

Emergency Communications

An Emergency Communications System (ECS) or a Mass Notification System (MNS) is something much more than an alarm system. By using the technologies based on fire alarm codes and standards, fire system manufacturers are able to produce a robust life safety solution. For the benefit of those considering an ECS/MNS to safeguard a particular building or complex, this article explains Mass Notification and its origins, the codes and standards' treatment of MNS, and the current cutting-edge technologies that are available.

Origins of MNS

The United States Department of Defense outlines Mass Notification in its Unified Facilities Criteria (UFC) 4-021-01 Design & O&M: Mass Notification. It is defined as "the capability to provide real-time information to all building occupants or personnel in the immediate vicinity of a building during emergency situations. To reduce the risk of mass casualties, there must be a timely means to notify building occupants of threats and what should be done in response to those threats. Pre-recorded and live-voice emergency messages are required by this UFC to provide this capability."

The UFC recommends the use of a combined fire alarm and Mass Notification System, particularly in new construction of military facilities, where the building fire alarm control panel forms a single combined system that performs both functions. For smaller buildings, the public address (PA) system may also be integrated with this combined system as long as the PA is interlocked with the fire alarm system and could be supervised for integrity.

Initially seen as a "military solution," Mass Notification Systems are becoming more popular among many non-military occupancies having that in recent years, a series of incidents has forced facility managers to rethink the way that they respond to emergencies. The need to inform large numbers of people about an emergency in a facility or on campus has become apparent.

The design standards such as United Facilities Criteria (UFC; UFC 4-021-01, titled "Design and O&M: Mass Notification Guide for DOD Facilities") and the National Fire Protection Association (NFPA 72-2010, Chapter 24 titled "Emergency Communication Systems"), both of which address the functional criteria and installation standards for Emergency Communications and Mass Notification Systems, have been the launch pad for emergency communication standards for non-military facilities such as offices, hospitals, and schools.

Chapter 24, Emergency Communication Systems (ECS) of NFPA 72 (2010 edition), "National Fire Alarm and Signaling Code", defines ECS as "a system for the protection of life by indicating the existence of an emergency situation and communicating information necessary to facilitate an appropriate response and action;" and defines MNS similarly to the UFC as "a system used to provide information and instructions to people in a building area, site or other space using intelligible voice communications and possibly including visible signals, text, graphics, tactile, or other communication methods." Chapter 24 describes the needs of ECS and how integrating ECS into fire alarm systems makes sense and the requirements of this chapter have been correlated with the requirements of the UFC. It also provides minimum requirements for system designers, installers and facility managers using MNS.

Applicable Codes & Primary Components

NFPA 72 in its latest edition now includes requirements for the design and installation of these systems within the growing variety of commercial facilities considering an ECS. The NFPA 72, chapter 24 "Emergency Communications Systems (ECS)" is subdivided into four major sections: one-way communication, two-way communication, command and control, and performance-based design alternative. It also indicates that when determining the required performance of the ECS, a detailed risk analysis must be completed for both fire and nonfire emergencies

Within NFPA 72, criteria for emergency communications systems design and installation are broken down to address three specific areas: Systems in buildings, Wide-area notification and Distributed notification.

The Department of Defense UFC outlines three primary components of an MNS system as being an autonomous control unit, a notification appliance network and a "Giant Voice" system.

Per UFC guidelines, an autonomous control unit is, "used to monitor and control the notification appliance network and provide consoles for local operation. Using a console, personnel in the building can initiate delivery of pre-recorded voice messages, provide live voice messages and instructions and initiate visual strobe and (optional) textual message notification appliances. The autonomous control unit will temporarily deactivate audible fire alarm notification appliances while delivering voice messages to ensure they are intelligible."

In addition, different messages can be broadcast to different areas of the building or campus based on the proximity to the emergency.

As well, the UFC defines a Notification Appliance Network as “a set of audio speakers, strobes, and text signs that are located to alert occupants and provide intelligible voice and visual instructions.” The last MNS component indicated in the UFC referred to as the “Giant Voice systems” and in NFPA 72 as “Wide-Area Mass Notification Systems” is “typically installed as a base wide system to provide a siren signal and pre-recorded and live voice messages. It is most useful for providing mass notification for personnel in outdoor areas.” Giant Voice systems are meant to alert those within parking lots, campus malls, stadiums, temporary buildings and the like. In the past, massive speaker systems were used in a limited capacity to sound your typical fire or bad weather siren warnings throughout large outdoor areas. Only recently with the rise in demand for MNS, have fire alarm manufacturers begun to develop more powerful speaker clusters to deliver intelligible voice instructions to those outdoors and in the general vicinity of buildings.

Much like UFC guidelines, NFPA 72 requires “security personnel should be able to effect message initiation over the MNS from either a central control station or alternate (backup) control station. Where clusters of facilities exist, one or more regional control stations might also exercise control.” It also requires that the MNS should offer a “dynamic library of scripted responses to various emergency events that would be easily customizable to meet the needs of the individual customer.”

Aside from the UFC and NFPA 72, the other codes and standards that certain facilities considering an MNS must note are the Americans with Disability Act (ADA), OSHA 1910.165, Employee Alarm Systems, and FEMA's Outdoor Public Alerting Systems.

Complete Solutions for Effective Notification

NFPA 72 clearly defines the priority and set the requirements of MNS as the protection of life by indicating the existence of an emergency situation and instructing the occupants of the necessary and appropriate response and action. With numerous MNS-type products flooding the market these days, it's often a challenge for specifiers to define a particular facility's MNS needs and then move forward with the design of an effective solution.

Per all the aforementioned codes and standards, utilizing fire alarm control systems for mass notification makes very good sense. Also, the code highly recommends that Mass Notification Systems integrate with fire systems because fire-based Mass Notification Systems have back-up, will be maintained and tested regularly and that “value” of supervision, maintenance and testing would have now migrated into the Mass Notification System.” If a problem occurred that could compromise the system's functionality, the fault would be detected and proper person-

nel alerted to the condition so they could correct it. Mass notification solutions that are not incorporated into the fire alarm system — PA systems, email, text messaging, and reverse 911 systems — are not subject to stringent codes and standards like fire alarm systems. If such a system should suffer a malfunction that prevents it from working properly, it could potentially go unnoticed and not function when needed.

Additionally, NFPA 72 makes clear that distributed recipient notification systems such as text messaging or e-mail shall not be used in lieu of required audible and visual alerting Mass Notification Systems, because they may provide conflicting information such as a text message directing a person to remain in place, while the fire alarm system in the building provides the evacuation message. If the fire alarm evacuation system is activated before the occupants received the message, there could be confusion. It is important that delays in transmission of signals be considered and minimized for critical information. The programming of these systems must be integrated and coordinated with the emergency plan and the sequence of operations for all of the systems.

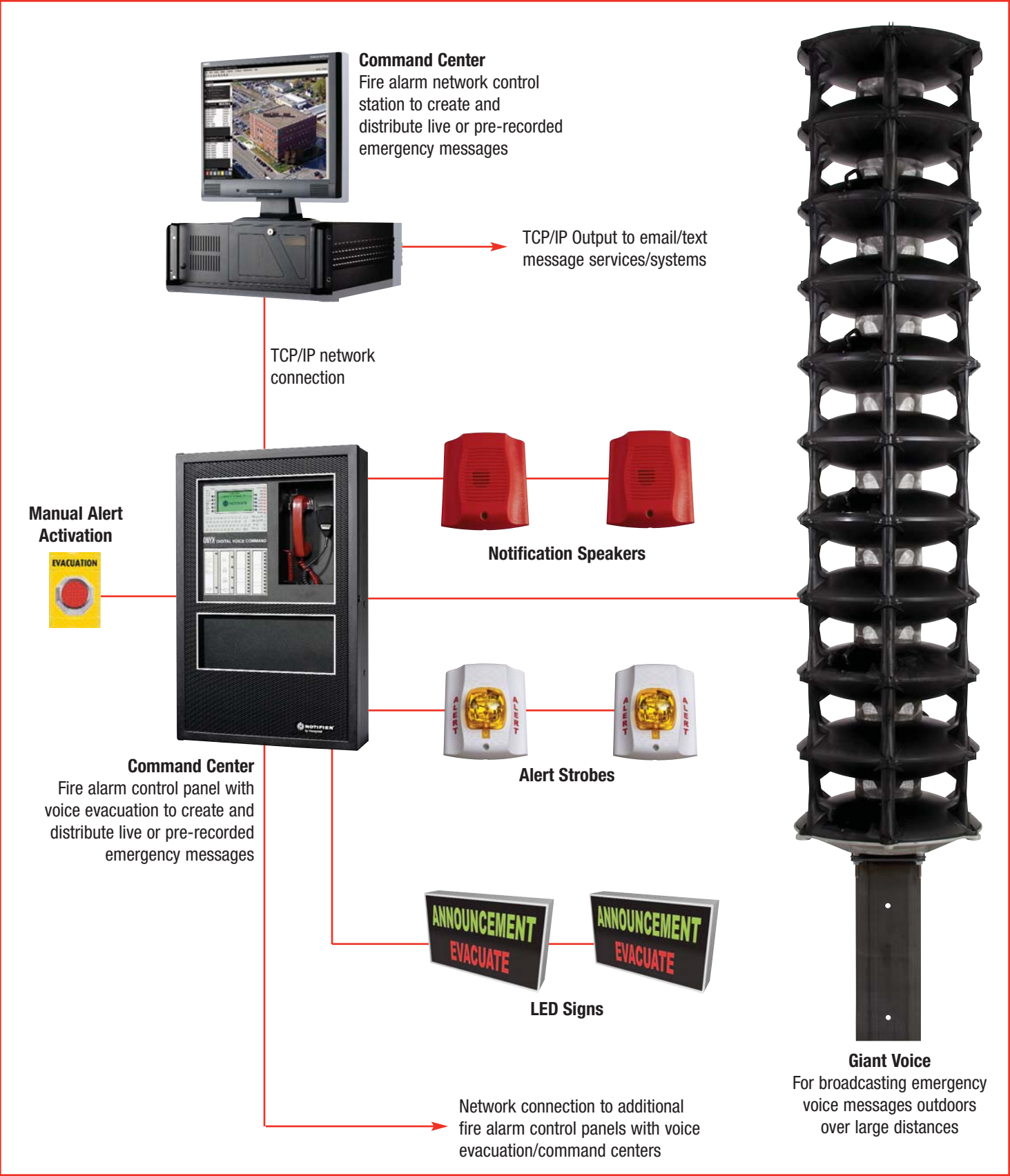
In the midst of an emergency, flashing strobes accompanied by live or pre-recorded audible instructions tend to have a much higher impact on occupants. At the same time, highly-visual signs in large areas of assembly can offer information specific to the emergency or display a simple message such as “evacuate.” To deliver voice instructions to those outside, large speaker clusters can be installed on the exterior of a building or throughout a campus. The most effective Mass Notification Systems utilize a combination of audible and visual notification devices, such as strobes, voice communications (indoor speakers and Giant Voice) and programmable LED signage.

For multiple buildings or campuses spread across a city, state or even the globe, some fire alarm manufacturers have harnessed the latest Voice over IP (VoIP) technology, delivering live voice messaging to anywhere in the world via the Internet. These state-of-the-art systems employ one or more workstations from which security or facilities personnel can send emergency communications using VoIP.

The marriage of ECS/MNS and fire alarm control systems is a growing trend that's expected to continue reaching into larger varieties of facilities and multi-building properties, including K-12 schools, high-rise buildings, mass transit hubs and even public gathering places such as theatres, restaurants and places of worship.

Fire alarm system manufacturers and installers work within a tightly regulated industry in which the federal and local codes and standards serve to promote and preserve life safety for any and every building occupant. Therefore, they have a strong understanding of the mass notification requirements and how their existing products and services compliment the technology.

Mass Notification System Components



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