and building occupants to access the mass notification system and originate messages in emergency situations from locations in the building other than from the ACU. These locations include:

- Provide a separate LOC for use by the fire department near the building FACP (or fire command center) unless this is also the location of the ACU.
- Do not place a LOC inside of a locked room or closet (with the possible exception of the LOC intended for use by the fire department near the FACP).
- Install a LOC at those facility entrances/exits that will be used when building access is limited because of elevated terrorism threat levels.
- Army and Air Force: Provide a LOC so that occupants do not need to travel a distance in excess of 61 m (200 ft) horizontally or to travel to other floors to

access a LOC.

- Army and Air Force: Make LOC available for use by visitors in those facilities open to unescorted visitors or to the public.
- Navy and Marine Corps: Provide no more than one LOC (if necessary) in addition to the ACU. Locate the LOC as directed by the cognizant Fire Protection Engineer.

4-5.2 **Design Features.** The LOC shall provide the following general features:

- A remote microphone station that emulates operation of the MNS from the ACU.
- An easy to use method (such as individual manual activation push buttons) to activate the MNS prerecorded messages.
- Provides visual notification when MNS functions have been temporarily disabled during simultaneous fire and terrorist events.
- Provide a single switch or operating mechanism capable of turning off or on the system's white/clear strobes. The switch shall function as a "dead-man" type to turn off the strobes.
- Provide a single switch or operating mechanism capable of turning off or on the system's amber strobes. The switch shall function as a "dead-man" type to turn off the strobes.
- Provides a single switch or operating mechanism capable of shutdown all heating, ventilating, air conditioning (HVAC) equipment in the facility in accordance with requirements of UFC 4-010-01.
- Protection of the LOC in a small, wall-mounted enclosure.
- Supplemental heating for those enclosures located outdoors or in areas where the LOC will be exposed to temperatures or humidity outside of the manufacturer's design limits.
- Use of a break-glass, thumb-lock, tamper wire, tamper alarm, or equivalent protection to minimize the potential for tampering with LOC. This is not required in those facilities with limited access so that unauthorized use would not reasonably be expected to occur. Enclosures that can be opened only by a key shall not be used.

4-6 NOTIFICATION APPLIANCE NETWORK

4-6.1 **Audible Appliance Network.** Requirements include:

- Provide appliances capable of satisfying all Uniform Federal Accessibility Standards (UFAS) and Americans with Disabilities Act Accessibility Guidelines (ADAAG).
- Use speakers suitable for the intended climatic and environmental conditions.
- Use speakers suitable for installation in commercial/industrial applications with consideration of electrically hazardous (classified) location.
- Provide speakers and installation methods compliant with Director of Central Intelligence Directive (DCID) 1/21, *Manual for Physical Security Standards for Sensitive Compartmented Information Facilities*, for areas classified as sensitive compartmented information facilities (SCIF).
- Speakers shall meet listing requirements of UL Standard 1480.

- System design shall comply with NFPA 72.
- Provide speakers at all locations inside a building where the building fire alarm must be audible.
- Provide speakers mounted on the exterior of the building to provide notification of any areas commonly used by building occupants. These include courtyards, covered break areas, designated smoking areas, and sidewalks leading from the building's exit doors to a public street or from parking areas for a distance up to 5 meters from the building. Use speakers with directional characteristics that transmit minimal backplane noise when mounted on the sides of the building. Generally, the speakers should be located near entrance/exit doors.
- Provide an effective voice communication within buildings using a design including many speakers, each with low audio intensity.
- Install speakers with field-adjustable tap settings to allow adjustment after installation to meet intelligibility requirements.
- Use speakers rated at two (2) watts of power or less and provided with multiple tap settings to adjust the output power for most occupied areas.
- Use speakers rated at eight (8) watts of power or less and provided with multiple tap settings not exceeding two (2) watts between settings for very large or very noisy areas.
- Do not use speakers exceeding eight (8) watts of power for indoor applications without prior approval of the AHJ.
- Use speakers capable of frequency response over the range at least 50 Hz to 10,000 Hz.
- Design to meet intelligibility requirements in accordance with NFPA 72.
- Verify by measurement after installation for intelligibility with a common intelligibility scale (CIS) score greater than 0.90 in each area where building occupants normally could be found. Areas of the building where occupants are not expected to be normally present may have a CIS score less than 0.90 if personnel can determine that a voice signal is being broadcast and they could walk less than 3 meters (10 feet) to find a location with at least 0.9 CIS. Measurements should be taken near the head level applicable for most personnel in the space under normal conditions (standing, sittings, sleeping, etc., as appropriate).
- Commercially available test instrumentation shall be used to measure intelligibility as specified by International Electrochemical Commission (IEC) 60849, Second Edition: 1998, *Sound Systems for Emergency Purposes*, and IEC 60268, Part 16, *The Objective Rating of Speech Intelligibility by Speech Transmission Index*.
- Wiring methods shall comply with NFPA 72. Class B wiring is permitted unless Class A wiring is required for fire alarms systems on the DoD Installation.

4-6.2 **Visual Appliance Network.** Requirements include:

- Provide visual appliances capable of satisfying all Uniform Federal Accessibility Standards (UFAS) and Americans with Disabilities Act Accessibility Guidelines (ADAAG).

- Use visual appliances suitable for the intended climatic and environmental conditions.
- Use visual appliances suitable for installation in commercial/industrial applications with consideration of electrically hazardous (classified) location.
- Strobes shall meet listing requirements of UL Standard 1971.
- Strobes are not required outside the building.
- Navy and Marine Corps: Provide white/clear strobes marked with the word "ALERT" for use by the building's combination MNS/FACP.
- Navy and Marine Corps: Provide LED text signs at every egress door of the building (i.e., doors to exit stairwells, entrances/exits, and emergency exit doors) to inform the hearing-impaired. (See Chapter 7 for operational requirements and information on message content.)
- Army and Air Force: Provide amber-colored strobes marked with the word "ALERT" to alert the hearing-impaired. These strobes are to be provided in addition to white/clear strobes provided for the building fire alarm system.
- Army and Air Force: Amber strobes activated in conjunction with the delivery of a live voice message shall operate during the period of message delivery and for a subsequent time period of not less than 15 seconds after message termination.
- Army and Air Force: Amber strobes activated in conjunction with the delivery of a prerecorded voice message shall operate continuously until message termination.
- Army and Air Force: White/clear strobes activated by the fire alarm system shall not operate during those periods when the amber strobes are in operation, but otherwise shall operate continuously until the fire alarm system is reset.
- Wiring methods shall comply with NFPA 72. Class B wiring is permitted unless Class A wiring is required for fire alarms systems on the DoD Installation.

4-7 **INTERFACES WITH WIDE AREA MNS.** The Individual Building MNS shall be capable of interfacing with an existing Wide Area MNS. If a Wide Area MNS is not presently provided on the DoD Installation, the Individual Building MNS shall be designed to allow future interface with a Wide Area MNS procured from another manufacturer. The electrical requirements, computer codes, or other protocols that are needed to interface the systems shall be provided to the DoD Installation. At a minimum, the Wide Area MNS shall be able to provide and the Individual Building MNS shall be able to receive an audio line level input.

CHAPTER 5

INDIVIDUAL BUILDING MNS FOR RENOVATION PROJECT

5-1 **SCOPE.** Individual Building MNS are intended to provide real-time information to personnel within and in the immediate vicinity of buildings on a DoD Installation. These systems are required by UFC 4-010-01 requirements for new construction and renovation of existing building. This chapter provides the design criteria for renovation projects.

5-2 **REQUIREMENTS FOR SYSTEM DESIGNERS.** The Individual Building MNS shall be designed under the supervision of Fire Protection Engineer having at least Bachelor of Science degree in Engineering from an accredited university engineering program plus a minimum of 5 years work experience in engineering related to fire alarm systems or Individual Building MNS. Alternately, the Individual Building MNS may be designed by an engineering technician qualified at National Institute for Certification in Engineering Technologies (NICET) Level IV in fire alarm systems plus a minimum of 10 years work experience.

5-3 USE OF NEW CONSTRUCTION CRITERIA

5-3.1 **Fire Alarm Control Panel Replacement – No Existing MNS in Building.** Provide a combination mass notification and fire alarm system meeting the requirements for new construction projects (see Chapter 4) for renovation projects that include replacement of the fire alarm control panel (FACP).

5-3.2 Fire Alarm Control Panel Replacement – Existing MNS in Building

5-3.2.1 **Navy and Marine Corps.** Replacement the existing MNS and installation of a combination system for all renovation projects is required unless prior authorization is received from the AHJ to install a separate FACP.

5-3.2.2 **Army and Air Force.** Replacement of the existing MNS and installation of a combination system for all renovation projects is recommended, but prior authorization from the AHJ to install separate systems is not required. Consider the age and condition of the MNS and the life cycle costs of keeping the existing MNS when determining whether to install combined or separate systems.

5-3.3 MNS Installation Projects

5-3.3.1 **Navy and Marine Corps.** Replacement the FACP and installation of a combination system for all renovation projects is required unless prior authorization is received from the AHJ to install a separate MNS.

5-3.3.2 **Army and Air Force.** Replacement of the FACP and installation of a combination system for all renovation projects is recommended, but prior authorization from the AHJ to install separate systems is not required. Consider the age and condition

of the FACP and the life cycle costs of keeping the existing FACP when determining whether to install combined or separate systems.

5-4 SYSTEM OVERVIEW

5-4.1 **Subsystems.** An Individual Building MNS for renovation projects includes several subsystems: autonomous control unit (ACU); local operating console (LOC); notification device network; interface with facility FACP; interface with facility public address (PA) system; and interface with the Wide Area MNS on the DoD Installation. System design and wiring is designed to meet NFPA 72 requirements for MNS and fire alarm systems.

5-4.2 **Autonomous Control Unit (ACU).** The ACU is used to monitor and control the notification appliance network. At the ACU personnel in the building can initiate delivery of pre-recorded voice messages, provide live voice messages and instructions, initiate visual strobe and alphanumeric message notification appliances, and temporarily silence fire alarm system visual and audible notification appliances.

5-4.3 **Local Operating Console (LOC).** LOC is a unit designed to allow emergency response forces and building occupants to operate the Individual Building MNS, including initiating delivery of pre-recorded voice messages, providing live voice messages and instructions, initiating visual strobe and alphanumeric message notification appliances, temporarily silencing fire alarm system visual and audible notification appliances, override external voice announcements, and terminate mass notification functions. LOC is usually contained in a small, wall-mounted enclosure. Not all functions that could be performed at the ACU are necessarily available at a LOC.

5-4.4 **Notification Appliance Network.** A notification appliance network consists of a set of audio speakers, strobes, and text signs located to alert occupants and provide intelligible voice and written instructions.

5-4.4.1 **Audio Appliance Network.** Speakers and strobes are provided at all locations in the building and provided around the building at entrances/exits and other outdoor areas (such as courtyards) commonly used by the building occupants. Important design considerations for the audio speakers include intelligibility and audio intensity.

5-4.4.1.1 Intelligibility is defined in National Fire Protection Association (NFPA) 72, *National Fire Alarm Code*. Commercially available test instrumentation shall be used to verify intelligibility

5-4.4.1.2 Effective voice communication within buildings occurs by using a system design of many speakers, each with low audio intensity.

5-4.4.2 **Visual Appliance Network.** Strobes are provided at all locations inside the building to meet accessibility requirements of the Uniform Federal Accessibility

Standards (UFAS) for persons with hearing disabilities. Strobes are provided at the same locations in a building that would be required for a fire alarm system notification device. Separate MNS and FACP systems may use either one strobe (white/clear) or two strobes (white/clear for fire and amber for MNS) as specified by the AHJ. Text signs are required at each egress stairway and exit door for systems that use one white/clear strobe.

5-4.4.2.1 Navy and Marine Corps Installations shall replace existing white/clear strobes, and also install text signs. Replacement is necessary to remove existing strobes that are marked with the word “FIRE”. New white/clear strobes will be marked with work “ALERT”.

5-4.4.2.2 Army and Air Force Installations shall use existing white/clear strobes for fire and install amber strobes for MNS. New amber strobes will be marked with work “ALERT”. Installation of text signs is optional and at the discretion of the DoD Installation.

5-4.5 **Interface with Facility FACP.** The MNS shall provide the capability to temporarily deactivate the facility’s fire alarm system audible and visual notification appliances. This is intended to allow the MNS to provide intelligible voice commands inside an individual building during simultaneous fire and terrorist events. System features are provided to compensate for the increased risk from fire in these cases.

5-4.6 **Interface with Facility PA System.** The use of the speakers and other components in the existing PA system may be appropriate in buildings in which the installation of a new speaker system is not cost-effective and the existing PA system is new or relatively new and in excellent condition. If this implementation approach is taken, an ACU must be interfaced with the existing PA system. The existing PA system must be tested to demonstrate acceptable intelligibility of the voice messages, and additional speakers added as required. Features must be provided in or added to the PA system to ensure that emergency messages have priority over non-emergency messages. Installation of a visual notification appliance network (i.e., strobes and text signs) is required.
Note: The term “public address system” is used in this UFC to mean both public address and intercommunication systems.

5-4.7 **Interface with the Wide Area MNS**. If a Wide Area MNS is provided on the DoD Installation, the Individual Building MNS communicates with the central control units of the Wide Area MNS to provide status information, receive commands, activate pre-recorded messages, and originate live voice messages. At a minimum, the Individual Building MNS shall be able to receive an audio line level input

5-4.8 **Logical Block Diagrams.** Figures 5-1 through 5-6 show the logical black diagrams for acceptable configurations of the Individual Building MNS for renovation projects.

Figure 5-1. Individual Building Mass Notification System – Separate Fire Alarm System and MNS (Navy and Marine Corps, if approved by AHJ)

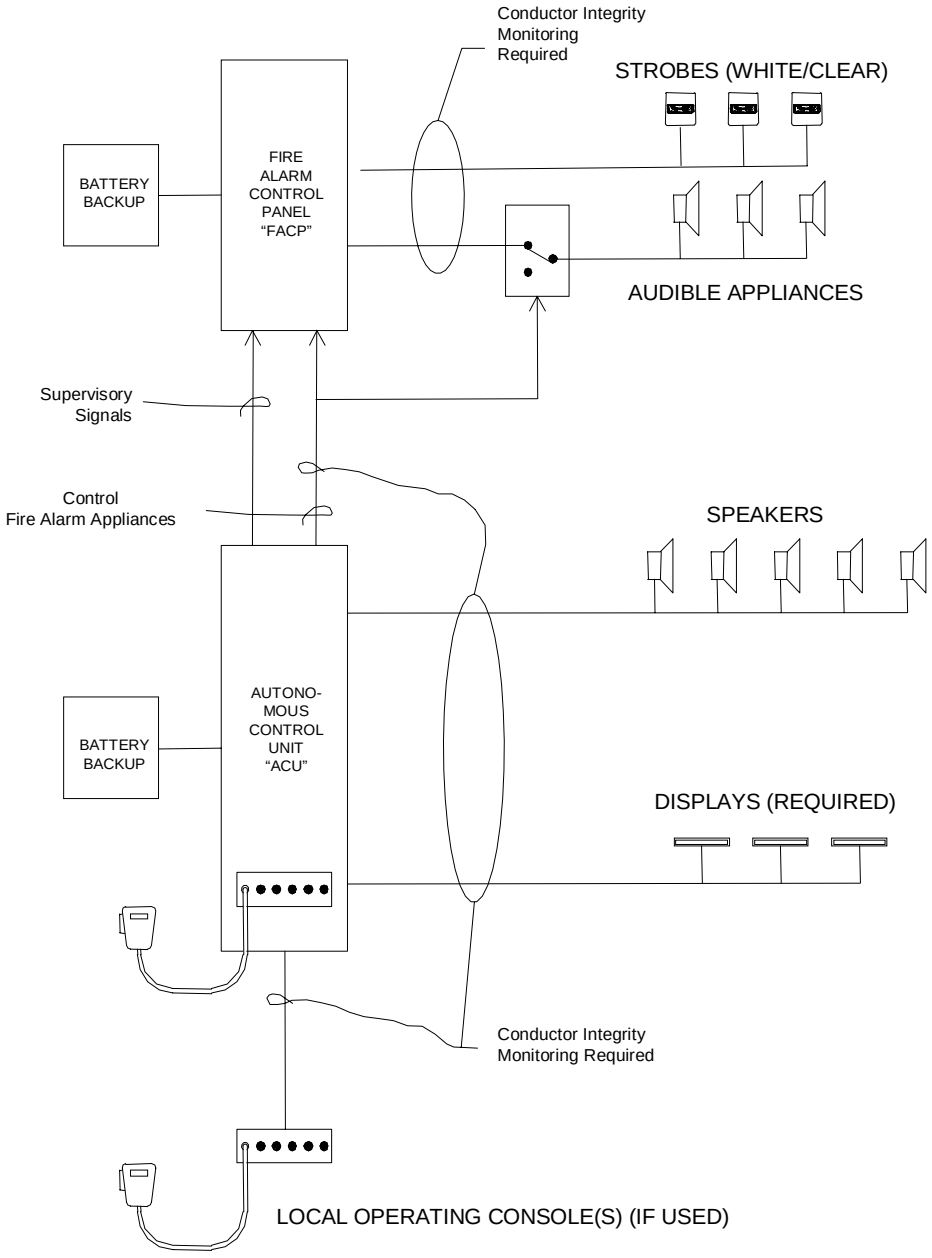


Figure 5-2. Individual Building Mass Notification System – Separate Fire Alarm System and MNS (Army and Air Force)

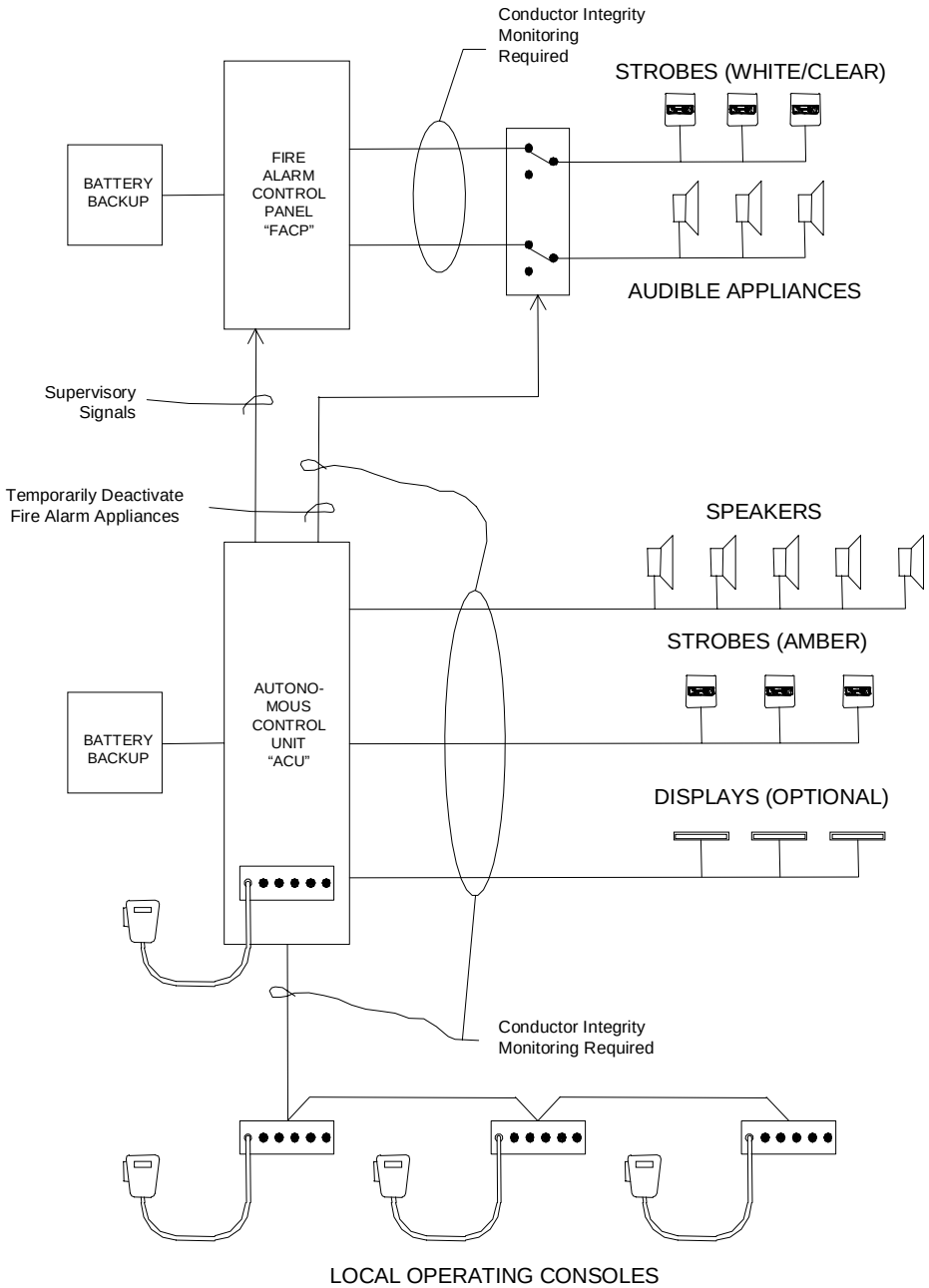


Figure 5-3. Individual Building Mass Notification System – Shared Speakers by Fire Alarm System and MNS (Navy and Marine Corps, if approved by AHJ)

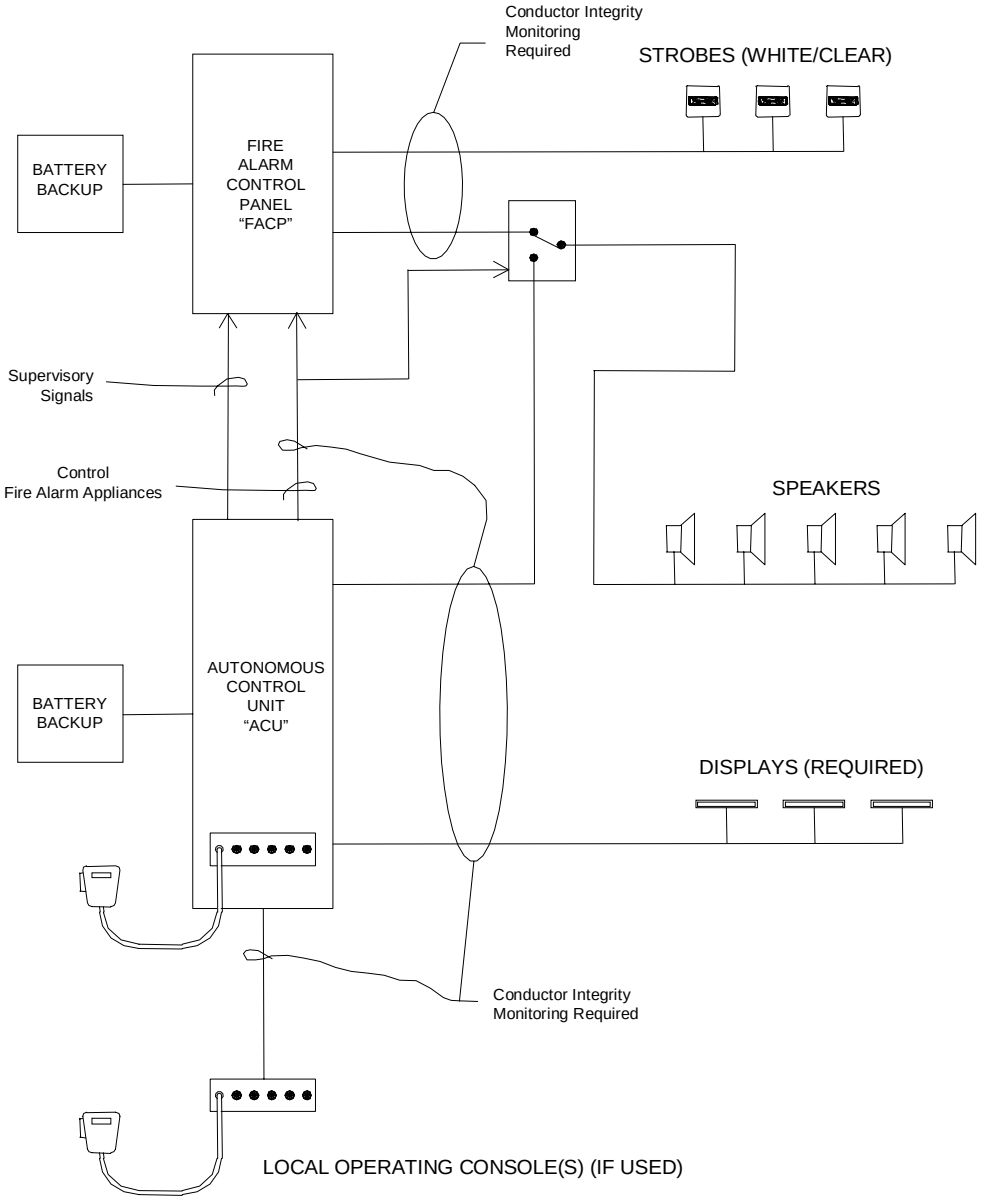


Figure 5-4. Individual Building Mass Notification System – Shared Speakers by Fire Alarm System and MNS (Army and Air Force)

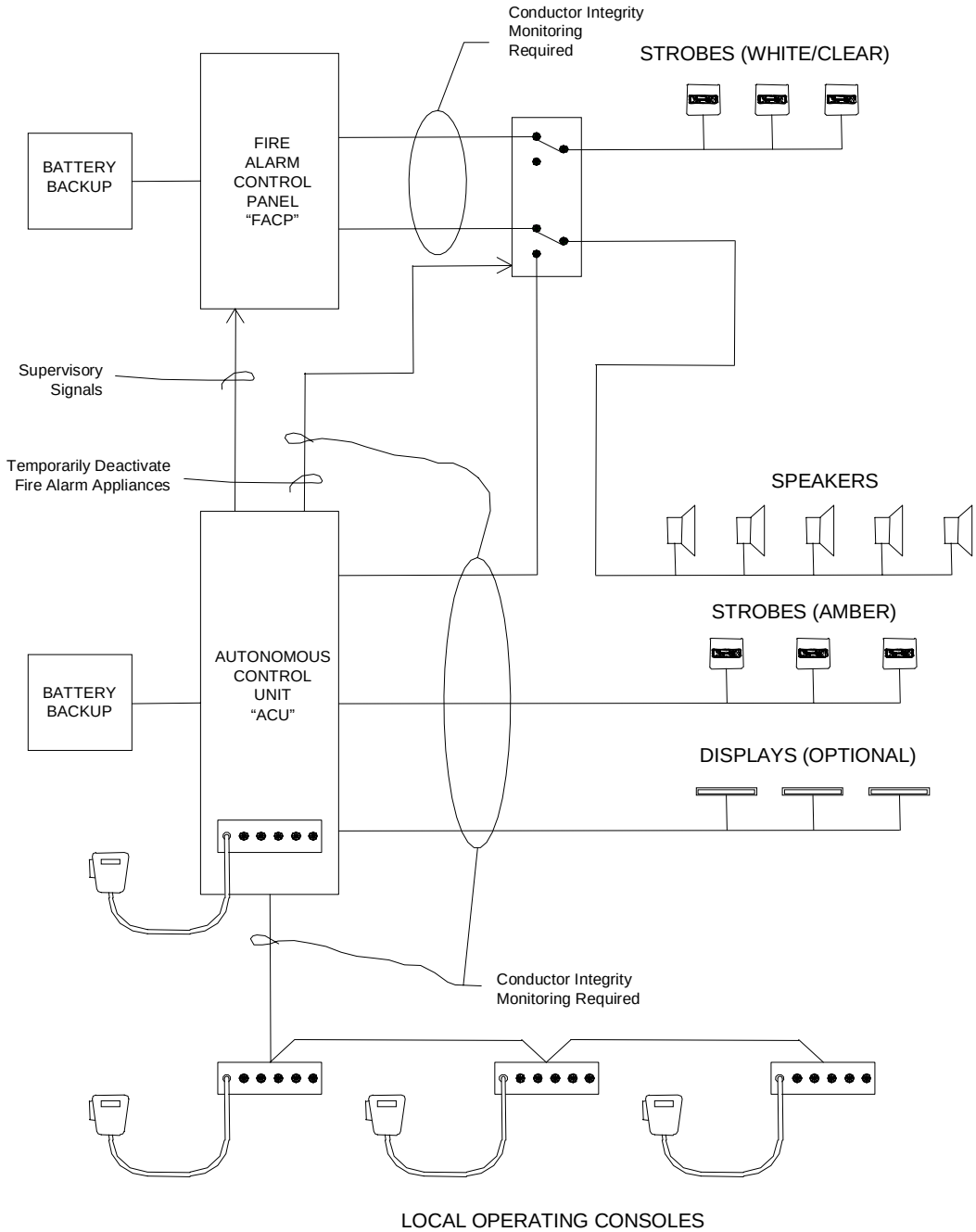


Figure 5-5. Use of Existing Public Address System (Navy and Marine Corps, if approved by AHJ)

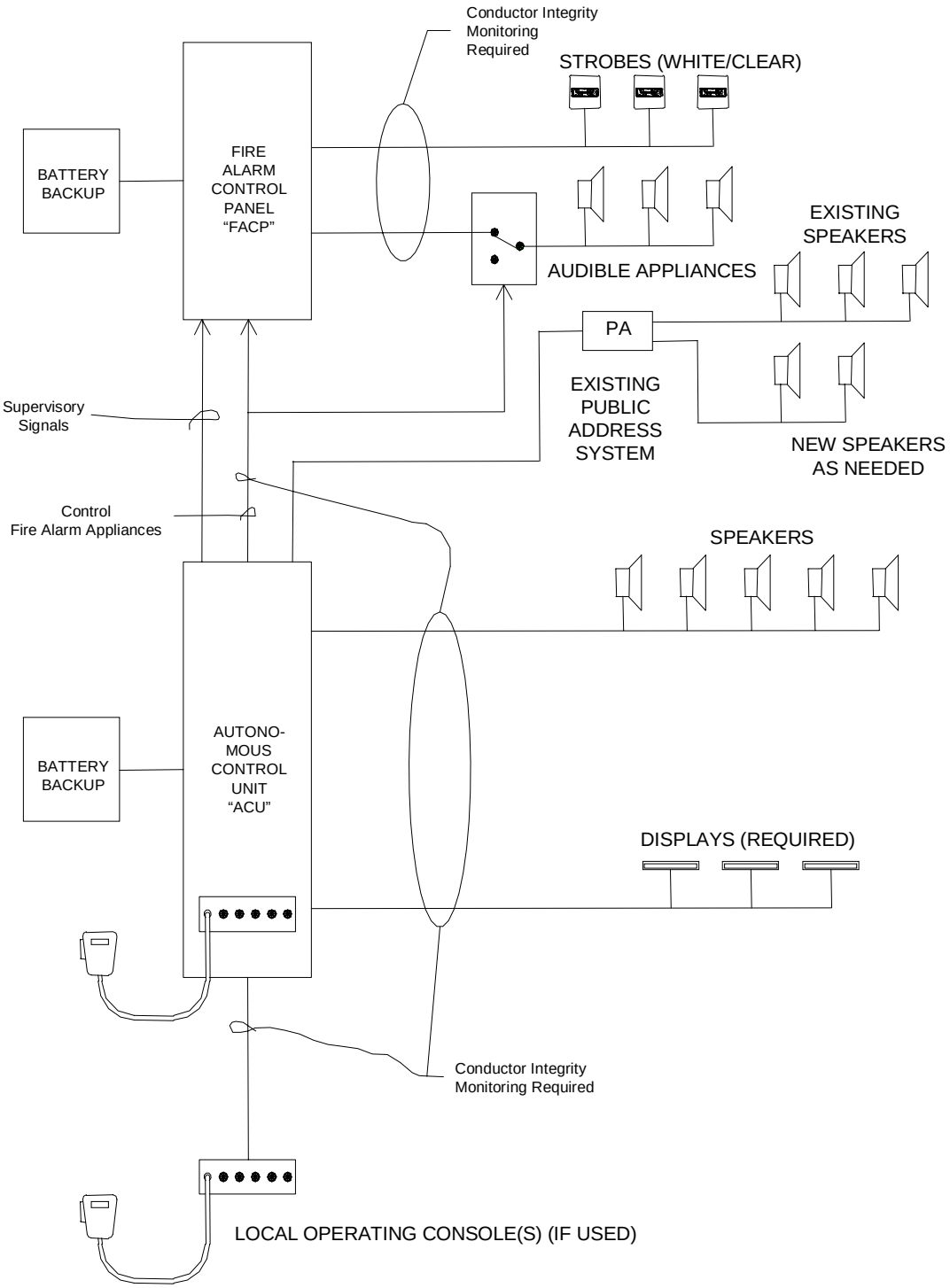
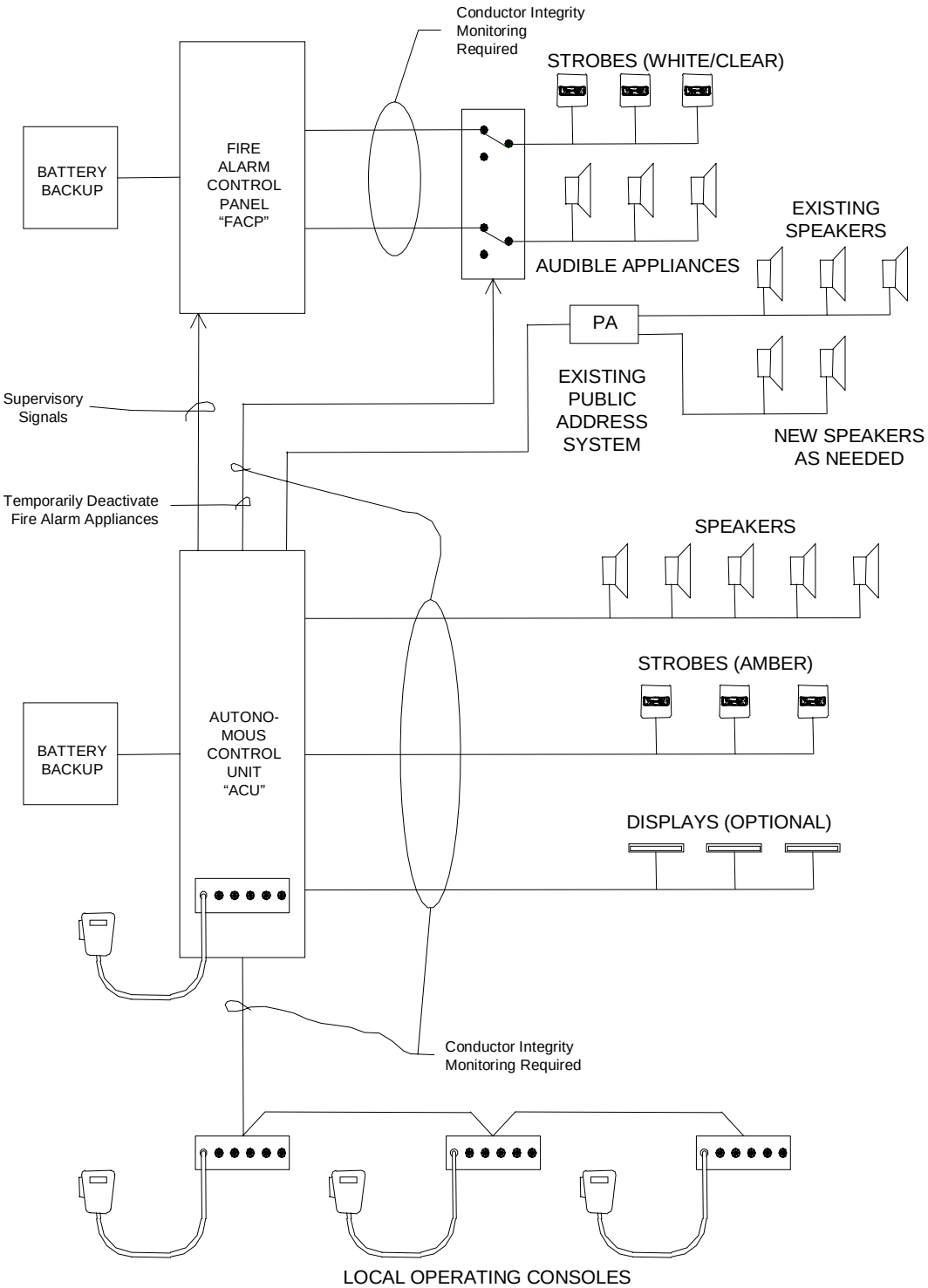


Figure 5-6. Use of Existing Public Address System (Army and Air Force)



5-5 AUTONOMOUS CONTROL UNIT (ACU)

5-5.1 **Location.** Install the ACU at the location normally specified by the DoD component AHJ for a stand-alone FACP. Provide fire detection at this location as required by NFPA 72 for the protection of fire alarm system control panels.

5-5.2 **Design Features.** The ACU shall provide the following general features:

- Able to function independently upon failure of the Wide Area MNS (if provided on the DoD Installation).
- The ACU design shall be tested to UL Standard 864 requirements as described in NFPA 72, *National Fire Alarm Code.*
- Able to activate strobes and text signs.
  - Navy and Marine Corps: Energize one set of white/clear strobe lights marked "ALERT" along with LED-type text signs provided at every exit door and stairway. These strobe lights shall be shared by both the MNS and fire alarm system.
  - Army and Air Force: Energize a set of amber strobe lights marked "ALERT" for the mass notification system. Simultaneously de-energize white/clear strobe lights used by the fire alarm system. Energize LED-type text signs if required by the DoD Installation.
- Available for use for general paging or other non-emergency messages without the activation of strobes.
- Ability to interrupt public address system announcements and to silence building background music while delivering voice messages.
- Conductor connections comply with NFPA 72. Use of Ethernet or Internet Protocol (IP) does not meet NFPA 72 requirements and is not acceptable.
- Conductor integrity monitoring for strobes, speaker wiring, power supplies, and connections to LOC.
- Able to switch between MNS and fire alarm notification functions without generation of trouble alarms in either system.
- Capacity for multiple prerecorded messages. Prerecorded messages shall be passed in the English language and, for OCONUS locations, also in the predominant language(s) used by the host nation. Messages should address at least the following:
  - Bomb threat or actual bomb within/around the building
  - Intruder/hostile person sighted within/around the building
  - Occupants directed to take cover within the building
  - Evacuation of the building using exits other than the normal main entrance/exit (since the front entrance/exit is often a location targeted by terrorists)
  - Emergency weather conditions appropriate for the local area
  - "All Clear" message
  - A test message intended for verifying functionality of the system.
- Ability to deliver messages quickly.
- Ability to automatically repeat prerecorded messages until terminated.
- Microphone for delivering live voice messages.

- Adequate discrete outputs to initiate text signs, initiate MNS strobes, and de-energize fire alarm strobes.
- Interfaces to LOC for initiating recorded messages and delivering live voice messages from locations in the building other than at the ACU.
- Establishes priority for passing messages to prevent interference between the ACU, LOC, and the Wide Area MNS on the DoD Installation.
- Allows the MNS to temporarily override fire alarm audible messages and provide intelligible voice commands during simultaneous fire and terrorist events. All other features of the fire alarm system, including the transmission of signals to the fire department, shall function properly.
- Provide a supervisory signal if the MNS is used to overrides fire alarm audible messages during simultaneous fire and terrorist events. The supervisory signal shall be annunciated at the FACP and any remote fire alarm annunciators, and be transmitted to the fire department. The visual annunciation of the separate supervisory signal shall be distinctly labeled or otherwise clearly identified. The Army requires that this supervisory signal be separate from other fire alarm system supervisory signals.
- Provide a single switch or operating mechanism capable of temporarily disabling MNS functions during simultaneous fire and terrorist events. Amber strobes shall be de-energized and white/clear strobes energized in those systems using two sets of strobe visual notification devices. Text signs shall display fire evacuation messages. The system shall automatically return to normal priority after completion of the fire event.
- Provide a supervisory signal if MNS functions have been temporarily disabled during simultaneous fire and terrorist events. The supervisory signal shall be annunciated at the FACP and any remote fire alarm annunciators, LOC, central control units of the Wide Area MNS, and be transmitted to the fire department. The visual annunciation of the separate supervisory signal shall be distinctly labeled or otherwise clearly identified.
- Provide a single switch or operating mechanism capable of turning off or on the system's white/clear strobes. The switch shall function as a "dead-man" type to turn off the strobes.
- Provide a single switch or operating mechanism capable of turning off or on the system's amber strobes. The switch shall function as a "dead-man" type to turn off the strobes.
- Provides a single switch or operating mechanism capable of shutdown all heating, ventilating, air conditioning (HVAC) equipment in the facility in accordance with requirements of UFC 4-010-01.
- Complete set of self-diagnostics for the controller and appliance network.
- Local diagnostic information display.
- Local diagnostic information and system event log file.

5-5.3 **Off-the-Shelf Equipment.** ACU equipment furnished as part of the Individual Building MNS shall be commercial-off-the-shelf (COTS) and tested to standards of Underwriters Laboratories.

5-5.4 **Programming Codes.** All programming codes or passwords required to access, update, modify, and maintain the ACU shall be provided to the DoD Installation.

5-5.5 **Power Supply Features.** Requirements include:

- Capable of accepting 110 to 240 volts, alternating current (AC), 50 to 60 hertz (Hz).
- MNS systems shall meet at least the minimum NFPA 72 requirements for standby power capacity. In addition, provide secondary (standby) power as follows:
    - Supply standby power for all loads for a minimum of 48 hours. At the end of the standby period, the secondary source of power shall provide a minimum of 30 minutes of mass notification at the maximum connected load.
    - Immediately upon loss of normal AC power, the standby source of power shall provide a minimum of 60 minutes of mass notification at the maximum connected load.
- When operating on standby power, mass notification strobes and prerecorded messages shall automatically turn off after 10 minutes of operation, but may be manually reinitiated for subsequent periods of 10 minutes each.
- Provides remote monitoring of trouble, supervisory, and alarm functions to a constantly occupied location. This may be the same location that receives fire alarm system signals or to the central control units of the Wide Area MNS on the DoD Installation.
- Provides conformance to applicable sections of NFPA 72.
- Uses only commercial off the shelf (COTS) components.
- Provides surge protection in accordance with UFC 3-520-01, *Interior Electrical Systems.*
- Provides fault-tolerance with major component redundancy.

5-6 LOCAL OPERATING CONSOLE (LOC)

5-6.1 **Locations.** Provide LOC to allow emergency response forces and building occupants to access the mass notification system and originate messages in emergency situations from locations in the building other than from the ACU. These locations include:

- Provide a separate LOC for use by the fire department near the building FACP (or fire command center) unless this is also the location of the ACU.
- Do not place a LOC inside of locked rooms or closets (with the possible exception of the operating console intended for use by the fire department near the FACP).
- Install LOC at those facility entrances/exits that will be used when building access is limited because of elevated terrorism threat levels.
- Army and Air Force: Provide a LOC so that occupants do not need to travel a distance in excess of 61 m (200 ft) horizontally or to travel to other floors to access a local operation console.
- Army and Air Force: Make LOC available for use by visitors in those facilities

open to unescorted visitors or to the public.

- Navy and Marine Corps: Provide no more than one LOC (if necessary) in addition to the ACU. Locate the LOC as directed by the cognizant Fire Protection Engineer.

5-6.2 **Design Features.** The LOC shall provide the following general features:

- A remote microphone station that emulates operation of the MNS from the ACU.
- An easy to use method (such as individual manual activation push buttons) to activate the MNS prerecorded messages.
- Provides visual notification when MNS functions have been temporarily disabled during simultaneous fire and terrorist events.
- Provide a single switch or operating mechanism capable of turning off or on the system's white/clear strobes. The switch shall function as a "dead-man" type to turn off the strobes.
- Provide a single switch or operating mechanism capable of turning off or on the system's amber strobes. The switch shall function as a "dead-man" type to turn off the strobes.
- Provides a single switch or operating mechanism capable of shutdown all heating, ventilating, air conditioning (HVAC) equipment in the facility in accordance with requirements of UFC 4-010-01.
- Protection of the LOC in a small, wall-mounted enclosure.
- Supplemental heating for those enclosures located outdoors or in areas where the LOC will be exposed to temperatures or humidity outside of the manufacturer's design limits.
- Use of a break-glass, thumb-lock, tamper wire, tamper alarm, or equivalent protection to minimize the potential for tampering with LOC. This is not required in those facilities with limited access so that unauthorized use would not reasonably be expected to occur. Enclosures that can be opened only by a key shall not be used.

5-7 NOTIFICATION APPLIANCE NETWORK

5-7.1 **Audible Appliance Network.** Requirements include:

- Provide appliances capable of satisfying all Uniform Federal Accessibility Standards (UFAS) and Americans with Disabilities Act Accessibility Guidelines (ADAAG).
- Use speakers suitable for the intended climatic and environmental conditions.
- Use speakers suitable for installation in commercial/industrial applications with consideration of electrically hazardous (classified) location.
- Provide speakers and installation methods compliant with Director of Central Intelligence Directive (DCID) 1/21, *Manual for Physical Security Standards for Sensitive Compartmented Information Facilities*, for areas classified as sensitive compartmented information facilities (SCIF).
- System design shall comply with NFPA 72.
- Speakers shall meet listing requirements of UL Standard 1480.

- Provide speakers at all locations inside a building where the building fire alarm must be audible.
- Provide speakers mounted on the exterior of the building to provide notification of any areas commonly used by building occupants. These include courtyards, covered break areas, designated smoking areas, and sidewalks leading from the building's exit doors to a public street or from parking areas for a distance up to 5 meters from the building. Use speakers with directional characteristics that transmit minimal backplane noise when mounted on the sides of the building. Generally, the speakers should be located near entrance/exit doors.
- Provide an effective voice communication within buildings using a design including many speakers, each with low audio intensity.
- Install speakers with field-adjustable tap settings to allow adjustment after installation to meet intelligibility requirements.
- Use speakers rated at two (2) watts of power or less and provided with multiple tap settings to adjust the output power for most occupied areas.
- Use speakers rated at eight (8) watts of power or less and provided with multiple tap settings not exceeding two (2) watts between settings for very large or very noisy areas.
- Do not use speakers exceeding eight (8) watts of power for indoor applications without prior approval of the DoD component AHJ.
- Use speakers capable of frequency response over the range at least 50 Hz to 10,000 Hz.
- Design to meet intelligibility requirements in accordance with NFPA 72.
- Verify by measurement after installation for intelligibility with a common intelligibility scale (CIS) score greater than 0.90 in each area where building occupants normally could be found. Areas of the building where occupants are not expected to be normally present may have a CIS score less than 0.90 if personnel can determine that a voice signal is being broadcast and they could walk less than 3 meters (10 feet) to find a location with at least 0.9 CIS. Measurements should be taken near the head level applicable for most personnel in the space under normal conditions (standing, sittings, sleeping, etc., as appropriate).
- Commercially available test instrumentation shall be used to measure intelligibility as specified by International Electrochemical Commission (IEC) 60849, Second Edition: 1998, *Sound Systems for Emergency Purposes*, and IEC 60268, Part 16, *The Objective Rating of Speech Intelligibility by Speech Transmission Index*.
- Wiring methods shall comply with NFPA 72. Class B wiring is permitted unless Class A wiring is required for fire alarms systems on the DoD Installation.

5-7.2 **Visual Appliance Network.** Requirements include:

- Provide visual appliances capable of satisfying all Uniform Federal Accessibility Standards (UFAS) and Americans with Disabilities Act Accessibility Guidelines (ADAAG).
- Use visual appliances suitable for the intended climatic and environmental conditions.

- Use visual appliances suitable for installation in commercial/industrial applications with consideration of electrically hazardous (classified) location.
- Strobes shall meet listing requirements of UL Standard 1971.
- Strobes are not required outside the building.
- Navy and Marine Corps: Provide white/clear strobes marked with the word "ALERT" for shared use by the facility's MNS and FACP.
- Navy and Marine Corps: Provide LED text signs at every egress door of the building (i.e., doors to exit stairwells, entrances/exits, and emergency exit doors) to inform the hearing-impaired. (See Chapter 7 for operational requirements and information on message content.)
- Army and Air Force: Provide amber-colored strobes marked with the word "ALERT" to alert the hearing-impaired. These strobes are to be provided in addition to existing white/clear strobes provided for the building fire alarm system.
- Army and Air Force: Amber strobes activated in conjunction with the delivery of a live voice message shall operate during the period of message delivery and for a subsequent time period of not less than 15 seconds after message termination.
- Army and Air Force: Amber strobes activated in conjunction with the delivery of a prerecorded voice message shall operate continuously until message termination.
- Army and Air Force: White/clear strobes activated by the fire alarm system shall not operate during those periods when the amber strobes are in operation, but otherwise shall operate continuously until the fire alarm system is reset.
- Wiring methods shall comply with NFPA 72. Class B wiring is permitted unless required otherwise by the local authority having jurisdiction.

5-8 **INTERFACES WITH WIDE AREA MNS.** The Individual Building MNS shall be capable of interfacing with an existing Wide Area MNS. If a Wide Area MNS is not presently provided on the DoD Installation, the Individual Building MNS shall be designed to allow future interface with a Wide Area MNS procured from another manufacturer. The electrical requirements, computer codes, or other protocols that are needed to interface the systems shall be provided to the DoD Installation. At a minimum, the Wide Area MNS shall be able to provide and the Individual Building MNS shall be able to receive an audio line level input.

CHAPTER 6

SPECIAL CONSIDERATIONS

6-1 **OVERVIEW.** DoD requirements for anti-terrorism mandate the installation of Individual Building MNS during new construction and renovation projects. These systems are presently being installed on the majority of all DoD Installations. Although not required by DOD, use of a Wide Area MNS may be an important part of the anti-terrorism strategy established by DoD Installations.

6-2 **INSTALLATION PLAN.** It is recommended that each DoD Installation establish an implementation plan that establishes a comprehensive approach to MNS that is acceptable to security, communications, and fire protection engineering personnel. Elements of an implementation plan should include a needs assessment, requirements definition, alternatives evaluation, system selection, and implementation schedule. Some DoD Installations may choose to first select and install a Wide Area MNS, and subsequently install Individual Building MNS that is compatible with the Wide Area MNS. This is not required by DoD but will immediately increase the readiness of the DoD Installation to respond to terrorist and other threats. This approach has been chosen by the Marine Corps. Other DoD Installations may choose to install Individual Building MNS in new construction and renovation projects, and also in their most significant and important facilities. This approach will spread the cost of installation over a longer time period. The completed implementation plan will serve as a roadmap to address the specific needs and unique circumstances associated with each particular DoD Installation.

6-3 **GIANT VOICE SYSTEM.** Some DoD Installations are currently provided with a Giant Voice system for outdoor notification. Many of these existing systems were designed in the Cold War era and intended for the transmission of tones signals, but not for voice signals. They may prove to be inadequate to provide intelligible voice signals over much of the DoD Installation. Closer spaced and less powerful speaker platforms are often required to achieve adequate intelligibility. Existing Giant Voice systems often have proved unsatisfactory in providing intelligible messages between multi-story buildings in high population density areas (such as industrial areas). Newer speaker technologies, such as planer directional speakers, are available and should be considered for installation in these areas. Additionally, this UFC does not permit the use of Giant Voice systems inside of buildings because of the difficulty in achieving acceptable intelligibility of voice messages, the need to monitor circuit integrity, and the requirement to provide visual notification devices for persons with hearing disabilities.

6-4 **TELEPHONE ALERTING SYSTEM.** A telephone alerting system may be useful in supplementing a Wide Area MNS and providing notification to building occupants where mass notification would not be required by UFC 4-010-01, such as small facilities with only a few occupants and single-family and duplex military family housing. Telephone alerting system services are sometimes outsourced to reduce the operation and maintenance burden on the base; however, outsourcing increases reliance on systems not under direct control of the facility being serviced and could

impact the reliability or vulnerability of telephone system capability.

6-5 **LIMITATIONS.** This UFC does not require the installation of mass notification capability for those persons who are unable to protect themselves and could not take action without the assistance of other. Examples include prisoners in correctional facilities that are physically prevented from taking action, and patients in a hospital that require assistance from the medical staff to take action. Mass notification capability is still required for the staff of these facilities so they may take know to take action to protect themselves and those persons in their care. The appropriate approach for these facilities is to emulate the design solution that would be applied in that building for the installation of a new fire alarm system.

CHAPTER 7

OPERATIONAL CHARACTERISTICS

7-1 **INTRODUCTION.** This chapter provides a description of the most significant operating characteristics of Wide Area MNS and Individual Building MNS.

7-2 WIDE AREA MNS

7-2.1 **Central Control Stations.** A primary and backup central control station is provided. At each central control station, a computer with a graphical interface device (GUI) is provided. With the GUI, the system operator can send live voice signals using a microphone, and send or activate pre-recorded voice signals, tones, and music signals. The signals can be sent to individual buildings, zones of buildings, individual outdoor speaker arrays, zones of outdoor speaker arrays, or to the entire DoD Installation. Different signals can be sent to different locations simultaneously. The central control station can receive voice signals by telephone or radio, and patch those through to desired locations on the DoD Installation. Music, such as Reveille and the National Anthem, can be transmitted throughout the DoD Installation. The central control station automatically or manually assigns priorities to all transmitted signals.

7-2.2 **Regional or National Command Centers.** When required by the DoD Component, those signals transmitted on the DoD Installation that meet a screening criteria for priority are automatically relayed to a regional or national command center, or to nearby DoD Installations that have a need to know of the emergency.

7-2.3 **High Power Speaker Arrays (HPSA).** Each HPSA is provided with a microphone to enable an on-scene commander, security forces, or others (such as a drill instructor) to use the HPSA for local announcements and instructions. Individual speakers or all speakers of the array may be locally selected and energized. The speakers are highly directional to permit operation from a location directly below the speakers without feedback or harmful sound pressure levels.

7-2.4 **Other Systems.** The Wide Area MNS can also interface with and control other notification systems such as telephone dialers, pagers, facsimile machines, and highway signage control systems.

7-3 INDIVIDUAL BUILDING MNS

7-3.1 **Combined Systems.** In new construction, mass notification and fire alarm functions are combined into one system. Public address (PA) may also be combined into this one system. In renovation projects, combined systems are preferred, but separate systems may be permitted in some applications. The mass notification functions can temporarily disable the fire alarm notification devices so to allow intelligible voice announcements when needed in the case of simultaneous terrorist and fire events. This is necessary because arson and fire system activation are some of the methods of attacks that have been used by terrorists.

7-3.2 **Local Operating Console (LOC).** These consoles are provided to allow building occupants and emergency response forces to operate the system and provide live voice or pre-recorded messages to personnel in the building. They also enable the building occupants to completely shutdown the heating, ventilating, and air conditioning system as needed to respond to a terrorist event or external natural disaster. Army and Air Force systems permit most building occupants to access the LOC, and use tamper resistant features to minimize unauthorized use. Navy and Marine Corps limit access to the LOC to emergency response forces and a few of the building occupants, such as the building manager, security staff, or the Commanding Officer's staff.

7-3.3 **Autonomous Control Panel (ACU).** The ACU has the same capabilities to operate the system as a LOC, plus the ability to override or disable the mass notification capability. Access to the ACU is limited to emergency response personnel.

7-3.4 **Notification Appliances.** Speakers are used to provide intelligible voice signals for mass notification. Strobes are used to meet accessibility requirements of those persons with hearing disabilities. Army and Air Force use amber colored strobes to alert those with hearing disabilities. Navy and Marine Corps use one set of white/clear strobes for both fire and mass notification. These strobes are marked "ALERT" instead of "FIRE". Navy and Marine Corps also use text signs to assist persons with hearing disabilities. These signs read "EVACUATE" when the fire alarm system is in alarm. The signs read "ANNOUNCEMENT" when a mass notification message is being transmitted and will continue for 10 seconds after the end of the announcement. The signs are places over all egress doors (stairways, entrance/exit doors, etc.)

CHAPTER 8

MAINTENANCE

8-1 **INTRODUCTION.** This chapter was developed on the basis of recommendations from MNS manufacturers, as well as experience with similar computer-based systems. Maintenance requirements established for each MNS must consider the manufacturers' maintenance recommendations and applicable DoD maintenance requirements.

8-2 QUALIFICATIONS OF MAINTENANCE PERSONNEL

8-2.1 **Inspection, Testing, and Maintenance Tasks.** Only personnel trained and qualified in the maintenance and repair of MNS will perform inspection, testing, and maintenance tasks. Most types of MNS use technology commonly found in fire alarm systems, Giant Voice, or other outdoor voice and siren warning systems, and similar maintenance skills are needed. Unless specific manufacturer training is available for a MNS, personnel shall be considered qualified if they have achieved a National Institute for Certification in Engineering Technologies (NICET) Level III or Underwriters Laboratories, Inc. (UL) certification level for fire alarm systems. Tasks must be performed according to manufacturers' instructions. Certain jurisdictions may require varying levels of continuing education to maintain recognized qualifications. Oversea locations should contact their command fire protection engineering office for guidance on appropriate qualifications. Military personnel having satisfactory completed the required schools in their career field are considered qualified.

8-2.2 **Other Inspections.** This UFC lists inspection tasks that must be performed during regularly scheduled facility inspections. Fire prevention, safety, and maintenance personnel, as well as other individuals familiar with MNS operations, shall perform these inspection tasks.

8-2.3 **Maintenance Records.** Each DoD Installation must maintain a permanent record of completed inspection, testing, and maintenance tasks in accordance with each agency's program for record keeping of recurring facility maintenance. Records may be hard copy or electronic. Where there are no DoD component-wide programs, records should be developed locally. Records must be maintained for every facility and include, as a minimum, each task, date scheduled, date completed, and name of the person completing the task.

8-3 **INDIVIDUAL BUILDING MNS.** See UFC 3-600-02, *Operations and Maintenance: Inspection, Testing, and Maintenance of Fire Protection Systems,* Paragraph 2-2.2, "Fire Detection and Alarm Systems," for applicable guidance on inspection, testing, and maintenance of engineered protection features in DoD facilities.

8-4 **WIDE AREA MNS.** Tables 8-1 and 8-2 provide maintenance information for the central control unit and communications network for a Wide Area MNS.

Table 8-1. Central Control Unit Maintenance

Frequency	Component	Tasks
Weekly	Central control unit, diagnostic log files	• Review event log file; verify correct events logged. • Review system diagnostic log file; correct deficiencies noted in log file.
	Central control unit, hard drive	• Delete unneeded log files. • Delete unneeded error files. • Verify sufficient free disk space available.
	System – Functional test	Send out an alert to a small set of pre-designated receiving devices and confirm receipt.
	System – Security	If remote control software is loaded onto system, verify that it is disabled to prevent unauthorized system access.
Monthly	System – Functional test	Send out an alert to a diverse set of pre-designated receiving devices and confirm receipt. Include at least one of each type of receiving device.
	Central control unit, reset	Power down the central control unit computer and restart.
Quarterly	System – Software backups	Make a full system software backup. Rotate backups based on accepted practice at site.
	Central control unit, computer	• Verify proper operation of computer. • Defragment hard drive. • Verify unobstructed flow of cooling air. Clean filters. Remove dust buildup on cooling fans, cooling fins, and air intake vents.
	Central control unit, UPS	• Verify that system will operate in the absence of line power; discontinue line power to system and verify functionality. • Test UPS. See NFPA 70B.

Yearly	System – Software backups	Test the current software backup system by installing the system backup.
	Central control unit, operation	• Verify content of pre-recorded messages. • Verify activation of correct pre-recorded message based on selected event. • Verify activation of correct pre-recorded message on the basis of targeted area. • Verify central control unit security mechanism functional.

Table 8-2. Communications Network Maintenance

Frequency	Component	Tasks
Weekly	Central control console	Verify no diagnostic failures indicated.
Monthly	Wireless transceivers	Perform silent activation of entire system.
	Total system functionality	• Perform test system activation for a particular zone/building/area. • Verify field components perform as expected.
Quarterly	Central control unit, UPS	• Verify that system will operate in the absence of line power; discontinue line power to system and verify functionality. • Test UPS. See NFPA 70B.

Every 6 months	Field components	• Perform a visual inspection of all components. Verify enclosure integrity not compromised. • Perform a visual inspection of antenna. Verify solid connection and no corrosion. • Perform a visual inspection of transceivers. Verify proper operation. • Generate a conductor integrity monitor alarm. Verify alarm status on central console. • Disconnect AC power. Verify AC power failure alarm status on central console. • Disconnect AC power. Verify battery voltage under load.
Yearly	Wireless signals	Check forward /reflected radio power.

GLOSSARY

Acronyms and Abbreviations

AC—alternating current

ACU—Autonomous Control Unit

ADAAG—Americans with Disabilities Act Accessibility Guidelines

AFPAM—Air Force Pamphlet

ANSI—American National Standards Institute

APCO—Association of Public Safety Communications Officials

COTS—commercial off-the-shelf

dBA—sound/noise power, adjusted, in decibels

DCID—Director of Central Intelligence Directive Directorate

DOD—Department of Defense

FCC—Federal Communications Commission

FSK—frequency-shift keying

GIS—Geographic Information System

GUI—Graphical User Interface

HPSA—High Power Speaker Array

HQ AFCESA/CES—Air Force Civil Engineer Support Agency, Engineering Directorate

HQ DLA-D—Defense Logistics Agency Director

HQ DLA-DSS-IP—Defense Logistics Agency, Support Services

HQ USACE/CECW-E—US Army Corps of Engineers, Directorate of Civil Works, Engineering and Construction

HQMC Code LFF-1—US Marine Corps, Headquarters

Hz—Hertz

IEC—International Electrotechnical Commission

IP—Internet Protocol

LOC—Local Operating Console

MEP—Mobile Electrical Power

MILCON—Military Construction

MNS—Mass Notification System

NAC—Notification Appliance Circuit

NAVFACENGCOM HQ CODE CHE—Naval Facilities Engineering Command, Headquarters Chief Engineer Division

NFPA—National Fire Protection Association

NICET—National Institute for Certification in Engineering Technologies

NIMA—National Imagery and Mapping Agency

NTIA—National Telecommunications and Information Administration

OSD—Office of the Secretary of Defense

PA—public address

SCIF—Sensitive, Compartmented Information Facilities

UFAS—Uniform Federal Accessibility Standards

UFC—Unified Facilities Criteria

UL—Underwriters Laboratories, Inc.

UPS—uninterruptible power supply

WAN—wide area network

Terms

Contractor—An entity that executes work in accordance with a contract.

Giant Voice—A nickname for the wide-area outdoor siren and voice signaling system often found on military bases. An earlier name for this system was “Big Voice.”

Mass Notification System—A system that provides real-time information to all building occupants or personnel in the immediate vicinity of the building during emergency situations.

System Integrator—A contractor that designs, fabricates, installs, starts up, tests, and documents electrical and electronic systems using COTS components manufactured by others. Qualified manufacturers can act as system integrators.

APPENDIX A

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