

## MNS Selection, Emplacement, & Operation

This white paper discusses considerations on selecting, emplacing, and operating a mass notification system. The author bases it on lessons learned through a seven-year period, during which he conducted the selection, installation, upgrade and use of a mass notification system. It includes tips on how to avoid pitfalls.

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### Introduction

Choosing a mass notification system (MNS) can seem a daunting task, starting with the very question of why to pick one at all. While an organization may know exactly what it wants in regard to something it produces or a service it provides, MNS users are just that – users – and may not be the most qualified people to determine the desired specifics of the selected MNS. Further, a MNS is another infrastructure cost with which to recon. If things go well, an organization will never have to use its MNS in an emergency situation. Given this reality, one must remember the cost of an incident can quickly exceed the price of preventative and mitigating measures such as having a MNS. Depending on the nature of an organization's operations, whether an incident will occur might be better expressed in terms of when it will occur. Once an organization decides to acquire a MNS, examination of a few basic issues can guide the organization to selecting a MNS that meets its requirements.

### Bottom Line

Predictably, a MNS is going to compete with other organizational priorities for funding; and, it will have to compete against things much more readily able to show a return on investment. Like most anything else, the organization acquiring a MNS is going to get what it pays for. The objective therefore becomes how to gain a reliable and effective system that does all the things the organization wants it to do, which should be to ...

- Satisfy all legal requirements for mass notification
- Protect personnel and assets from analyzed threats
- Reduce unnecessary redundancy and confusion in notification systems
- Provide additional utility from the installed system via extra features
- Allow the organization to adhere to its health, safety, and environment policies, which are ethical and legal obligations it incurs

### Definition

Throughout this paper, the author refers to organizations. An "organization" is any entity where a significant number of people work, live, or congregate. This includes all types of businesses – manufacturing, retail centers, entertainment facilities, etc. It also includes schools, government buildings and military installations. Finally, any

mass notification requirements may well extend beyond the defined organization to the surrounding area, depending on the specific hazard and potential impact it could have outside of the organization's immediate area.

## Selection

*Legal Requirements.* An organization will face legal requirements driving selection of a MNS; and, those requirements are going to extend well past the selection phase. In addition to fire code, which is rather universally accepted and requires adherence to NFPA 72, there are also laws dictating MNS capabilities that exceed what a fire alarm system can normally do. The Canadian Centre for Occupational Health and Safety and the US Occupational Safety and Health Administration both require organizations to have a MNS if certain conditions are present. They prescribe features, again contingent on conditions. There is even international agreement on the need for mass notification capability. The International Labor Office, in Geneva, stipulates, "Works management should arrange for the onset of any accident or emergency to be quickly communicated to all appropriate workers and personnel off site." (Section 8.4.2)

*System Characteristics.* The legal authority with jurisdiction over an organization will prescribe some standards. This is actually the easy part about system selection since compliance is not optional and guidance is generally straightforward. Annex E to NFPA 72 provides a solid set of specifications that, when followed, virtually guarantee compliance with legal requirements. Some organizations face additional requirements with which they must comply. For example, US military installations must follow the Unified Facilities Criteria (UFC) 4-021-01 guidance on MNSs. Note that the UFC is posted to the internet and available for anyone's use. System characteristics are also contingent on desired capabilities. A small company with ten employees all working in plain sight of each other, with non-hazardous materials, and in one small building, can probably meet its MNS needs quite easily: fifty dollars and one bullhorn later, the company complies with legal and ethical requirements. In this simple example, however, the small company still has a need for mass notification capabilities. An oil refinery, of course, needs a tremendously more capable MNS.

*Cost.* Cost is clearly linked to system complexity, capability, and expansiveness. An organization would do well to procure a professional assessment. This can address issues directly bearing on cost, such as whether to employ fiber-optic cable or use existing copper wire. The assessment can also reveal cost-saving measures such as the ability to tie-in with existing systems like fire alarm and public address systems.

→ **Tip!** Have the company offering the MNS detail several tiers of equipment and emplacement options. The first tier can be the bare minimum required to comply with all applicable laws and with the company's own policies. The second tier can then include what the management needs to perform what it considers the basic functions in response to the analyzed threats. Tier three can then reflect what the organization

would like to have in a financially unconstrained environment – more than a proverbial wish list, it can serve as a desired MNS end state.

*Design.* Optimally, the company doing the assessment will either be the same company designing the equipment and tailoring the particular package for the organization, or it will have experience working in cooperation with it. Annex E to NFPA 72 is clear in stipulating, “MNS plans and specifications should be developed in accordance with this annex by persons who are experienced in the proper design, application, installation, and testing of MNSs.” Several companies specialize in the design, manufacture, and installation of integrated MNSs. One example of these companies is INDUSTRONIC. Since 1964, INDUSTRONIC has designed and developed mass notification systems as well as tailored packages for organizations throughout the global market.



## Emplacement

*Who Should Install the System?* The choice is between a complete installation from the company providing the MNS and a cooperative effort that uses the receiving organization’s in-house assets. Annex E to NFPA 72 tells us, “Installation personnel should be supervised by persons who are qualified and experienced in the installation, inspection, and testing of MNSs.” The key word here is “supervised.” Some organizations have large in-house work capabilities. An oil drilling platform, for instance, likely has no shortage of engineers and workers able to run cable, mount speakers, weld brackets, etc. Similarly, a military installation has its own engineering force. In both examples, in-house work under the supervision of the company furnishing the MNS could be a viable and cost-saving approach. There are nonetheless some real disadvantages, to which the organization must pay attention.

### **In-House Work Force - Advantages**

- Potential cost savings on the MNS installation process (although this could work the opposite way, depending on the in-house force expertise)
- In-house force gains better understanding and knowledge of the system
- Organization has greater control over how the system is installed

### **In-House Work Force - Disadvantages**

- Slower, due to competing demands on the work force’s time
- Loss of the benefit of an experienced installation crew and potentially higher costs
- Tendency to want to cut corners to save material and time
- Work force may be resultantly too busy to perform it’s regular duty functions

→ **Tip!** The author’s primary experience with a MNS acquisition involved a new, comprehensive system installation spread over six geographically separated areas

that were all within a few kilometers of each other. To save money, the organization used its in-house engineering and labor force to do most of the installation, under the supervision of the firm supplying the system. It didn't take long to wish the organization had contracted the installation to the firm as well. Months later, when the installation was complete, it became apparent positioning of speakers and such was more a function of where they could go as opposed to where they should go. It was also unclear that the organization saved any money, as it then had to contract for functions its in-house personnel lacked time to do because of the MNS installation. This does not mean an organization cannot benefit from an in-house approach; however, it will need some rigid control measures up front.

*Existing Systems.* The new MNS probably need not displace existing systems. By its nature, a MNS is a comprehensive communication system that's designed to incorporate a number of functions. Where possible, the new MNS should make use of existing hardware and systems. This can significantly reduce installation costs as well as result in a more capable system. Rolling existing systems into the MNS will likely enjoy more success in larger, more geographically diverse organizations. A military base, for instance, may have a couple of schools with their own public address systems, a shopping complex with its own system, assorted headquarters with their own systems, and so on. In this scenario, an overarching MNS that taps into the existing address systems would gain the ability to instantly reach a much larger audience without the cost of installing a completely new system. One must take care with this approach, however, where existing systems are obsolete. Trying to tie-in an old system that is a candidate for replacement anyway can be more trouble than it's worth and can cause a weak component in the MNS communication network.

→ **Tip!** Large organizations with multiple, diversified departments operating under somewhat autonomous sets of leadership may encounter buy-in problems. A medical clinic located on a much larger facility, for instance, may meet all of its requirements for fire alarms and public address; however, it could fall short in terms of instant accessibility from the office controlling the overall security and safety mission. In this example, the clinic would need to have its system tied-into the overarching MNS. This becomes a leadership issue to resolve any resistance to the initiative. Installation of the MNS, as part of the overarching security and safety program, is only going to be effective when the organization's leadership prioritizes it and takes a corresponding interest in the program's success.

### Operation

*Operations Personnel.* Determining who will operate the MNS hinges, in part, on how complicated it is. A fire alarm system requires five things: a building or complex evacuation plan, frequent training of personnel on the plan, automatic or manual activation of the alarm on noticing the fire, a means to reset the system after resolving

the emergency, and periodic maintenance and system inspection. By comparison, an integrated and multifunctional MNS that includes the fire alarm system but also the ability to provide a variety of different warnings – tones, recorded voice instructions, live voice broadcasts, etc. – and also uses visual displays, is going to require operator training. Who exactly the operators are will hinge on who is charged with communicating emergency instructions. If there is a dedicated operations center, the personnel staffing it would be the ones to meet this responsibility. Depending on the organization's mission, security posture, analyzed threats, and potential incident severity, a dedicated operations center may well provide the best trained and most responsive personnel, able to reliably and quickly select the correct response to an incident. In the absence of an operations center, an integrated MNS requires trained operators to stay on site. Naturally, these people don't have to be strictly dedicated to this mission, or they would compose a de facto operations center. Instead, this could be additional duties for the identified personnel. The person issuing mass warnings and instructions hopefully has decision-making authority and may or may not also be personally trained on how to operate the MNS.

**An organization must remain able to address these questions.**

- Who, by name or position, is going to physically operate the MNS?
- Who, again by name or position, is going to decide which instructions to issue?
- Where are these people located?
- Where are their access points for MNS use?

→ **Tip!** The decision to staff an operations center requires careful analysis of what skills the personnel working in the center must have. This is particularly true with extended-hour or 24-hour operations centers where the operators may be acting independently of their seniors. As with the MNS hardware, the organization gets what it pays for in personnel. Strict procedures in response to predictable incidents take one type of operator. Personnel able to make critical and immediate decisions, perhaps void of anticipation, rehearsal, or precedent, cost a lot more money.

*Non-emergency Applications.* The more multifunctional and complex a MNS, the more able it is to perform additional, non-emergency applications for the organization. Even a simple, real time voice address system can make broadcasts, announce events, or pass timely information to multiple recipients. Visual displays enhance communication capability and are essentially unlimited in the information they can disseminate.

→ **Tip!** Do not allow anyone to hijack the MNS. As useful as it may be for other applications, the MNS exists primarily for incident prevention and damage mitigation. Moderate, alternate use of a versatile system is generally advantageous, yet one must consider the risk of desensitizing the audience to the serious circumstances that could surround the system's employment. After a few weeks of looking at, and hearing about, the employee of the month, for instance, personnel could overlook an

emergency instruction. System overuse could lead to complacency and a failure to heed a genuine emergency instruction.

*System Maintenance.* It shouldn't need too much. Part of ensuring a high reliability rate for a MNS is keeping its design simple and minimizing the possibility of malfunction. There are visual inspections and tests. When the MNS includes the fire alarm system, NFPA 72 and other fire code includes the test specifics, such as the frequency. It's important to not overlook visual inspections. Things change in an organization. A loudspeaker could have been mounted to the wall for ten years; however, that may not have deterred a new forklift operator from clipping it yesterday. Cables get cut. Line of sight gets obstructed. While live tests will reveal malfunctions, visual inspections can show potential problems before they happen or before they worsen. Modern MNSs also run their own diagnostics and can alert personnel to malfunctions. In all cases, most important is that the people responsible for maintenance know their duties and the required frequency with which to perform them.

*Training Personnel at All Levels.* In short, an organization should train with its MNS as often as necessary to maintain operator proficiency and personnel familiarity with actions to take in the event of announced emergencies. Particularly in regard to fire alarms, the authority exercising jurisdiction over an organization may impose minimum timelines for system exercises. Since training is particularly costly when it involves diverting personnel from their normal activities to practice evacuation and other full-scale training contingencies, an integrated training plan should take into account different levels of training, with a higher level meeting the requirement for the periodic lower level events. Also important are exercise responses under different scenarios.

#### **Sample MNS Training Plan**

As Needed: Hold new personnel training on necessary emergency actions.

Weekly: Perform operator refresher training on the MNS without issuing actual alarms.

Monthly: Conduct the weekly training but issue practice alarms that don't require action.

Semi-annually: Exercise with alarms requiring a specific action in part of the facility.

Annually: Test the entire MNS system, including required person actions.

*Safety in Training.* Reasonably prudent approaches to personnel training on emergency actions allow the organization to safely practice all levels of response, including a full evacuation scenario. Ultimately, the best outcome of a genuine emergency would be to have all occupants of an endangered facility or area come out of the incident unscathed and thinking they just went through another training exercise. Frequency of training is important. It needs to happen enough for personnel to know exactly what to do in a given situation, even if that situation is an unrehearsed set of actions directed by live broadcast. Familiarity is key, as is security and safety emphasis from all levels of management and leadership. The organization plans, conducts, and controls the exercise as it would any other significant operation: with a perpetual consideration for safety as well as achieving the desired outcome.

→ **Tip!** Mistakes can happen; and, it's important to make the most of them. The author once inadvertently evacuated a whole school while attempting only a partial test elsewhere. No one was hurt or experienced an irretrievably disrupted schedule; and, the evacuation worked perfectly. Plus, the school got credit for doing a full exercise.

### Upgrades

At some point, the organization may want to upgrade the system. Upgrades generally come in two forms: actual equipment improvements and expansions to achieve greater utility from the MNS. Beyond the legal requirements for mass notification, often funding availability and changes in an organization's mission or operating parameters can drive the need for an upgrade. These are organizationally-generated requirements. Technology and innovation can drive upgrades as well. New products with new capabilities can appeal to organizations that wish to – or must – take advantage of system capabilities that were not previously available.

→ **Tip!** Resist the urge to tie control of emergency response personnel into the MNS. That's not where it belongs. First responders – security, medical, fire, rescue, etc. – are in the business of active, two-way communication and not operating on the receiving end of mass notification. That's not to say a good MNS cannot provide for two-way interface: it can and it should. But the level of communication first responders need, coupled with the often dynamic and mobile nature of their missions, require a dedicated means of continuing, reliable communication. There are also sensitivity issues. First responders need information different from what most personnel in an emergency setting require – information it may well be counterproductive to generally disseminate. While first responders certainly do need to all receive their traffic simultaneously and to constantly know each other's activities, this is something better achieved with secure radio communication.

### Conclusion

The selection, emplacement, and operation of a mass notification system is primarily about saving lives. Secondary, but also critical, considerations are protecting material assets, safeguarding the organization's interests and reputation, and promoting a wholesome work environment. The theme throughout this white paper has been that, as a rule, the organization gets what it pays for. The MNS it selects, emplaces, and operates is no exception.

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