

White Paper

# 9 Critical Factors for FSAS\* Success

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\*Fire Station Alerting Systems

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**PURVIS SYSTEMS**

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There are plenty of reasons why you may be contemplating a change in your Fire Station Alerting System (FSAS). Your existing fire station alerting system may be nearing the end of its useful life. Perhaps you are struggling with system reliability or integration issues with your current system. You might be looking to add more sophisticated features to your present voice or tones-only system. Or, you could be faced with regional consolidation, or even an expansion into a new station. Whatever the reason for considering a Fire Station Alerting System (FSAS), you want to make sure your system is highly effective at incident notification, efficient to operate, and suited to your particular environment.

To that end, this paper outlines **nine critical success** factors that can be used to guide your selection of a Fire Station Alerting System. It can direct you on delivering the most value to your fire department, ensuring you consider the right options, while staying in tune with the needs and nuances of today's dynamic, fire and rescue personnel. These insights are drawn from PURVIS' more than 40 years of deployment of technology and services solutions in public safety and defense organizations nationwide.

1. **Reducing Response Time.** When lives and property are at risk, every second of the emergency response cycle counts. The solution you choose should be tightly integrated with your community's Computer Aided Dispatch System, and provide reliable, instantaneous alert delivery in multiple formats to your first responders.
2. **Multiple Modes of Communication.** Accurate and clear communications are integral to reducing turnout time. Increase accuracy of information delivery with a solution that ensures communication to a variety of devices that convey critical information to the appropriate personnel.
3. **Adopt a Flexible Deployment Architecture.** One size does not fit all. Make sure the system you choose is modular, customizable scalable, and utilizes off-the-shelf devices, allowing for reconfiguration and expansion as needs and budgets change.
4. **Leverage Existing Equipment.** Undoubtedly your fire station has some systems and devices in place. Get the most from your investment by choosing a solution that provides seamless integration with your existing Computer-Aided-Dispatch (CAD), Public Address (PA), radio-based systems and other station devices.
5. **Minimize Firefighter Stress Levels.** Firefighting is physically exhausting, mentally demanding and highly dangerous. But often overlooked is the stress caused by alerts received in the fire station. The very best systems provide ramped and auto-adjusting audio levels, low intensity pathway lighting and incident-or unit-specific alerts to reduce the stress of night calls.
6. **How About Remote Personnel?** Not all first responders are at the station when an alarm comes in. An ideal system is one that can activate your personnel irrespective of their location – in station or remote.
7. **Built for High Reliability and Accessibility.** Station and personnel alerting is a life-critical function. Look for a system that offers device, server side and geographic redundancy and system self-monitoring backed by a committed team, providing ongoing support and maintenance whenever and wherever you need it.

8. **Designed for Service First.** Since downtime is not an option, look for FSAS solutions that are architected to make servicing easy, and select a vendor with a strong track record of service and proven experience in public safety.
9. **Use a Standards-Based Approach.** Adopting a system that is standards-based and National Fire Protection Association (NFPA) 1221 compliant will keep you within guidelines for public safety and insurance purposes.

## 1. Reducing Response Time

In the world of first responders, time has always been of the essence. Responding quickly can make all the difference in saving lives, reducing injuries and minimizing property damage.

Much of the focus on reducing response time is placed on reducing the time interval from fire station to scene. However, two critical elements of the overall response time are “incident handling time” and “turnout time”. See descriptions of each in the sidebar. Each step of the process—from incident reporting to first alert to dispatch and acknowledgement— can cost valuable time and can have pitfalls, such as:

- An overly-heavy reliance on the CAD operator’s manual efforts to activate emergency personnel.
- Unreliable communications and message integrity due to RF channel interference, signal fading, and intermodulation distortion; downed hard-link connections; and ambient noise in firehouse
- Inaccurate or ambiguous and slow delivery of critical information
- Missing or unclear incident information
- Limits of firefighting personnel to assimilate and retain verbal information while in emergency response mode.

Adopting a fire station alerting system that is intelligently integrated into your communication center’s CAD system, to automate the process of getting communications out to first-responders is “Job 1” in improving response time. Beyond that you need reliable alert delivery, and utilization of a wide array of alerting media and devices to meet the varied roles, locations, and communication styles of your emergency personnel.

### What Makes Up Response Time?

**Incident Handling Time:** from initial receipt of alarm to station notification.

**Turnout Time:** from station notification by audible and/or visual alerts until responding unit is en route.

**Travel Time:** from responding unit en route to arrival on scene.

**Action or Intervention Time:** from arrival on scene until some action or intervention is performed.

**Total Response Time:** from the receipt of the alarm at the primary public safety answering point (PSAP) to when the first emergency response unit is initiating action or intervening to control the incident.

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NFPA 1710 requires that **turnout time** should be 80 seconds for fire incidents and 60 seconds for EMS incidents. **Travel time** to a fire suppression incident, by the initial arriving company, should be 4 minutes or less, or 8 minutes or less for the deployment of a full first alarm assignment.

## 2. Multiple Modes of Communication

When a fire or EMS unit is heading to an emergency, seconds can make the difference whether someone lives or dies or whether a building burns to the ground. Communications clarity and accuracy are key to helping responding fire/EMS units understand the type of emergency they are responding to and where they are going the first time, without having to call the 911 center and ask for information to be repeated.

With older bell and tone systems the only information available is what the dispatcher reads over the radio. When station personnel are moving fast it's easy to misinterpret spoken instructions about an emergency.

Fire station alerting systems can efficiently and effectively mobilize fire station staff for responding to an incident by controlling a wide array of alerting devices that present critical information to the appropriate individuals as quickly as possible in redundant configurations:

- **Automated alerts and announcements** can be instantaneously conveyed to all responding parties via text-to-speech broadcast. Incident information is converted to speech automatically, saving the CAD operator huge chunks of time. Alerts can be preceded with pre-announcement alert tones and text.
- **Both audible and visual devices** should be employed as your personnel have different communication and comprehension styles, and may be in a situation, such as a noisy room, where one type of communication is critical for message delivery. Further, one mode serves as a backup to the other should a device fail. Bells, buzzers and sirens provide backup to PA and radio announcements, and various lighting options provide further redundancy.
- **Informational displays** such as LED, flat panel and TV provide specific incident information including incident type; address, cross street and common name; responding units; and tactical radio channel so that personnel are armed with the critical information they need to respond safely and appropriately.
- **Touch-screen controls** give responders fast, easy access to information and the ability to effortlessly interact with the system. Faster access translates to faster response and, in emergency situations, being even one second faster can make all the difference.
- **Rip-and-run printers** provide hard copy of dispatched information and preplan information (such as warehoused apartments, type and length of line stretch, number of apartments per floor, unsafe conditions, standpipe conditions, etc.), if available, to responding units, eliminating the need to call back in if an alert was missed, thus saving time and clearing the dispatch channel. Further, printed copies travel with the first responders as they board their vehicles.
- **Two-way messaging** with acknowledgement and real time communications provide live dispatcher interaction (dispatcher to station and station to dispatch) and ensure private and secure communications via touch-to-talk interface over Voice over Internet Protocol (VoIP).
- **On-screen maps** within the station display the location of the incident, removing confusion over where responders are going.

- **Camera and doorbell controls** with integrated microphones enable a two-way dialog with the person(s) standing outside. Sometimes an emergency notification happens at the fire station door. Could be someone dropping off a baby, or looking for help to a medical emergency happening nearby. Install a camera at the front-door of the firehouse, along with 2-way audio communications. This provides a video feed into the station and also back to the communications center. Any caller to the fire station, can get immediate assistance, either from station personnel who can get a “visual” on the caller, or from the communications center if station personnel may be away or sleeping.
- **Zone control** ensures that only those units or individuals required for response are alerted.

The bottom line is you need an FSAS that efficiently provides up-to-date incident status, access to hazardous materials information, and other critical data about an incident to the appropriate personnel in multiple formats so they can respond, quickly and appropriately.

### 3. Adopt a Flexible Deployment Architecture to Accommodate Growth

One size does not fit all. Each fire station is unique and so are the needs of its personnel. Different deployment sizes and architectures are critical to meeting those needs.

You need to tune your FSAS deployment architecture to match your department and station needs, balancing several considerations including cost, scalability and failover capability.

The most flexible architectures enable you to utilize a wide variety of alerting devices and transmission protocols. Deployment strategies can change as your implementation grows to support more locations, companies, jurisdictions and alerting options.

#### Expandable

Once installed, the FSAS could be in operation for many years. Therefore you’ll want to keep the future in mind as you evaluate choices. Even if you don’t have the funding to activate specific features today, you’ll want to invest in a system that will be capable of supporting them later.

#### Modular

Make sure the system you choose is modular, allowing for reconfiguration and expansion as needs and budgets change—without requiring extensive hardware changes. Choose the best and most cost-effective technology within your financial limitations.

One department might use several different types of alerting devices—even for a single station. Even if you are starting with a basic FSAS implementation you need to be able to choose the best devices for your application, and to know that as your device requirements change, your FSAS solution will adapt and grow with you.

For this reason it’s appropriate to expect that the system you choose will support a broad range of non-proprietary devices from different manufacturers.

### Customizable

You'll want to tailor a fire station alerting system specific to your department. Make certain you select a system that is **software-based**, highly configurable and can be tailored to meet your unique needs.

### Scalable

Even a very large organization may start by FSAS-enabling a single station or a subset of the department before deploying more broadly across multiple stations and departments; or they may choose to start with fewer alerting options and expand to more over time. Flexible deployment architecture can help ensure a streamlined initial project while enabling the implementation to scale to any size needed.

### Off-the-Shelf

Utilizing non-proprietary devices gives you the flexibility downstream to add new features and capabilities to the system. Off-the-shelf devices are also more readily and more quickly available, which in mission-critical environments, is imperative when parts fail. It also means that you are not locked into a single vendor.

Be sure the system you install can meet your current and future needs. You should be able to implement an off-the-shelf base configuration, such as an FSAS control unit tied to speakers, and then update and upgrade by adding other devices such as printers, cameras, lights, and monitors as well as new stations, as your needs change and your budget allows.

## 4. Leverage Existing Systems and Devices to Minimize Costs

Most fire departments have an alerting system and/or some alerting devices in place; however many of the systems and associated equipment have been used for some time. Some systems or devices may be reaching the end of their useful life and need to be replaced; some may need modernizing, and some are fully operational.

Does your FSAS supplier have the expertise to engineer a system that really fits your department? Can they phase in a plan for you that leverages existing investments in communications infrastructure and station devices, while expanding and modernizing over time?

It's only prudent to maximize the use of your existing infrastructure. Your day-to-day department processes are supported by your existing CAD, radio, public address, phone and lighting systems. With the substantial time and money you have spent analyzing, selecting and implementing these systems and developing the processes they support—and the challenge of obtaining new funding—you need to be able to incorporate a FSAS without costly retooling or replacing existing systems and devices whenever possible. A FSAS should add value to, and enhance, the systems and processes you have in place.

*"We saved thousands of dollars that we were able to redirect into additional FSAS features, based on the recommendation from our FSAS supplier to test, evaluate and repair our existing in-station "readerboards"*

*FSAS Customer*

For example, you might choose to reduce the cost of your infrastructure by tying in to existing equipment and deploying a combination of audio alerts and rip-and-run printers.

Minimize your investment by choosing a solution that seamlessly integrates with existing Computer-Aided Dispatch (CAD), public address and radio-based systems. Insist on using standard, off-the-shelf in-station hardware devices that are easy to service and replace. Using non-proprietary equipment makes it easy to integrate to existing systems and makes purchasing and maintenance more cost-effective.

## 5. Minimize Firefighter Stress Levels

Occupational stress is inherent in firefighting and emergency response. But at no time in the history of the American fire service has this been more acute—as the increase in arson, acts of domestic violence, terrorist acts, automobile accidents, airplane crashes, hurricanes, tornadoes and earthquakes will attest. The rigors of firefighting, rescue and victim extrication are such that only the bravest among us need apply.

Other stresses on firefighters are more subtle, such as the effect of receiving alerts in the fire station – especially at night. Interrupted sleep, startling alarms and bright lights take their toll immediately as heart rates soar in response to alerts and again later with the onset of fatigue due to sleep deprivation.

Aspects of a system that minimizes these stressors include:

- **Customizable day/night settings** control audio zones, lighting, devices such as outdoor speakers and ambient noise level sensors.
- **Ramped audio levels** awaken firefighters without the acute stress that abrupt ear-piercing tones can produce.
- **Low intensity lights** illuminate dorms, bunk rooms and exit corridors so that sleepy first responders don't lose precious seconds adjusting to bright lights and can safely navigate the egress while preserving their night vision.
- **Ambient noise level sensors** detect ambient background noise and automatically adjust volume levels accordingly to ensure critical audio alerts are heard, especially in noisy areas such as drive bays.

*“Heart attacks or stroke were responsible for 49% of firefighter deaths in 2012. This single year total is a near average proportion of firefighter deaths from heart attack or stroke over recent years. This nature of fatal injury has remained relatively constant, while others, on average, have been reduced during the past decade.”*

U.S. Fire Administration  
(USFA)  
Spring 2013

- **Zone-specific notification** provides custom tones and announcements, colored light indicators and appropriate speaker activation – by unit/incident, individual bunk or personal space, or all – so first responders not needed for a call can continue sleeping, while those required can begin responding immediately.
- **Automated controls** open and close doors, display apparatus status, turn off appliances, control egress lighting, open bay doors and activate traffic signals, letting responding individuals concentrate on the incident.

Choose a system that provides ramped and auto-adjusting audio levels, low intensity pathway lighting, incident- or unit-specific alerts and automated controls to reduce the physical and visual stress of night calls.

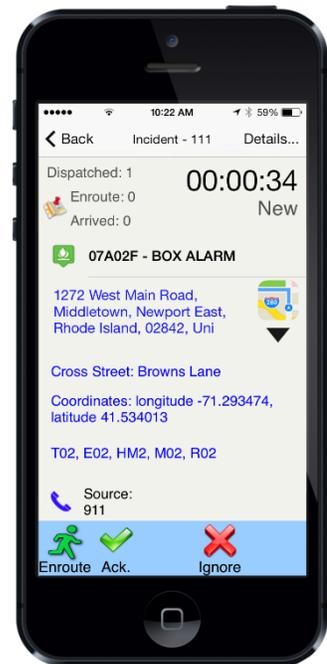
## 6. How About Remote Personnel?

Not all first responders are at the station when an alert comes in. They may be out of range of normal dispatch communications, they may not have access to their pagers or they may be volunteers or remote personnel.

The most up-to-date FSAS systems support text messaging, smartphone and email notification in addition to radio and pager. Emergency alerts automatically delivered via these multiple and redundant means, ensures the appropriate first responders are activated irrespective of their location, and thus accelerating crisis response and resolution, saving lives and property. Capabilities to look for:

- **Emergency alerts** utilizing the same text-to-speech announcement that goes to the station, allow responders to receive the actual dispatch page right on their department-issues radio or personal cell phones.
- **Group message selections** facilitate communications according to rank, title and unit, such as chiefs, haz-mat or dive team or according to incident type.

Enable your personnel to make more informed decisions on the proper response to an incident. Look for a system that leverages analog and digital radio, plus modern mobile technology to seamlessly alert your personnel, wherever they are.



## 7. Built for High Reliability and Accessibility

For people who put their lives on the line every day, reliable communication is vital. Reliable fire station alerting depends on crucial alerts reaching their destination. When a communications or device failure occurs and fire station personnel are not made aware of it, companies are delayed in responding to emergency calls.

### Automated Self-Monitoring

Automated fire station monitoring allows designated personnel to quickly determine equipment problems within the fire station such as failed communication hardware, downed lines and backup power system operation. Your system should have sophisticated self-monitoring that provides in-station visual and audible notification and that can tie into text messaging or email servers for real-time notification of a network or alerting system malfunction. This enables fire service personnel and the system vendor to begin proactive correction of the problem, thus maximizing system uptime and reducing the chance of a missed call.

### Redundant Architecture Design

Take a fully redundant and "layered approach" to your FSAS plans. Look for a system that provides:

- **Device redundancy** – visual and audible devices
- **UPS (Uninterruptable Power Supply)** backup that alerts the station when the power is out
- **Redundant servers** will continually operate in an active mode, eliminating the need for failover actions to be taken.
- **Geographic redundancy** with support for multiple dispatch locations and the option for geographically separated backup servers with near-instantaneous switchover (automatically or manually)
- **Dual communications paths** provides a necessary level of security should one communications path fail.

You'll want to implement a high-availability system. Redundant equipment, communication paths and backup sites can take over for damaged parts of the network, ensuring uninterrupted communications. Backup power supplies ensure your critical systems stay up during power failures.

### Voice over Internet Protocol (VoIP)

IP-based solutions are highly secure, highly reliable and won't clog existing radio networks. They promote better dispatching between Emergency Operation Centers and responding units for seamless and immediate response.

### Leverage Radio for Voice and Data

Your radio network is an important channel for delivery of voice communications, but it can also be used as an alternate data delivery network to your fire/rescue stations. Some FSAS vendors understand networking communications at a level of sophistication that enables them to implement data compression techniques and effective protocols to utilize lower-bandwidth networks, like Radio, for delivery of incident data, in addition to voice-based alerts. If your goal is to implement a modern Fire Station Alerting System with redundant communication paths, your existing Radio network can be leveraged as one of those paths.

### Software-Based System

In addition to providing more flexibility to customize a solution to meet your unique needs, software-driven technology is more cost-effective to maintain than traditional hardware-based systems. Because they are digitally programmed, customers can make easy, on-the-go changes to the configuration.

### Reliable Solutions, Proven Experience, Customer-First Attitude

- Skilled team with deep client relationships, domain knowledge and skills
- Time-tested approach, sustainable processes & exceptional customer service
- Breadth of capabilities, including system integration, software and hardware development, defense expertise, engineering, field services, call center and more.

## 8. Designed for Service First

Because FSAS systems are used in life-safety environments you should have an expectation of service performance. Downtime is not an option. Look for FSAS solutions that feature a service-friendly architecture—serviceability should be designed into the technology..

The FSAS should also be designed for remote administration so that updates and other fixes can be installed from a central location, such as the department's communications facility or fire headquarters, and pushed out to all fire stations. This eliminates costly and time-consuming trips to the individual fire stations throughout the city or county for normal service calls.

As importantly, partner with a vendor who has a demonstrable *attitude* of service. One who will do whatever it takes – from providing preventative maintenance and repair maintenance to supporting you whenever and wherever you need it—to ensure your systems operate seamlessly 24/7 so you can focus on priority #1: protecting the lives and property of the communities you serve.

Not only should your vendor provide reliable, redundant solutions, but they should have proven experience supporting the most complex and vital systems during times of extreme crisis, and on a daily basis, to ensure your systems perform to their maximum capacity—always.

In addition to proven experience, your vendor of choice should be financially stable. Demand audited financials to ensure your vendor has adequate resources and staying power for the long haul.

Look for a vendor who provides:

- 24/7 infrastructure and capabilities
- Proven record of high-value support
- Fully equipped maintenance facilities
- Proven methodology for planning, implementation, testing and customer training
- Non-proprietary devices and replacement parts
- An intelligent approach to equipment spares

## 9. Use a Standards-Based Approach

The NFPA has many standards—most voluntary and some mandatory—that affect fire departments. These standards protect fire and rescue personnel from unnecessary workplace hazards and establish the standard of care that may be used in civil lawsuits against fire and rescue departments. Accordingly, fire and rescue departments should pay close attention to applicable standards. You need an alerting system that won't cause your department to fall short of NFPA compliance—one that meets NFPA 1221 standards and helps you meet the requirements of NFPA 1710 and 1720. And you need a vendor that has personnel who are members of NFPA so they are tied into the latest standards, updates and requirements.

In addition, in the interest of interoperability and cost justification, many first responders are being asked to participate in citywide, countywide, statewide, or national shared communications systems.

Fire departments are setting up more mutual aid agreements with nearby communities and with local, state and Federal agencies, which places critical importance on networks that can interoperate with other departments and jurisdictions. Communities are recognizing the benefits of sharing one system across multiple departments in order to share costs and ensure reliable and available communication when events require a joint response.

### National Fire Protection Association (NFPA) 1221 Recommendations

- Redundant dispatch circuits
- Switch-over operation
- Self-monitoring
- Back up time during power loss
- Alert tones
- Automatic recording of system activity
- Alarm alert acknowledgment from the fire station to the dispatcher
- Manual GUI alerting backup to Computer Aided Dispatch (CAD) for added level of redundancy

Deploying a modern, standards-based FSAS and related technologies to facilitate the dispatch of fire and EMS first responders to a call puts your department in a better position from a compliance, interoperability and cost perspective.

Fire departments wishing to take advantage of modern FSAS technology should look for hardware and software products that adhere to NFPA and other standards for several reasons:

- Compliance protects the health and well-being of first responders and the community it serves.
- Observance minimizes liability exposure for the fire department.
- Standards incorporate best practices for architecting scalable FSAS solutions.
- When multiple vendors adhere to a vendor-neutral standard, customers benefit from products that can interoperate easily.
- As standards evolve compliant products will keep pace with technological advances.
- Standards compliance can ultimately translate to lower risk of property loss in your community, which the insurance standards board will recognize in setting lower community insurance rates.

## Conclusion

The world of first response is not static. Fire departments continuously review and revise their processes in response to community needs, organizational changes, new locations, compliance and interoperability requirements and/or new technologies. Because a FSAS is a critical part of your overall response processes, your FSAS implementation will need to be tailored to your department.

Whatever your objective—replacing or upgrading an existing system, expanding your FSAS alerting options or building out a new FSAS—the factors discussed in this white paper are critical to your success. To review, implement a complete FSAS solution; one that:

- **Reduces response time.** Demand a solution that provides reliable alert delivery and streamlines the emergency response process.
- **Improves communications.** Deploy a solution that provides a variety of devices that present critical information to the appropriate personnel.
- **Adopts a flexible deployment architecture.** Invest in a system that is modular, customizable and scalable, and allows for reconfiguration and expansion as needs and budgets change.

- **Leverages existing systems and devices** and minimizes your investment. Select a solution that provides seamless integration with existing Computer-Aided Dispatch (CAD), Public Address (PA) and radio-based systems.
- **Minimizes firefighter stress levels.** Choose a system that provides ramped and auto-adjusting audio levels, low intensity pathway lighting and incident- or unit-specific alerts to reduce the stress of night calls.
- **Supports remote personnel.** Look for a system designed to alert your personnel via smartphone, email and text messaging with the same announcement that comes into the station and to their pagers.
- **Is built for high reliability and accessibility.** Opt for a system that offers redundancy, no single point of failure and system self-monitoring, backed by a committed team that provides ongoing support and maintenance whenever and wherever you need it.
- **Is designed for service first.** Look for FSAS solutions that support a services-oriented architecture and a vendor who has a demonstrable *attitude* of service and proven experience.
- **Use a standards-based approach.** Adopt a system that is standards-based and NFPA 1221 compliant to keep you within guidelines for public safety and insurance purposes.

Innovative fire departments recognize the strategic value of Fire Station Alerting Systems and are expanding early deployments to include a broader range of capabilities. By following the nine critical success factors outlined here, your fire department will be well-positioned to integrate FSAS into its operations, reducing operating costs, improving the speed and efficiency of response and enhancing the safety of responders.