NENA Standard for the Non-Conventional Means of Communicating with E9-1-1

Abstract: This document provides E9-1-1 stakeholders with guidance that supports non-conventional emergency calls.

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1 Executive Overview

Public Safety Answering Points (PSAPs) across the country receive service requests via non-conventional technology that connect to Enhanced 9-1-1 (E9-1-1) systems, resulting in unexpected, spontaneous, technical, and operational challenges in the PSAP requiring second-by-second resolution to determine if the 9-1-1 call is legitimate. When the transmission of the data from non-conventional technology is received by the PSAP, the customary Automatic Number Identification and Automatic Location Identification (ANI/ALI) provisioning may not appear or may not be organized in a fashion that is familiar to telecommunicators. This gap in how the data is presented could result in delayed dispatch of emergency resources.

This document provides 9-1-1 stakeholders with guidance that bridges the gap between formatting E9-1-1 data and what is needed for successful transmission of this data to legacy PSAPs.

The legacy E9-1-1 environment cannot support multimedia sessions or receive data transmitted directly via IP-based technology. While the data can be easily conveyed and understood in an NG9-1-1 environment, the same data does not translate into an E9-1-1 environment. The lack of consistent standards for these situations results in technology providers attempting to meet the need using non-standardized means. When unexpected data is received at the PSAP, there may be a lack of understanding of this information, which can cause confusion for the telecommunicator and present potential risk for the provider, the PSAP, and the 9-1-1 caller.

Examples[1] include, but are not limited to,

- Wearable devices that initiate E9-1-1 call when a medical issue with the wearer is recognized.
- Devices or services that originate a non-human initiated, automated call that transmits a pre-recorded audio or text message to E9-1-1 (whether or not the PSAP that receives the call accepts text messages).
- Devices or services that send a one-way alert or request for assistance.
- Automated direct-dial alarms that transmit directly to the E9-1-1 network.

The implementation of NG9-1-1 networks will not uniformly be adopted for many years. Until then, these methods should not be prohibited, discouraged, or encouraged to proliferate, but need to be understood. Stakeholders who are responsible for any aspect of the conveyance and support of non-conventional data and voice transmissions, from the initiation of the emergency request to receipt at the Enhanced 9-1-1 PSAP, have an

[1] One-way, automated alerts and/or alarms sent directly to 9-1-1 may not be legal in many cities, counties, parishes, provinces, or states. The readers should perform their own research to determine whether restrictions exist in the jurisdiction where services are provided.

obligation to be aware of the issues identified in this document and the requirements and standards established for seamless transmission of location and (telephone) number information required for an emergency response. Stakeholders include, but are not limited to:

- Application Developers and Service Providers
    - For the purposes of this document, "application" is defined as a software program designed specifically to initiate an emergency call and/or to gain access to public safety communications as its primary purpose or in support of another application in performing the same function. Developers and Service Providers develop and support the application lifecycle and are responsible for the application's interaction with the PSAP. In this document, the term Application Service Provider (ASP) is used to refer to both Developers and Service Providers.
- API (Application Programming Interface) Providers
- ALI and Dynamic ALI Service Providers
- Originating Service Providers (OSP)
- 9-1-1 Service Providers
- Public Safety Answering Points (PSAPs)

This standard will focus on existing and transitional E9-1-1 environments to:

- provide examples of non-conventional data transmissions to public safety entities,
- identify mechanisms used to handle non-conventional communication modes,
- include guidance on what can be delivered to the E9-1-1 PSAP, and
- specify methods to convey the customary call information to the E9-1-1 PSAP.

Proper guidance, requirements, and standards are specified to minimize misunderstanding for E9-1-1 stakeholders in the support of new and emerging services within the legacy environment.

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2. MUST NOT: This phrase, or the phrase "SHALL NOT", means that the definition is an absolute prohibition of the specification.
3. SHOULD: This word, or the adjective "RECOMMENDED", means that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.
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These definitions are based on IETF RFC 2119 [1].

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2.3 Reason for Issue/Reissue

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Document Number	Approval Date	Reason For Issue/Reissue
NENA-STA-030.1-2025	August 13, 2025	Initial Document

3 General Body of Information and Requirements

3.1 Introduction

The future of 9-1-1 is NG9-1-1 which includes the NENA i3 standard [3]. The ideal solution for non-conventional 9-1-1 calls is for the calls to go to the NG9-1-1 environment, and for the information to be delivered to legacy E9-1-1 PSAPs through Legacy PSAP Gateways. However, it is not possible to assume that legacy gateways will have the robust capabilities needed to deliver the many types of additional data to legacy PSAPs, given the limitations of the legacy ANI/ALI subsystems.

Because NG9-1-1 is not yet deployed everywhere, a transitional approach to supporting non-conventional data for use with existing E9-1-1 systems is needed. This standard defines protocols and procedures for acquiring and conveying non-conventional data to successfully integrate with the mechanisms referenced in NENA's i3 standard.

This standard also defines and addresses the obstacles and/or limitations between the NG9-1-1 and legacy environments; and specifies call delivery options, what data can be delivered, and how it can be delivered to a legacy PSAP. For the purposes of this document, over-the-top (OTT) delivery and solutions are not included. OTT is a technology that bypasses traditional network distribution approaches and runs over, or on top of, core Internet networks. This document is focused on data delivered from non-conventional sources into the legacy 9-1-1 system. PSAPs can always choose to implement an OTT delivery solution for additional data, but PSAP managers should give careful consideration to operational, management, and technical controls including cybersecurity.

3.1.1 Non-Conventional Data

Non-conventional data is information that has not traditionally been conveyed to legacy E9-1-1 systems as defined within industry standards. A few examples of these data are:

- IoT (Internet of Things) sensor data
- Supplemental location information
- Medical records
- Subscriber information
- Information enhancing situational awareness

To define any evolutionary changes to E9-1-1 in support of non-conventional data, we must first take a look at those standards that specify non-conventional data within the context of NG9-1-1.

3.1.2 NG9-1-1 End-to-End Architecture

The following diagram is a NENA i3 NG9-1-1 reference architecture depicting the environment that will be supported in an end-state NG9-1-1 deployment.

9-1-1 [Call]	Assumed IP Call Transport; may include Geolocation Header/PIDF-LO
Signaling+Media (Data)	User 9-1-1 call -> OSP -> NGCS -> i3 PSAP. Media may include voice, messaging, and video.
OSP	Originating Service Provider (can include an Application Service Provider, ASP)
NGCS	Next Generation Core Services (in the context of an ESInet-Emergency Services IP Network)
PSAP (i3)	NG9-1-1 Capable Public Safety Answering Point

Figure 1: NENA i3 NG9-1-1 Reference Architecture

In a NENA i3 NG9-1-1 environment, the originating 9-1-1 call (or request for assistance) is generated in an IP based Originating Service Provider (OSP) network, optionally via an associated Application Service Provider (ASP), traversing an NG9-1-1 infrastructure, specifically Next Generation Core Services (NGCS) in the context of an Emergency Services

IP Network (ESInet) to an NG9-1-1 enabled PSAP. This approach also accommodates the delivery of data in the context of 9-1-1 call signaling and media.

As the emergency communications industry transitions to an end-to-end i3 NG9-1-1 environment, different architectures will be used to accommodate the transition of the different segments: OSPs, 9-1-1 Networks, and PSAPs.

3.1.3 NG9-1-1 to E9-1-1 Transitional Architectures

The following diagram includes the addition of legacy functional elements and a Legacy PSAP Gateway to accommodate two transitional states:

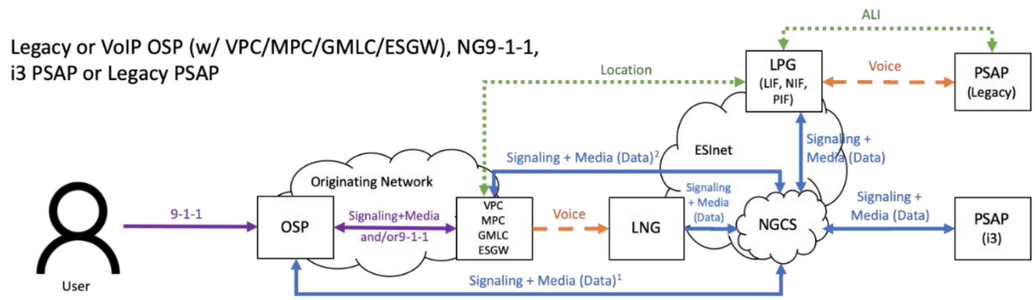
1. IP or Legacy 9-1-1 call origination
2. Legacy PSAP, in addition to a NENA i3 PSAP

The legacy functional elements include a VoIP Positioning Center (VPC), Mobile Positioning Center (MPC), Gateway Mobile Location Center (GMLC), and/or Emergency Services Gateway (ESGW) to show the variation of originating 9-1-1 call architectures. The Legacy PSAP Gateway (LPG) is shown to support a legacy PSAP. This architecture supports transfers between a Legacy PSAP and a NENA i3 PSAP.

The following diagram also supports multiple variations of call flow including:

1. OSP direct to NGCS, and then to i3 PSAP or Legacy PSAP via LPG
2. OSP with a VPC/MPC/GMLC routing calls directly to the NGCS or via an ESGW and Legacy Network Gateway (LNG), then to i3 PSAP or Legacy PSAP via LPG
3. Support for transfers back and forth between i3 PSAPs and Legacy PSAPs using LPG and NGCS.

Additional information on transitional PSAPs may be found in the NENA NG9-1-1 Transition Plan Considerations Information Document (NENA-INF-008 [31]) or any subsequent updates thereto.



9-1-1 [Call]	IP or Legacy 9-1-1 Call Transport, IP may include Geolocation Header/PIDF-LO
Signaling + Media (Data)[1]	9-1-1 Call OSP -> NGCS
Signaling + Media (Data)[2]	VPC/MPC/GMLC/ESGW -> NGCS -> i3 PSAP or Legacy PSAP via LPG
Location	Location Information such as ALI E2 or PAM connection(s) or Location Dereference (e.g., HELD)
ALI	Legacy ALI (via LPG) <-> PSAP Connection(s)
Voice	Legacy [analog] Voice
OSP	Originating Service Provider (can include an Application Service Provider, ASP)
VPC/MPC/GMLC/ESGW	VoIP Positioning Center or Mobile Positioning Center or Gateway Mobile Location Center with Emergency Services Gateway functions to interface OSPs with 9-1-1
LNG	Legacy Network Gateway
NGCS	Next Generation Core Services (in the context of an ESInet-Emergency Services IP Network)
LPG	Legacy PSAP Gateway , including Location Interwork Function (LIF), Network Interwork Function (NIF), and Protocol Interwork Function (PIF)
PSAP (i3)	NG9-1-1 Capable Public Safety Answering Point
PSAP (Legacy)	Legacy E911 Public Safety Answering Point

Figure 2: NG9-1-1 Architectures Including OSP Originating Network and PSAP Variations

Notes:

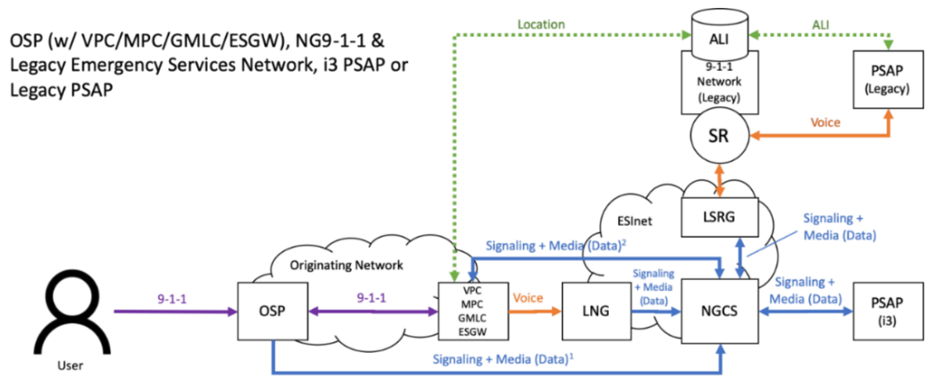
- Double Arrows indicate that voice is two way and/or data includes a query and a response.
- Call flow from the OSP to the NGCS can occur with multiple options including OSP to VPC/MPC query and response for routing instructions or ESGW anchors the call/media.
- The Location (interface) path between the VPC/MPC/GMLC/ESGW element supports location information transmission between the source of the 9-1-1 call and the Legacy PSAP via the LPG element. This interface can be any of the standardized interfaces and protocols such as E2, PAM, or HTTP Enabled Location Delivery (HELD).
- The LPG supports a location interface in the Data path with the NGCS, supporting location information transmission between the source of the 9-1-1 call and the Legacy PSAP.
- The analog legacy voice interface between the Legacy PSAP and the LPG can support voice and transfer requests using a standard hook flash method.

Regardless of which type of non-conventional data set is available, this document attempts to standardize the use of various forms of non-conventional data through the Additional Data mechanism for query/conveyance [4].

The following diagram includes a Legacy Emergency Services Network (E9-1-1 network with a legacy Selective Router and ALI Database) and the use of a Legacy Selective Router

Gateway (LSRG) (egress) between the Legacy E9-1-1 Network and the NGCS. This accommodates multiple variations of the call flow, including:

1. OSP direct to NGCS, and then to i3 PSAP or Legacy PSAP via an egress LSRG and Legacy 9-1-1 Network
2. OSP with a VPC/MPC/GMLC routing calls directly to the NGCS or via an ESGW and LNG, then to i3 PSAP or Legacy PSAP via an egress LSRG and Legacy 9-1-1 Network
3. Support for transfers between i3 PSAPs and Legacy PSAPs using a Legacy 9-1-1 Network and NGCS

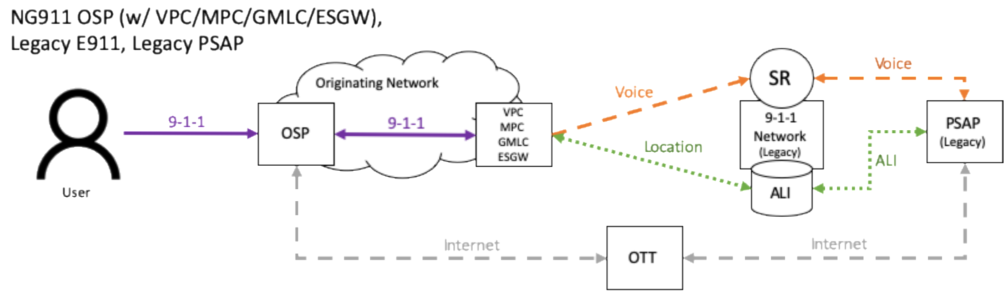


9-1-1 [Call]	IP or Legacy 9-1-1 Call Transport, IP may include Geolocation Header/PIDF-LO
Voice	Legacy [analog] Voice
Location	VPC/MPC/GMLC/ESGW -> ALI E2 or PAM Connection(s)
ALI	Legacy ALI DB <-> PSAP Connection(s)
Signaling + Media (Data)[1]	9-1-1 Call OSP -> NGCS
Signaling + Media (Data)[2]	VPC/MPC/GMLC/ESGW -> NGCS -> i3 PSAP or Legacy PSAP via LSRG
OSP	Originating Service Provider (can include an Application Service Provider, ASP)
VPC/MPC/GMLC/ESGW	VoIP Positioning Center or Mobile Positioning Center or Gateway Mobile Location Center with Emergency Services Gateway functions to interface OSPs with 9-1-1
NGCS	Next Generation Core Services (in the context of an ESInet-Emergency Services IP Network)
LSRG	Legacy Selective Router Gateway (egress)
9-1-1 Network (Legacy)	Legacy Emergency Services Network including a Selective Router (SR) and ALI Database (SLI)
PSAP (i3)	NG9-1-1 Capable Public Safety Answering Point
PSAP (Legacy)	Legacy E911 Public Safety Answering Point

Figure 3: NG9-1-1 Architectures Including 9-1-1 Network (Legacy) Integration

3.1.4 E9-1-1 Architecture

The following diagram shows an OSP using IP or Legacy 9-1-1 call transport with a Legacy Emergency Services Network.



9-1-1 [Call]	IP or Legacy 9-1-1 Call Transport, IP may include Geolocation Header/PIDF-LO
Voice	VPC/MPC/GMLC/ESGW -> Legacy SR Connection(s) -> PSAP (Legacy)
Location	VPC -> ALI E2 or PAM Connection(s)
ALI	Legacy ALI DB <-> PSAP Connection(s)
9-1-1 Network (Legacy)	Legacy Emergency Services Network including a Selective Router (SR) and ALI Database (SLI)
OTT	Over The Top - Alternative Mechanism for Supplemental Data

Figure 4: Legacy E9-1-1 Architecture

Included is an alternative Over the Top (OTT) mechanism supporting optional methods for delivering additional data to a PSAP.

3.1.5 Additional Data Mechanism

IETF RFC 7852, *Additional Data Related to an Emergency Call* [4], defines the Additional Data mechanism for use in emergency calling scenarios. This Additional Data mechanism describes the conveyance of any kind of data that is not traditionally included in existing standards but is useful for processing emergency calls and alerts. Additional Data may be conveyed within the original SIP signaling, referred to as "by-value", or conveyed as a URI pointer ("by-reference") that is dereferenced separately.

3.1.6 Other Access Methods Considered

Some early implementations that provide non-conventional data have leveraged the HELD-ext protocol for retrieving supplemental location from an HTTP server that is supplied from a Device-Based Hybrid (DBH) source. HELD-ext [5] was originally intended for end devices to obtain their own location, rather than for consumers (e.g., the PSAP/ECC) of location to acquire end device location from a middle server. While the reuse of HELD-ext for location may work, based on the call back number provided with the emergency call, it does so via an over-the-top, or Internet style approach, that is not integrated with i3 data paths to deliver non-conventional data.

3.1.7 Additional Data Structured Blocks

The Additional Data mechanism is a general approach that uses individual block structures that are defined within a registry and alluded to within this document. Some data block types have already been defined, whereas other new types have yet to be defined.

According to RFC 7852 [4], five data structures, or blocks, are defined, each with a MIME media type and XML encoding. The five data structures are:

'Data Provider': This block supplies name and contact information for the entity that created the data.

'Service Information': This block supplies information about the service.

'Device Information': This block supplies information about the device placing the call.

'Owner/Subscriber': This block supplies information about the owner of the device or about the subscriber.

'Comment': This block provides a way to supply free form human-readable text to the PSAP or emergency responders.

Each block is added to the "Additional Data Blocks" registry (ref. RFC 7852, Section 11.1.9) and categorized as providing data about the caller.

New blocks added to the registry in the future MUST also be categorized per the description of the three categories that include Additional Data about the Caller, the Call, or about Location.

Additional Data Blocks are designed for the NG9-1-1 environment. Use of Additional Data Blocks in a legacy E9-1-1 environment is not supported by the legacy standards.

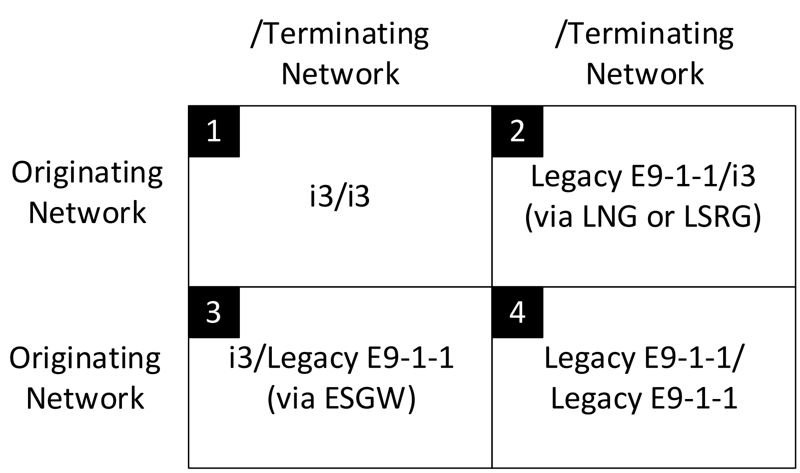


Figure 5: Additional Data Block Scenarios

3.1.7.1 Scenario 1: i3 Originating Network to i3 Terminating Network

The goal of NG9-1-1, embodied within the NENA i3 standard, is to be able to support multimedia over current standardized IP protocols as a benefit to public safety. This document introduces this as an end goal but does not go into detail in describing an end-to-end i3 solution for non-conventional emergency calls but is found in the NENA-STA-010 [3] standard.

3.1.7.2 Scenario 2: Legacy E9-1-1 Emergency Service Originating Network to an i3 Terminating Network

Mapping data from a more-constrained legacy originating network to an i3 terminating network interface is the most likely scenario that captures and delivers the most data, since i3 interfaces are more extensible than those in legacy systems. This document will attempt to show this mapping by way of a given set of examples.

3.1.7.3 Scenario 3: i3 Originating Network to Legacy E9-1-1 Emergency Services Network

Originating networks that convey i3 SIP signaling toward an E9-1-1 legacy emergency services terminating network MUST interact with a protocol conversion gateway, (e.g., an i2 defined ESGW or similar), to convey the call setup and location information. Some of the i3 defined data will not be conveyed across the gateway due to the constraints inherent with the legacy TDM and ALI interfaces. This document will endeavor to show how some i3 data can be mapped to a legacy ALI interface for non-conventional emergency calls.

3.1.7.4 Scenario 4: Legacy E9-1-1 Emergency Service Originating Network to a Legacy E9-1-1 Terminating Network

This scenario requires no mapping of data to or from i3 since it provides no interaction with SIP based i3. There are some examples that this document will examine to “fit” non-conventional emergency calling data into existing legacy originating and terminating networks. Please refer to the NENA Standard for NG9-1-1 Additional Data, NENA-STA-012.2 [6].

3.1.8 Additional Data within NG9-1-1

Since the Additional Data mechanism is referenced by NENA-STA-010 [3], the “i3” standard for NG9-1-1, there is no change required to the mechanism in order to supply new types of data within the NG9-1-1 standards. NG9-1-1 functions will need to be made aware of the Additional Data in order to take advantage of it in the execution of an emergency call.

3.1.9 Additional Data within E9-1-1

Transitional NG9-1-1 environments that still maintain some Legacy E9-1-1 components, may also leverage the existing Additional Data approach through the use of LPG or LSRG (egress type) gateways that provide a data path between and NG9-1-1 NGCS and a legacy E9-1-1 PSAP or Legacy Emergency Services Network. Because each of these have limitations in the manner, and the type of data that can be conveyed to a legacy PSAP, some of the non-conventional data made available to the E9-1-1 gateway may not be able to be conveyed across legacy interfaces, such as E2, PAM, or NENA i2 because of these constraints.

For some scenarios, Additional Data may be able to augment existing legacy protocols and interfaces, such as for the delivery of location (both civic address and geodetic position information).

3.2 Limitations of the Legacy Environment

3.2.1 Static, Nomadic, and Mobile 9-1-1 Calls

The PSAP has endured the challenges of location information related to static (fixed), nomadic (user self-provisioned), and mobile (non-fixed) 9-1-1 calls from the time that wireless and VoIP emergency calls joined wireline deployments. Since the inception of these later technologies, it can sometimes be difficult to determine the location of the caller because of the inherent differences of determining location within each technology.

- Fixed call (location is provisioned ahead of time and remains the same through the duration of the call). Historically related to traditional landline services, the location relates to a physical location, where the address of service is provided to the telephone company which is then MSAG validated with the local 9-1-1 authority.
- Nomadic call (user self-provisioned location that may be changed between emergency calls). Typically associated with a VoIP call, the location registration is dependent on the subscriber updating their present location information. After the caller registers their device account with an appropriate physical location, that location is used to route the emergency call and is then delivered to the 9-1-1 center supporting the registered location. If the device is moved to a different location for use, the caller is required to register a new location. If the caller does not update the location before dialing 9-1-1, the 9-1-1 call may be routed based on the previously known address to the wrong 9-1-1 center.
- Mobile call (device can move and the location can be updated throughout the duration of the call). Wireless 9-1-1 calls are the best example of a 9-1-1 call with a mobile location. Mobile calls initially receive Wireless Phase I information (the location of the tower), and then can request updated Wireless Phase II information as the call proceeds. Wireless Phase II refers to the ability to locate the caller’s device as a geodetic position (latitude/longitude). The 9-1-1 telecommunicator can perform a location update (rebid) to obtain updated location information from the 9-1-1 network if the caller moves. Note: as technology changes, the telecommunicator may receive additional elements including geodetic location and elevation as part of the initial information received from a variety of other sources.

The incorporation of non-conventional communication devices adds additional complexity to the 9-1-1 emergency calling landscape and therefore will present its own set of challenges for the PSAP. Recommendations or requirements have been made within this document to provide clarification where those changes can be reasonably supported by the legacy network and ALI systems, while preserving legacy 9-1-1 functionality. Where those changes are not feasible, additional information has been added to support PSAP personnel understanding to include recommendations for PSAP and public education efforts.

3.2.2 One-way versus Two-way Communication

Non-conventional technologies communicate with the PSAP in a variety of ways (such as voice, text, data-only, or non-interactive calls) and as either one-way or two-way communication. One-way communication is the ability to only transmit information (i.e., from the caller to the 9-1-1 telecommunicator) without an ability to receive incoming communication. Two-way communication provides the ability to both transmit and receive interactive communication. While historically one-way or two-way communication definitions have included only voice communications, today this could include one-way and two-way data and media transmissions.

One-way communication sent directly to 9-1-1 is not legal in many jurisdictions. Before developing or deploying non-conventional technology with only one-way communication, research should be performed to determine whether restrictions exist in the jurisdiction where services are intended to be sold or provided. The use of one-way communication is discouraged.

3.2.3 Vehicle-Initiated 9-1-1 Calls

Vehicle-initiated 9-1-1 calls are a special type of mobile call. These calls can present as either wireless calls or VoIP calls via wireless data.

It has been common for vehicles to support emergency calls through a third-party telematics provider. The telematics provider operates a call center which performs initial screening of incident information including automated crash detection, and then directly contacts the appropriate PSAP. In this scenario, much of the emergency call processing occurs outside of the 9-1-1 domain, including how the call is "routed." In NG9-1-1, there is a framework for vehicle-initiated calls in the AACN call type [3], definition of minimum information delivered about a vehicle for an emergency call [7] and new protocols [8][9] for vehicles to directly initiate two-way multimedia, data and command and control sessions with a PSAP.

A call placed directly from a vehicle where eCall [9] functionality is unavailable will be an E9-1-1 call. Calls are typically originated from a cellular device embedded in the vehicle and not from a phone handset. The device places a conventional wireless emergency call over a carrier network, and the PSAP will most likely be provided wireless phase I and/or phase II information delivered over ALI at most. There may be no immediate indication that the call was not placed from a cell phone. The ability to initiate a callback to the vehicle may be limited by the configuration of the vehicle and the cellular device embedded in it, as the device may be capable only of outbound emergency calls and not for general purpose cellular use.

Even though a vehicle-initiated E9-1-1 call is placed from a cellular device, it is very unlikely that the vehicle supports SMS for text communication. This lack of functionality is important to note since it is common operational procedure to text traditional wireless 9-1-1 callers in certain circumstances, such as when the caller hangs up having not spoken (i.e., abandoned call).

3.2.4 Non-Service Initialized (NSI) Device

Non-Service Initialized (NSI) devices, as defined by the Federal Communications Commission (FCC), MUST NOT be used for non-conventional emergency calling. While the requirement to support NSI calling is necessary for traditional wireless devices, non-conventional emergency calls that are reliant on a wireless connection should be developed utilizing an active service contract with a CMRS provider. Additional research may be required where Accessibility concerns exist.

3.2.5 Call Capacity

There are CAMA trunks that deliver calls from the local 9-1-1 System Service Provider (9-1-1 SSP) to the PSAP. The PSAP purchases the CAMA trunks from the local 9-1-1 SSP. A CAMA trunk is limited to carrying a single 9-1-1 call. The number of concurrent calls a PSAP can handle is directly dependent on the number of CAMA trunks for a particular PSAP.

The OSPs connect to the 9-1-1 Tandems or Selective Routers with various types of dedicated trunks. For example, one OSP (or one group of OSPs) may assign two (2) or more trunks or call paths into the 9-1-1 Tandem or Selective Router, supporting an equivalent number of concurrent calls. In this case the serving PSAP may have four (4) CAMA trunks. In this example the capacity limitation for the one OSP is two (2) calls, even though the PSAP may have four (4) CAMA trunks.

In a typical configuration, a PSAP may receive calls from more than one OSP, with each OSP having a minimum of two (2) trunks connecting to the 9-1-1 Tandem or Selective Router. The number of trunks required to support all OSPs will always be greater than the number of PSAP CAMA trunks.

3.2.6 NG9-1-1 Network to Legacy PSAP Interface

Figure 2: NG9-1-1 Architectures Including OSP Originating Network and PSAP Variations, in Section 3.1.3, shows the difference between the LNG and the LPG. The LNG is the gateway function between the originating network and the NGCS. The LPG is the gateway function between the NGCS and a legacy PSAP. Details of the NGCS components including the LNG

and LPG can be found in NENA-STA-010 [3]. As a 9-1-1 call traverses the LPG to a legacy PSAP, the inherent limitations of a legacy E9-1-1 Network are reintroduced.

Figure 3: NG9-1-1 Architectures Including 9-1-1 Network (Legacy) Integration - in Section 3.1.4 shows an OSP using IP or legacy E9-1-1 call transport with a legacy Emergency Services Network. This diagram shows the inherent limitations of E9-1-1 networks in terms of communicating data to PSAPs and call capacity. Call data, including location information, is restricted to what can be transmitted via an ALI database (ALI DB). Call capacity is limited based on circuits as discussed in Section 3.3.

There is a need for ASPs to be able to deliver data to both legacy and i3 PSAPs. Additionally, it is possible to use an OTT provider to deliver additional data to a transitional or legacy PSAP. The limitations of this technique are that it is not ubiquitous and is dependent on non-standard methods.

3.2.7 Network Interfaces

Figure 3: NG9-1-1 Architectures Including 9-1-1 Network (Legacy) Integration in Section 3.1.4 shows an OSP using IP or legacy 9-1-1 call transport with a legacy Emergency Services Network. The OSP to the 9-1-1 network or 9-1-1 SSP network interface is limited to a voice path that includes the calling party's telephone number (ANI). Separately, systems allow for the retrieval of location information. For Wireless and VoIP Calls the data path goes through the 9-1-1 SSP. The data path from the 9-1-1 SSP to the ALI Service Provider is limited to E2 or PAM protocols. The assignment of the class of service (COS) in the E2 and PAM protocols describes the location information that can be delivered.

The figures in Section 3.1.3 show that the Originating Network for the OSP, based on implementation, can interface to a variety of 9-1-1 Service Providers in a transitional state of using NGCS. In many instances, 9-1-1 calls will traverse a gateway to provide access to an NG9-1-1 network. These legacy components will introduce limitations on call capacity and call data. Due to the nature of these limitations, in the absence of NG9-1-1, OTT providers have emerged to provide additional data above and beyond the typical ALI formats.

3.2.8 PSAP Equipment

Due to the nature of non-conventional emergency calls, an evaluation of the PSAP's equipment capabilities is in order. The 9-1-1 Authority should ensure that the PSAP equipment providers have reviewed this standard and are prepared to discuss the incorporation of any changes needed to support the non-conventional call. In addition, when contacted regarding accepting new services, the PSAP should consult with their 9-1-1 System Service, ALI Database, Call Handling Equipment, Computer-Aided Dispatch (CAD), and Recording Equipment providers about the requested service to determine if there would be any operational impacts to current configurations.

Potential operational impacts are summarized below. This summary should not be considered as a comprehensive list of concerns. Consultations with the respective providers are strongly suggested prior to accepting a new type of 9-1-1 call.

- ALI Presentation
  - Due to possible changes in the ALI data stream, such as the repurposing of ALI fields for additional information and the use of a new or previously unused Class of Service, broad changes may be required to include programming at the 9-1-1 system network, ALI database, and PSAP equipment.
- Mapped ALI Applications
  - Mapped ALI solutions may use data from the ALI response to select screens and other visual data elements for presentation. New elements in the ALI record may require modifications to the configuration.
- Computer Aided Dispatch (CAD) Applications
  - The CAD interface, traditionally referred to as the ALI spill, allows downstream systems to consume data for the programmatic initialization of a call record, and display within an integrated map of an incident. New elements in the ALI record may require modifications to the configuration.
- Recording Equipment
  - Depending on the data capture and search capabilities of the recording systems, changes may be required to allow use of new data, e.g., new Class of Service or descriptive category identifiers. The audio/video capture methods are not anticipated to be impacted.

3.3 Legacy ALI

The ALI is typically limited to 512 characters with further character limitations within each of the individual fields.

The intent of this standard isn't to create new Classes of Service (CoS) but to map existing CoS to new scenarios. CoS were originally specified in Alliance for Telecommunications Industry Solutions (ATIS) ATIS J-STD-036-C-2 [10] to be identified for Wireless Phase 1 Calls with the Emergency Services Protocol (ESP) over E2 interface. The standard specifies a position source that the ALI DB converts to a CoS to be transmitted in an ALI record. The ESP over E2 interface later was adapted for Wireless Phase 2 Calls. Whether for Wireless Phase 1 or Wireless Phase 2, the CoS for wireless calls cannot be manipulated because a wireless call's CoS is specified by the position source. The ESP over E2 Protocol was subsequently reused in the i2 call flow for VoIP calls. The specification of the CoS for VoIP calls provides more flexibility to adjust the CoS compared to wireless calls.

3.3.1 Wireline ALI

In legacy E9-1-1 systems, Automatic Location Identification (ALI) is the mechanism that uses a database to associate a described location, such as an address, with a telephone number. This telephone number serves as an identifier known as Automatic Number Information (ANI). ALI is a feature of the E9-1-1 (Enhanced 9-1-1) systems. The ALI database is generally maintained by the ILEC (Incumbent Local Exchange Carrier) under contract by the PSAP. Each ILEC has its own standards for formatting data within the database. The address information in the ALI database conforms to MSAG-formatted information. Call routing relies on the stored MSAG address information, and the associated Emergency Service Number (ESN), to route a call to the appropriate PSAP. When a call arrives at a PSAP, the ALI database is queried using the ANI to retrieve the location information of the caller or (in the instance of wireline) the fixed equipment location connected to the PSTN. The location information is returned to the PSAP call taker to assist with the emergency call.

NENA standards for ALI data formats are contained in the *NENA Standard Data Formats For E9-1-1 Data Exchange & GIS Mapping, NENA-STA-015* document [11].

ALI data consists of a total of 512 characters, typically including the following fields:

- NPA
- NXX
- TEL
- CLASS OF SERVICE
    - CoS (Class of Service) is a designation in E9-1-1 that defines the service category of the telephony service.
- MONTH
- DAY
- HOUR
- MINUTE
- CUSTOMER NAME
- HOUSE NUMBER
- PILOT AREA CODE
- PILOT NUMBER
- STREET DIRECTION
- STREET NAME 1
- STREET NAME 2
- LOCATION
- PSAP NUMBER
- ESN (NUMBER)
- RESIDENCE STATE
- RESIDENCE CITY

- OPERATING TELEPHONE COMPANY (OTC)
- RESIDENCE COMPANY ID
- RESIDENCE LATITUDE
- RESIDENCE LONGITUDE
- RESIDENCE UNCERTAINTY
- ESN (VALUE)
    - The Emergency Service Number (ESN) is used in an E9-1-1 Selective Router or Tandem switch to send wireline 9-1-1 calls to the appropriate PSAP by associating the ESN number to a telephone number (i.e., ANI). An ESN is an identifier that relates to a PSAP serving area. These ESN-defined areas are called Emergency Service Zones (ESZ).
    - Each ESZ is also a unique combination of law, fire, and EMS responders defined in the ELT.
- ELT (ENGLISH LANGUAGE TRANSLATION)
    - Identifies Emergency services based on the caller location.

An ALI display may have many different formats that vary from PSAP to PSAP. Individual call handling systems may have a way to parse the raw data so only what is useful to the call taker at a particular PSAP will display on the PSAP's Call Handling Equipment screen.

Two of many different ALI display formats are shown here.

Format 30W

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	↵																															
2	(	N	P	A	)	**s**	E	X	C	-	L	I	N	E	**s**	C	o	f	S	**s**	M	M	/	D	D	**s**	H	H	:	M	M	↵
3	S	U	B	S	C	R	I	B	E	R	_	N	A	M	E	>	>	>	>	>	>	>	>	>	>	>	>	>	↵			
4	H	O	U	S	E	N	U	M	>	>	s	H	N	S	>	**s**	**s**	**P**	**#**	N	P	A	-	E	X	C	-	L	I	N	E	↵
5	P	D	**s**	S	T	R	E	E	T	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵						
6	S	T	R	E	E	T	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵											
7	L	O	C	A	T	I	O	N	>	>	>	>	>	>	>	>	>	>	>	>	**s**	**s**	P	I	D	**s**	E	S	N	#	#	↵
8	S	T	**s**	C	O	M	M	U	N	I	T	Y	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
9	O	T	C	>	>	>	>	>	>	>	>	>	>	>	>	**s**	**s**	**s**	**T**	**E**	**L**	**=**	T	E	L	C	O	↵				
10	L	A	T	.	0	0	0	0	0	0	s	s	L	O	N	.	0	0	0	0	0	0	s	H	U	N	C	E	R	T	s	↵
11	**P**	**S**	**A**	**P**	**=**	P	S	A	P	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
12	L	A	W	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
13	F	I	R	E	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
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Format 65_CBN

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
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3	S	U	B	S	C	R	I	B	E	R	_	N	A	M	E	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵		
4	H	O	U	S	E	N	U	M	>	>	s	H	N	S	>	**s**	**s**	**P**	**#**	N	P	A	-	E	X	C	-	L	I	N	E	↵
5	P	D	**s**	S	T	R	E	E	T	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵						
6	S	T	R	E	E	T	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵											
7	L	O	C	A	T	I	O	N	>	>	>	>	>	>	>	>	>	>	>	>	**s**	**s**	P	I	D	**s**	E	S	N	#	#	↵
8	S	T	**s**	C	O	M	M	U	N	I	T	Y	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
9	O	T	C	>	>	>	>	>	>	>	>	>	>	>	>	**s**	**s**	**s**	**T**	**E**	**L**	**=**	T	E	L	C	O	↵				
10	L	A	T	.	0	0	0	0	0	0	s	s	L	O	N	.	0	0	0	0	0	0	s	H	U	N	C	E	R	T	s	↵
11	**P**	**S**	**A**	**P**	**=**	P	S	A	P	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
12	L	A	W	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
13	F	I	R	E	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
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15																																
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3.3.2 Wireless ALI

Location information relating to a Wireless E9-1-1 emergency call is also delivered via an ALI interface to the PSAP based on an ALI query using an ANI in the form of a pseudo-ANI (pANI). The ALI database receives the request and in turn queries a 9-1-1 system service provider (9-1-1 SSP) database (e.g., dynamic ALI database) to retrieve location information. An explanation of static and dynamic data elements is available in the *NENA Wireless (Pre-XML) Static and Dynamic ALI Data Content Technical Information Document*, NENA 02-501.1 [12].

A pANI is provisioned into the carrier database, typically from a pool of non-dialable telephone numbers. Querying for location information for a wireless call returns both a latitude and longitude (and sometimes an altitude) representing either the cell tower location (Phase 1) or caller's device estimated location (Phase 2), and optionally the cell tower location in the form of an MSAG address.

A pANI is referred to as an ESRK (Emergency Services Routing Key) for Wireless calls. The *NENA Wireless Phase I & II Features and Functions Operational Information Document*, NENA 57-501 [13], provides an operational description of Wireless Phase I and Phase II that includes clarification of ALI data elements, Class of Service, and Location Data. The most recent FCC regulations should be referred to for current accuracy requirements.

3.3.3 VoIP ALI (i2)

Location information relating to a VoIP E9-1-1 emergency call is also delivered via an ALI interface to the PSAP based on an ALI query using an ANI in the form of a pseudo-ANI (pANI), per the NENA Interim VoIP Architecture (i2) [16]. The ALI database receives the request and in turn queries a 9-1-1 system service provider (9-1-1 SSP) database (e.g., dynamic ALI database) to retrieve location information. A pANI is provisioned into the carrier ALI database, typically from a pool of non-dialable telephone numbers. Querying for location information for a VoIP call returns a civic address location, provided by the subscriber, that is intended to be a Dispatchable Location per FCC *911 Requirements for Multi-Line Telephone Systems (MLTS), 47 C.F.R. Part 9, Subpart F* [14], and optionally the latitude and longitude representing the caller's device location in the form of an MSAG address (line 1) and a descriptive address line 2.

A pANI is referred to as an ESQK (Emergency Services Query Key) for VoIP calls. The *NENA ESQK Guidelines for VoIP E9-1-1 Connectivity Technical Information Document (TID)*, NENA 03-507 [15], is a guide on connectivity and call routing for VoIP calls. For an overview of the VoIP architecture, functional elements, interfaces, and interface specifications, the reader should consult the *NENA Interim VoIP Architecture for Enhanced 9-1-1 Services (i2)* standard, NENA 08-001 V2 [16]. The most recent FCC regulations should be referred to for current dispatchable location (Multi-Line Telephone System) requirements [14].

3.4 Location Information

3.4.1 ALI Service Provider

An ALI Service Provider (ALI SP) [17] is a type of Data Base Management System Provider that operates an ALI database. The ALI database is provisioned with MSAG-validated addresses (Wireline) and with ALI shell records (Wireless/VoIP).

3.4.2 9-1-1 SSP (9-1-1 System Service Provider)

A 9-1-1 SSP is an entity that provides systems and support necessary to enable 9-1-1 calling for one or more Public Safety Answering Points (PSAPs). A 9-1-1 SSP may provide the systems and support for either E9-1-1 or NG9-1-1. In the context of Wireline E9-1-1, it is typically, but not always, an Incumbent Local Exchange Carrier (ILEC) or their subcontractors.

A 9-1-1 SSP [1] typically provides:

- A method of interconnection for telecommunications providers including but not limited to the wireline, wireless, and VoIP carriers
- A method and mechanism for routing a 9-1-1 call to the Public Safety Answering Point (PSAP) with no degradation in service regardless of the technology used to originate the call

- A method to provide location information for an emergency caller to a PSAP and if required, to other emergency response agencies
- Coordination with PSAP authorities and other telecommunications entities for troubleshooting and on issues involving contingency planning, disaster mitigation and recovery

The *NENA Standard for E9-1-1 Data Exchange & GIS Mapping*, NENA-STA-015 [11], defines data exchange formats as it relates to ALI and MSAG. The map for ALI data mapping is to be adhered to in the exchange between Originating Service Providers and ALI Service Providers.

All data exchange formats utilize American Standard Code for Information Interchange (ASCII) characters. The NENA Data Technical Committee established four (4) versions of standard data formats for use by Originating Service Providers and ALI Service Providers when exchanging E9-1-1 database information. The four (4) versions of standard format are defined for each of the following:

- ALI source data exchange
- Master Street Address Guide (MSAG) data exchange
- Header and trailer records
- Wireless data formats

Definitions of these four (4) versions are available in the *NENA Standard for E9-1-1 Data Exchange & GIS Mapping*, NENA-STA-015 [11], document.

3.5 Legacy ALI and Support of Non-Conventional Call Information

The limitations of the legacy E9-1-1 system provide a significant challenge to the delivery of information related to a non-conventional emergency call. While non-conventional calls delivered to an NG9-1-1 system can include data beyond the traditional E9-1-1 call, connecting the call to a legacy E9-1-1 network or PSAP may require that same information to be stripped down to a few characters of information.

Some proposed solutions for non-conventional data have included the use of internet URLs to reference the additional information. The usage of malicious internet URLs is a known threat vector for attacks by bad actors. Attempts to provide PSAP personnel with tools to determine which URLs are safe and which are not safe have been largely unsuccessful. While URLs are useful and safe in the secure NG9-1-1 ecosystem, the same is not true of the legacy E9-1-1 ecosystem. In addition, many PSAPs do not provide public internet access from their call-handling equipment. Solution developers are strongly cautioned against embedding internet URLs in the ALI record as a part of any proposed solution. PSAPs and 9-1-1 authorities are strongly cautioned against accepting such a proposed solution. Therefore, URLs SHOULD NOT be used as part of a viable ALI solution for any PSAP.

To support telecommunicators' understanding of what types of non-conventional emergency calls that they may receive, the results of an assessment highlighted the following questions.

- How will the call be placed (human-initiated or non-human device-initiated)? For the purposes of this standard, human-initiated is when a human intentionally dials 9-1-1. A non-human device-initiated call is when a 9-1-1 call is initiated by a system.
- How will the call be delivered to the PSAP via E9-1-1 network (wireline, wireless, VoIP, etc.)?
- Will the call support one-way or two-way communications?
- Will the call be first answered by a third-party Call Center or be directly connected to a PSAP?
- What type of location may be sent?
- What are the current Classes of Service (CoS) values?
- What Class of Service could be used to differentiate the conventional call from a non-conventional call?

This assessment revealed that most non-conventional calls fall within specific category types that could be supported with a unique CoS value. Categorization of non-conventional calls with unique CoS value assignments provide the telecommunicator with new information on the type of 9-1-1 calls received within the legacy network constraints.

3.5.1 Non-Conventional Call Category Types (Category Type)

The following Non-Conventional Call Category Types are designed to define the different types of calls with associated CoS values and location received for use in the ALI.

3.5.1.1 Category Type and Definition

1. **LIFE DEVICE–CTR**

Calls initiated from a device, whether human or non-human initiated, with one-way or two-way communications, that connects to a call center representative (medical or other function) and calls 9-1-1 via a Fixed or VoIP line. This type of category includes Telehealth.

2. **LIFE DEVICE–DIR**

Currently implemented over a VoIP or Fixed line, calls initiated from a device, either manually or automatically, with one-way or two-way communications, that places a call to 9-1-1 directly.

3. **AACN–CTR**

Calls initiated by a vehicle, whether human or non-human device initiated, with one-way or two-way communications, that connects to a call center representative (Telematics function) that calls 9-1-1 via a Fixed or VoIP line to report an Advanced Automatic Crash Notification [7]. This Category Type may be capable of delivering the Vehicle Data Set (VEDS) Structure - Data Object Model to support location data elements.

Operational Note: The telecommunicator can ask the call center for additional information. The additional data available for inquiry by the telecommunicator is defined in the Advanced Automatic Crash Notification (AACN) Vehicle Data Set (VEDS), APCO/NENA ANS 2.102.1-2022 [7], Section 3.2 Data Fields in Order of Importance to the PSAP/ECC.

4. AACN–DIR

Calls initiated by a vehicle, whether human or non-human device initiated, with one-way or two-way communications, that places a call to 9-1-1 directly utilizing a non-fixed VoIP line over a wireless data connection to report an Advanced Automatic Crash Notification [7]. This Category Type may be capable of delivering the Vehicle Data Set (VEDS) Structure - Data Object Model to support location data elements. Note: non-conventional calls that are delivered via the legacy wireless (CMRS) network, may not support a category or unique CoS due to the limitations of the legacy network.

5. VEH-CTR

Calls initiated by a vehicle, whether human or non-human device initiated, with one-way or two-way communications, that connects to a call center representative (Telematics function) by calling 9-1-1 via a Fixed or VoIP line. This type of call is not related to crash notifications. See the AACN Category Types for crash notification.

6. VEH-DIR

Calls initiated by a vehicle, whether human or non-human device initiated, with one-way or two-way communications, that places a call to 9-1-1 directly utilizing a non-fixed VoIP line over a wireless data connection. This type of call is not related to crash notifications. See the AACN Category Types for crash notification.

Note: non-conventional calls that are delivered via the legacy wireless (CMRS) network, may not support a category or unique CoS due to the limitations of the legacy network.

7. ALARM–CTR

Calls initiated from a device, whether human or non-human initiated, with one-way or two-way communications, that connect to a call center (alarm function). The call center places a call to 9-1-1 via a fixed or VoIP line which is routed to the PSAP that serves the caller/incident location. This is not applicable to Alarm Monitoring Center call flows that call a designated 10-digit alarm number.

Operational Note: A discussion with the PSAP is REQUIRED as this method allows for an Alarm Monitoring Center to connect to 9-1-1 directly in the instance of imminent danger to life or property, in the context of local laws and the Alarm Validation Scoring Standard, ANSI/TMA-AVS-01 2023, [18]. Today, alarms connect to a 10-digit number based on the type of alarm. A discussion with the PSAP on the preferred call path (9-1-1, 10-digit, etc.) is REQUIRED.

8. ALARM–DIR

Calls initiated from a device, whether human or non-human initiated, with one-way or two-way communications, that places a call to 9-1-1 via a Fixed or VoIP line and that routes it to the appropriate PSAP.

Operational Note: Permission for an alarm device or service to directly connect to the PSAP via 9-1-1 is REQUIRED. This type of connectivity may not be allowed based on local rules, regulations, laws, or the PSAP's inability to support direct connectivity. Any alarm that connects directly to 9-1-1 is REQUIRED to meet the ANSI/TMA-AVS-01 standard [18].

3.5.2 ALI Requirements

The legacy ALI, and its 512 characters, have been fully allocated to deliver the 9-1-1 call information necessary to support emergency response. Therefore, only specific areas of the ALI could be considered for new data to help the telecommunicators understand what type of non-conventional call they may be dealing with. To add to the difficulty, a lack of standardization in the use of ALI display formats, and how they have been used locally, may challenge 9-1-1 System Service Providers and PSAPs to sufficiently include the new information within the constraints of the legacy ALI framework.

The following table depicts values that MUST be populated in an ALI record based on the associated scenario and Non-Conventional Call Category Types.

Table 1 describes the ideal treatment of the data that MUST be included in the ALI if available and can be supported within the specific ALI format.

Table 1. ALI Requirements

CoS [11]	**Customer Name Field**	**Civic Location Information**	**Geopositioned Information**	**Carrier or Company Name** [17][20][21]
Scenario #1: Life Device-CTR when Location represents End User.				
VOIP (Fixed)	[Customer Name] + LIFE DEV-CTR	Dispatchable Location [11][19], as applicable	N/A	ASP Name or Call Center NENA CID
Scenario #2: Life Device-CTR when Location is Lat/Long or unknown (e.g., a default location from the call center).				

CoS [11]	Customer Name Field	Civic Location Information	Geopositioned Information	Carrier or Company Name [17][20][21]
VOIP (Fixed)	[Company Call Center] + LIFE DEV-CTR	Dispatchable Location [11][19],as applicable	Latitude/Longitude as applicable	ASP Name or Call Center NENA CID
Scenario #3: Life Device-DIR when Life Device connectivity is via POTS.				
RESD/BUSN	[Customer Name] + LIFE DEV-DIR	ALI Location, as provisioned	N/A	Carrier ID NENA CID
Scenario #4: Life Device-DIR when Life Device Connectivity is via VoIP origination.				
VOIP (Fixed)	[Customer Name] + LIFE DEV-DIR	Dispatchable Location [11][19], as applicable	N/A	ASP Name or Call Center NENA CID
Scenario #5: Life Device-DIR when Life Device provides Lat/Long for location.				
OMBL (x,y)	[Customer Name] + LIFE DEV-DIR	Dispatchable Location [11][19], as secondary, if available	Latitude/Longitude as primary	ASP Name or Call Center NENA CID
Scenario #6: Life Device-DIR when Life Device Connectivity is VoIP; however, it is nomadic.				
VNOM (Civic)	[Customer Name] + LIFE DEV-DIR	Dispatchable Location [11][19], as primary	Latitude/Longitude as secondary, if available	ASP Name or Call Center NENA CID
Scenario #7: Life Device-DIR when Life Device and Application provides location by a third-party service provider.				
SDXY	[Customer Name] + LIFE DEV-DIR	N/A	Supplementary geodetic location information, as defined by NENA STA-015 [11]	ASP Name or Call Center NENA CID
Scenario #8: AACN-CTR when the vehicle initiates an emergency call to a Call Center to report a crash notification, which after verifying the emergency initiates an emergency call to 9-1-1.				
TLMA	[Company Call Center] + AACN-CTR	Cross Street Description, if available – or – Location Address [18]	Latitude/Longitude	ASP Name NENA CID

CoS [11]	Customer Name Field	Civic Location Information	Geopositioned Information	Carrier or Company Name [17][20][21]
Scenario #9: AACN-DIR when the vehicle initiates an emergency call directly to 9-1-1 to report a crash notification.				
TLMA	[Customer Name] + AACN-DIR	Cross Street Description, if available – or – Location Address [18]	Latitude/Longitude	ASP Name NENA CID
Scenario #10: VEH-CTR when the vehicle initiates an emergency call to a Call Center, which after verifying the emergency initiates an emergency call to 9-1-1.				
TLMA	[Company Call Center] + VEH-CTR	Dispatchable Location [11][19], as applicable	Latitude/Longitude as applicable	ASP Name or Call Center NENA CID
Scenario #11: VEH-DIR when Location is Lat/Long or unknown (e.g., a default location from the call center).				
TLMA	[Customer Name] + VEH-DIR	Dispatchable Location [11][19], as secondary, if available	Latitude/Longitude as applicable	ASP Name NENA CID
Scenario #12: Alarm-CTR when Location is Lat/Long or unknown (e.g., a default location from the call center).				
VOIP (Fixed)	[Company/Call Center] + ALARM-CTR	Dispatchable Location [11][19], as applicable	Latitude/Longitude, as applicable	ASP Name or Call Center NENA CID
Scenario #13: Alarm-DIR when Life Device Connectivity is via VoIP origination.				
VOIP (Fixed)	[Customer Name] + ALARM-DIR	Dispatchable Location [11][19], as applicable	N/A	ASP Name NENA CID
Scenario #14: Alarm-DIR when Alarm System and Application provides Lat/Long for location.				
OMBL (x,y)	[Customer Name] + ALARM-DIR	N/A	Latitude/Longitude as derived from the CoS	ASP Name NENA CID
Scenario #15: Alarm-DIR when Alarm System and Application Connectivity is VoIP; however, it is nomadic.				

CoS [11]	Customer Name Field	Civic Location Information	Geopositioned Information	Carrier or Company Name [17][20][21]
VNOM (Civic)	[Customer Name] + ALARM-DIR	Dispatchable Location [11][19], as applicable	N/A	ASP Name NENA CID
Scenario #16: Alarm-DIR when Alarm System and Application provide location by a third-party separate from the mandatory location required by applicable regulations.				
SDXY	[Customer Name] + ALARM-DIR	N/A	Supplementary geodetic location information, as defined by NENA STA-015 [11]	ASP Name NENA CID
Scenario #17: Wireless Based				
WPH1, WPH2 – or – WCVC, WDL1, WDL2	N/A	N/A	Latitude/Longitude	N/A

Note: The RESD and BUSN CoS, which connects via wireline to the 9-1-1 network, will need to retain the CoS assigned. The Category Type SHALL be placed in the ALI structure, when available, in a field determined by the 9-1-1 System Service Provider and the PSAP.

3.5.2.1 Customer Name Field

The preferred method of conveying the Non-Conventional Call Category Type is to populate the category in the Customer Name Field. This allows for quick visibility and assessment by the telecommunicator. Any existing Customer Name information MUST NOT be overwritten but concatenated with the Category Type. The Category Type MUST be preceded by the Customer Name. See examples in 3.5.2.3.

3.5.2.2 Location and Address Line 2 Fields

If additional fields are needed to support the Category Type, the Location and Address Line 2 fields can be used if the use of the category does not remove any content that already exists within the field. For the Location field, existing information might not be known due to its free-form nature. See Figure 9 as an example.

3.5.2.3 Examples of ALI Based on Category Type and Class of Service

The following examples are to assist the provider in how to implement the ALI requirements identified in Table 1. Discussions between the PSAP(s) and key stakeholders are REQUIRED to avoid conflicts in data conveyance and display.

Category Types: LIFE DEVICE–CTR / ALARM–CTR

Class of Service: VOIP

The first three (3) examples contain the RECOMMENDED placement of the Category Type. The fourth example, in Figure 9, is an optional placement for data that cannot conform to the recommended style.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
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2	(	5	5	5	)	**s**	1	2	3	-	4	5	6	7	**s**	V	O	I	P	**s**	0	9	/	1	3	**s**	1	0	:	0	0	↵
3	C	U	S	T	O	M	E	R	s	N	A	M	E	s	L	I	F	E	s	D	E	V	-	C	T	R	>	>	↵			
4	H	O	U	S	E	N	U	M	>	>	s	H	N	S	>	**s**	**s**	**P**	**#**	N	P	A	-	E	X	C	-	L	I	N	E	↵
5	P	D	**s**	S	T	R	E	E	T	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵							
6	S	T	R	E	E	T	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵											
7	L	O	C	A	T	I	O	N	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	**s**	E	S	N	#	#	↵
8	S	T	**s**	C	O	M	M	U	N	I	T	Y	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
9	O	T	C	>	>	>	>	>	>	>	>	>	>	>	>	**s**	**s**	**s**	**T**	**E**	**L**	**=**	T	E	L	C	O	↵				
10	L	A	T	.	0	0	0	0	0	0	s	s	L	O	N	.	0	0	0	0	0	0	s	H	U	N	C	E	R	T	s	↵
11	**P**	**S**	**A**	**P**	**=**	P	S	A	P	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
12	L	A	W	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
13	F	I	R	E	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
14	E	M	S	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	*
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Figure 6: Customer Name Concatenated with Life Device-CTR

	1	2	3	4	5		6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
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2	(	5	5	5	)		**s**	1	2	3	-	4	5	6	7	**s**	V	O	I	P	**s**	0	9	/	1	3	**s**	1	0	:	0	0	↵
3	C	A	L	L	C		E	N	T	E	R	N	A	M	E	s	L	I	F	E	s	D	E	V	-	C	T	R	>	↵			
4	H	O	U	S	E		N	U	M	>	>	s	H	N	S	>	**s**	**s**	**P**	**#**	N	P	A	-	E	X	C	-	L	I	N	E	↵
5	P	D	**s**	S	T		R	E	E	T	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵							
6	S	T	R	E	E		T	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵											
7	L	O	C	A	T		I	O	N	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	**s**	E	S	N	#	#	↵
8	S	T	**s**	C	O		M	M	U	N	I	T	Y	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
9	O	T	C	>	>		>	>	>	>	>	>	>	>	>	>	**s**	**s**	**s**	**T**	**E**	**L**	**=**	T	E	L	C	O	↵				
10	L	A	T	.	0		0	0	0	0	0	s	s	L	O	N	.	0	0	0	0	0	0	s	H	U	N	C	E	R	T	s	↵
11	**P**	**S**	**A**	**P**	**=**		P	S	A	P	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵

12	L	A	W	>	>		>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
13	F	I	R	E	>		>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
14	E	M	S	>	>		>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	*
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Figure 7: Call Center Name Concatenated with Life Device-CTR

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
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2	(	5	5	5	)	**s**	1	2	3	-	4	5	6	7	**s**	V	O	I	P	**s**	0	9	/	1	3	**s**	1	0	:	0	0	↵
3	C	A	L	L	C	E	N	T	E	R	N	A	M	E	s	A	L	A	R	M	-	C	T	R	>	>	>	>	↵			
4	H	O	U	S	E	N	U	M	>	>	s	H	N	S	>	**s**	**s**	**P**	**#**	N	P	A	-	E	X	C	-	L	I	N	E	↵
5	P	D	**s**	S	T	R	E	E	T	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵						
6	S	T	R	E	E	T	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵											
7	L	O	C	A	T	I	O	N	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	**s**	E	S	N	#	#	↵
8	S	T	**s**	C	O	M	M	U	N	I	T	Y	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
9	O	T	C	>	>	>	>	>	>	>	>	>	>	>	>	**s**	**s**	**s**	**T**	**E**	**L**	**=**	T	E	L	C	O	↵				
10	L	A	T	.	0	0	0	0	0	0	s	s	L	O	N	.	0	0	0	0	0	0	s	H	U	N	C	E	R	T	s	↵
11	**P**	**S**	**A**	**P**	**=**	P	S	A	P	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
12	L	A	W	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
13	F	I	R	E	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
14	E	M	S	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	*
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Figure 8: Call Center Name Concatenated with Alarm-CTR

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
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2	(	N	P	A	)	**s**	E	X	C	-	L	I	N	E	**s**	V	O	I	P	**s**	M	M	/	D	D	**s**	H	H	:	M	M	↵
3	S	U	B	S	C	R	I	B	E	R	_	N	A	M	E	>	>	>	>	>	>	>	>	>	>	>	>	>	↵			
4	H	O	U	S	E	N	U	M	>	>	s	H	N	S	>	**s**	**s**	**P**	**#**	N	P	A	-	E	X	C	-	L	I	N	E	↵
5	P	D	**s**	S	T	R	E	E	T	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵						
6	S	T	R	E	E	T	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵											
7	C	A	L	L	C	E	N	T	E	R	N	A	M	E	s	A	L	A	R	M	-	C	T	R	>	**s**	E	S	N	#	#	↵
8	S	T	**s**	C	O	M	M	U	N	I	T	Y	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
9	O	T	C	>	>	>	>	>	>	>	>	>	>	>	>	**s**	**s**	**s**	**T**	**E**	**L**	**=**	T	E	L	C	O	↵				
10	L	A	T	.	0	0	0	0	0	0	s	s	L	O	N	.	0	0	0	0	0	0	s	H	U	N	C	E	R	T	s	↵
11	**P**	**S**	**A**	**P**	**=**	P	S	A	P	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
12	L	A	W	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
13	F	I	R	E	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
14	E	M	S	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	*
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Figure 9: Call Center Name Concatenated with Alarm-CTR in Location Field

Category Types: LIFE DEVICE–DIR / ALARM–DIR

Class of Service(s): RESD, BUSN, VOIP, OMBL, VNOM, and SDXY, as applicable based on connectivity and location type as identified in Table 1.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
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2	(	5	5	5	)	**s**	1	2	3	-	4	5	6	7	**s**	O	M	B	L	**s**	0	9	/	1	3	**s**	1	0	:	0	0	↵
3	C	U	S	T	O	M	E	R	s	N	A	M	E	s	L	I	F	E	s	D	E	V	-	D	I	R	>	>	↵			
4	H	O	U	S	E	N	U	M	>	>	s	H	N	S	>	**s**	**s**	**P**	**#**	N	P	A	-	E	X	C	-	L	I	N	E	↵
5	P	D	**s**	S	T	R	E	E	T	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵						
6	S	T	R	E	E	T	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵											
7	L	O	C	A	T	I	O	N	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	**s**	E	S	N	#	#	↵
8	S	T	**s**	C	O	M	M	U	N	I	T	Y	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
9	O	T	C	>	>	>	>	>	>	>	>	>	>	>	>	**s**	**s**	**s**	**T**	**E**	**L**	**=**	T	E	L	C	O	↵				
10	L	A	T	.	0	0	0	0	0	0	s	s	L	O	N	.	0	0	0	0	0	0	s	H	U	N	C	E	R	T	s	↵
11	**P**	**S**	**A**	**P**	**=**	P	S	A	P	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
12	L	A	W	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
13	F	I	R	E	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
14	E	M	S	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	*
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Figure 10: Customer Name Concatenated with Life Device–DIR

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
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2	(	5	5	5	)	**s**	1	2	3	-	4	5	6	7	**s**	V	O	I	P	**s**	0	9	/	1	3	**s**	1	0	:	0	0	↵
3	C	U	S	T	O	M	E	R	s	N	A	M	E	s	A	L	A	R	M	-	D	I	R	>	>	>	>	>	↵			
4	H	O	U	S	E	N	U	M	>	>	s	H	N	S	>	**s**	**s**	**P**	**#**	N	P	A	-	E	X	C	-	L	I	N	E	↵
5	P	D	**s**	S	T	R	E	E	T	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵						
6	S	T	R	E	E	T	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵											
7	L	O	C	A	T	I	O	N	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	**s**	E	S	N	#	#	↵
8	S	T	**s**	C	O	M	M	U	N	I	T	Y	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
9	O	T	C	>	>	>	>	>	>	>	>	>	>	>	>	**s**	**s**	**s**	**T**	**E**	**L**	**=**	T	E	L	C	O	↵				
10	L	A	T	.	0	0	0	0	0	0	s	s	L	O	N	.	0	0	0	0	0	0	s	H	U	N	C	E	R	T	s	↵

11	**P**	**S**	**A**	**P**	**=**	P	S	A	P	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
12	L	A	W	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
13	F	I	R	E	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
14	E	M	S	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	*
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Figure 11: Customer Name Concatenated with Alarm–DIR

Category Types: AACN–DIR / AACN–CTR

Class of Service: TLMA

For Advanced Automatic Crash Notification (AACN) calls, whether received by the PSAP from a call center or direct to the PSAP, the CoS MUST be TLMA, where it can be supported. In cases where the AACN call requires a Commercial Mobile Radio Service (CMRS) device to initiate the 9-1-1 call toward the PSAP, the CoS may be limited to the use of a wireless CoS (i.e., WPH1, WPH2, etc.).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	↵																															
2	(	5	5	5	)	**s**	1	2	3	-	4	5	6	7	**s**	T	L	M	A	**s**	0	9	/	1	3	**s**	1	0	:	0	0	↵
3	C	U	S	T	O	M	E	R	s	N	A	M	E	s	A	A	C	N	-	D	I	R	>	>	>	>	>	>	↵			
4	H	O	U	S	E	N	U	M	>	>	s	H	N	S	>	**s**	**s**	**P**	**#**	N	P	A	-	E	X	C	-	L	I	N	E	↵
5	P	D	**s**	S	T	R	E	E	T	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵						
6	S	T	R	E	E	T	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵											
7	L	O	C	A	T	I	O	N	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	**s**	E	S	N	#	#	↵
8	S	T	**s**	C	O	M	M	U	N	I	T	Y	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
9	O	T	C	>	>	>	>	>	>	>	>	>	>	>	>	**s**	**s**	**s**	**T**	**E**	**L**	**=**	T	E	L	C	O	↵				
10	L	A	T	.	0	0	0	0	0	0	s	s	L	O	N	.	0	0	0	0	0	0	s	H	U	N	C	E	R	T	s	↵
11	**P**	**S**	**A**	**P**	**=**	P	S	A	P	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
12	L	A	W	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
13	F	I	R	E	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
14	E	M	S	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	*
15																																
16																																

Figure 12: Customer Name Concatenated with AACN–DIR

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	↵																															

2	(	5	5	5	)	**s**	1	2	3	-	4	5	6	7	**s**	T	L	M	A	**s**	0	9	/	1	3	**s**	1	0	:	0	0	↵
3	C	A	L	L	C	E	N	T	E	R	N	A	M	E	s	A	A	C	N	-	C	T	R	>	>	>	>	>	↵			
4	H	O	U	S	E	N	U	M	>	>	s	H	N	S	>	**s**	**s**	**P**	**#**	N	P	A	-	E	X	C	-	L	I	N	E	↵
5	P	D	**s**	S	T	R	E	E	T	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵						
6	S	T	R	E	E	T	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵											
7	L	O	C	A	T	I	O	N	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	**s**	E	S	N	#	#	↵
8	S	T	**s**	C	O	M	M	U	N	I	T	Y	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
9	O	T	C	>	>	>	>	>	>	>	>	>	>	>	>	**s**	**s**	**s**	**T**	**E**	**L**	**=**	T	E	L	C	O	↵				
10	L	A	T	.	0	0	0	0	0	0	s	s	L	O	N	.	0	0	0	0	0	0	s	H	U	N	C	E	R	T	s	↵
11	**P**	**S**	**A**	**P**	**=**	P	S	A	P	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
12	L	A	W	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
13	F	I	R	E	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	↵
14	E	M	S	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	*
15																																
16																																

Figure 13: Call Center Name Concatenated with AACN-CTR

3.5.2.4 English Language Translation (ELT) and Location

Dependent on the type of 9-1-1 call and related to the Emergency Service Number (ESN), the English Language Translation (ELT) contains information on the law enforcement, fire, and emergency medical services agencies associated to the 9-1-1 call. The ELT information has been modified beyond the emergency response agency information to support additional information to accommodate changing technologies. As in the case of VoIP, the ELT may contain information such as "VOIP 9-1-1 Caller" and "Verify Caller's Location" to guide the telecommunicator in their support of the 9-1-1 call.

This standard identifies previously defined Classes of Service that may have not been implemented. This document highlights an opportunity to provide additional information within the ELT field. While it may be technically possible to implement additional CoS values, only the Classes of Service identified in this standard SHALL be utilized for non-conventional call handling.

Operational note: If a change to the ELT is required, the PSAP, 9-1-1 Authority, and 9-1-1 System Service Provider SHOULD discuss what capabilities are available for modifying the ELT in the local environment before committing to any changes.

3.6 Preparing for New Applications

Resources were developed by NENA and APCO in 2012 to provide Public Safety Considerations for Smartphone App Developers [22] information on access to 9-1-1 services. The questionnaire has been updated to maintain relevance and is provided as a resource for the 9-1-1 Authority to share with potential ASPs to guide new implementations (see Appendix).

3.7 Provider and Customer Responsibility

The table provided below provides a detailed description and summary of the role and responsibility of each functional entity involved in the planning, testing, implementation, and 9-1-1 call delivery. Each functional entity performs a specific function from the ASP to the PSAP for successful 9-1-1 call processing and delivery. Each functional entity in the table below is identified by a specific acronym (e.g., ASP) and can be located by referring to the Abbreviations, Terms, and Definitions section of this document.

Table 2. Provider and Customer Responsibility

Task Description I = Informed O = Other Owner P = Primary Owner	**Responsibility**				
	ASP	**Third Party Service Provider (TPSP)**	**OSP**	**9-1-1 SYS SERVICE PROVIDER (9-1-1 SSP)**	**PSAP**
1 – Application Ready for 9-1-1 Deployment					
1.1 – ASP Develops ALI/CoS Requirements	P	I	I	I	I
1.2 – ASP Testing with OSP					
1.2.1 – without TPSP	P		O	I	I
1.2.2 – with TPSP	P	O		I	I
1.3 – ASP/OSP Testing with 9-1-1 SSP					
1.3.1 – without TPSP	P		O	O	I
1.3.2 – with TPSP	P	O		O	I
2 – ASP Launch Project Kick-Off					
2.1 – Obtain PSAP and state or regional 9-1-1 Authority Contact (if applicable)	P	I	I	I	O
2.2 – ASP/OSP sends requirements to PSAP					
2.2.1 – without TPSP	P		I	I	I
2.2.2 – with TPSP	P	I		I	I
2.3 – ASP Sends Education and Training Information to PSAP	P	I	I	I	O
3 – Training					

3.1 – System Admin training	P	I	I	I	O
3.2 – Public Safety Telecommunicator (PST) training	P	I	I	I	O
4 – Testing					
4.1 – Provide PSAP Test Plan					
4.1.1 – without TPSP	P		O	O	O
4.1.2 – with TPSP	P	O		O	O
4.2 – Pre-production testing					
4.2.1 – ASP/OSP					
4.2.1.1 – without TPSP	P		O	I	I
4.2.1.2 – with TPSP	P	O	I	I	I
4.2.2 – ASP/OSP/9-1-1 SSP					
4.2.2.1 – without TPSP	P		O	O	I
4.2.2.2 – with TPSP	P	O	I	O	I
4.2.3 – ASP/OSP/9-1-1 SSP/PSAP					
4.2.3.1 – without TPSP	P		O	O	O
4.2.3.2 – with TPSP	P	O	I	O	O
4.3 – Network cutover					
4.3.1 – without TPSP	P		O	O	O
4.3.2 – with TPSP	P	O	I	O	O
4.4 – Schedule and Complete Test Cases until successful					
4.4.1 – without TPSP	P		O	O	O
4.4.2 – with TPSP	P	O	I	O	O
4.5 – PSAP signs off on completed Test Cases	I	I	I	I	P
5 – Deployment					
5.1 – "Live" notification to PSAP	P	I	I	I	O
5.1.1 – Limited availability	P	I	I	I	O

5.1.2 – General availability					
5.1.2.1 – without TPSP	P		O	I	O
5.1.2.2 – with TPSP	P	O	I	I	O
5.2 - Public Announcement / Public Education	P	I	I	I	O

3.7.1 Vetting and Communication Among Stakeholders

3.7.1.1 Mutual Agreement between PSAPs and ASPs

The process for establishing a mutual/bilateral agreement between the PSAPs and the ASPs SHOULD include the following considerations and responsibilities that will constitute legal and binding conditions:

The ASPs MUST complete a formal registration process with a national database accessible to PSAPs. For example, the NENA Company ID database [20] could be used for providing registration of third-party ASPs. The company ID associated with an ASP can be provided in the ALI record database by using the Data Provider ID / **Company ID 2** field that is available in the ALI record [17][20][21]. It is incumbent upon the receiving PSAP to determine if Company ID 2 data is already present or can be displayed by the customer premises equipment (CPE).

The ASP MUST contact the PSAPs in writing to notify them of the ASP's intent to launch new services. Upon agreement of the PSAP, notification in writing serves as documentation of an agreed-upon date for launching the new service in all jurisdictions where the ASP service is being deployed. Copies of ASP communications to their end users SHALL be provided to PSAPs.

ASPs SHOULD expect to pay all costs incurred to the PSAPs, but it SHOULD be part of a legal written mutual agreement to avoid excess costs and overages due to heavy call volume incurred as a result of ASP calls.

A Standard Operating Procedure (SOP) SHOULD be defined by an ASP regarding the use of any non-published PSAP line for administrative calls. The ASP SHOULD attempt to reach an agreement with the PSAP on how the ASP will deliver the call to the PSAP.

The new SOP needs to be tested with PSAPs and involve all parties in the end-to-end testing process as documented in Table 1 of Section 3.7. Certification and registration of the ASP MUST be provided by the ASP prior to any ASP making test calls to any PSAP. The ASP SHOULD create Generic Guidelines for the PSAPs including but not limited to standard definitions, terminology, service guidelines, operating processes and procedures.

PSAPs SHOULD publish a single point of contact and a defined process for onboarding ASPs.

Common management, operational, and technical requirements and procedures from ASPs (as a group) and from PSAPs (as a group) are highly desired.

Common requirements and procedures will provide a standardized testing approach across all ASPs and all PSAPs. Testing with individual PSAPs could be tied to regions where marketing of the service is planned. PSAPs with common equipment and management may not need to be tested individually but rather as a group.

To the degree possible, all emergency calls SHOULD arrive at a PSAP on a 9-1-1 trunk unless otherwise specified by the PSAP. Before a decision is made to route emergency calls to administrative lines, all other options should be considered. ASPs MUST NOT use PSAP administrative telephone lines to deliver emergency calls without prior PSAP agreement.

3.7.1.2 Escalation Procedure

Mutual agreements between PSAPs and ASPs MUST include a requirement to provide contact information details to PSAP operations managers and IT staff, and a documented escalation procedure within the ASP for problem resolution. ASPs MUST provide a means for a PSAP to contact an ASP during an emergency call if immediate ASP assistance is needed. In addition, the escalation procedure provides a main point of contact for PSAPs to follow up with ASPs on possible issues or any non-compliance or non-conformance-related problems that could occur during a call. This escalation procedure will enable PSAPs to work together with the ASP on resolving these issues in a timely manner. Where and when issues and multiple problems cannot be resolved, or where repeated cases of non-compliance with a specified procedure occur, the issues can be escalated and addressed. In cases of repeated non-compliance, the potential exists for the ASP's access to a PSAP to be blocked, and the mutual agreement between the parties to be terminated.

3.7.1.3 Error Reporting / Quality Control

The mutual agreement MUST include an error-reporting process. PSAPs SHOULD notify the ASP when a reportable issue is encountered. Examples of reportable issues with an ASP are inaccurate emergency location address and/or geographic coordinates, and time delays associated with third-party call center assisted calls.

For statistical purposes it would be helpful to be able to track the number of administrative and/or troubleshooting calls that occur between an ASP and the PSAP, in order to allow PSAPs to quickly identify issues for emergency calls received from an individual ASP and address these issues for rapid troubleshooting operations. While this can equally be achieved using the calling number from the ASP or other method, use of a dedicated number may be more consistent and a more reliable type of approach. Having a unique inbound calling number for each ASP is recommended to allow specific routing of the troubleshooting call within the PSAP.

3.8 Testing Criteria

3.8.1 Initial Testing before Distribution to the Public

The Application Service Provider (ASP) (IoT, VoIP, third-party solution, etc.) SHALL identify the PSAPs within the geographic service areas in which the solution will potentially be deployed. The following resources may be useful in this process: the NENA Enhanced PSAP Registry and Census (EPRC) [23], National Association of State 911 Administrators (NASNA) [24] representative(s), state 9-1-1 administrator(s), FCC 911 Master PSAP Registry [25], and 9-1-1 SSP(s). ASPs will need to assume that all PSAPs across the entire US will potentially receive these types of calls for service and MUST be adequately tested.

To accomplish testing, each ASP will need to determine the various 9-1-1 providers and PSAP call handling equipment for each geographic service area. It will be necessary to develop procedures to facilitate testing with each combination of providers and their specific call handling equipment. Testing MUST be done as directed by the 9-1-1 authority. Testing SHOULD be performed with a sufficient number of PSAPs to represent effective operability in the region where the solution will be deployed (or PSAP groups of similar capability and governance if mutually agreeable). The PSAPs involved in testing SHOULD include smaller, larger, legacy, transitional, and i3 PSAPs as applicable to represent the PSAP population.

The purpose of testing is to verify that each deployed configuration will function as intended. Testing SHOULD confirm that calls are routed appropriately, and supplemental data is transmitted, received, and consumed successfully by the PSAP. During training and testing the results SHALL be logged and shared with the appropriate 9-1-1 authority. If problems or failures occur during the testing process, the ASP will be REQUIRED to retest in the environments that had failures or problems.

Before beginning any testing, the ASP, OSP, or other testing entity MUST coordinate with the PSAP to ensure that the PSAP has approved the testing schedule and is able to accommodate testing. All testing and notification MUST be done in accordance with PSAP or 9-1-1 authority testing policies.

Prior to testing, the ASP, OSP, or other testing entity SHOULD provide all relevant stakeholders, including the PSAP and/or 9-1-1 authority, with an overview of prerequisites, test plan, and expected results of placing a 9-1-1 call from the application or device.

3.8.2 Notification and Testing for each significant upgrade

Prior to making a functional change to an application or device, a notification SHOULD be created to inform all relevant entities including the authority with jurisdiction. Significant changes (with the potential to affect PSAP operations or connectivity) SHOULD include testing processes, i.e., the process created for initial implementation. An initial deployment or a major upgrade will require testing to ensure system operability criteria are met (application/device to PSAP). Change management best practices, including rollback capability, MUST be followed.

3.8.3 Test Calls

Activations MUST include at a minimum the following information.

3.8.3.1 Location Types – Geodetic Location and Dispatchable Location

The FCC defines "Dispatchable Location" as 'the street address of the caller and additional information, such as room or floor number, necessary to adequately locate the caller.' More information about the requirement can be found at https://www.fcc.gov/911-dispatchable-location. Geodetic location (Latitude/Longitude) is the current standard for wireless voice calls. Most PSAPs are capable of receiving and mapping the location associated with a wireless Phase 1 or 2 call, but some PSAPs do not have an automated method for mapping a geodetic location associated with a non-wireless call. In those cases, the geodetic location is manually entered on a separate computer in order to map the location. Manual entry processes significantly increase the likelihood of input errors due to numbers that are lengthy (decimal degrees and number of decimal places) that could result in an incorrect map display of the location of the calling device.

When geodetic information is received by an ASP the geodetic location SHOULD be delivered to the PSAP. If a civic location is desired by the PSAP, reverse geocoding of the geodetic location SHOULD NOT be performed by the ASP, since it can give an erroneous location for the caller. The PSAP MUST be notified if a civic address is presented in the ALI but the civic address is derived through reverse geocoding. The method of making this notification is out of scope for this document. In some situations, and if available, the distance from the geodetic point to the civic address may be provided using best available methods such as an OTT mechanism.

It is possible, in some cases, that both a geodetic and civic form of location may be delivered with the call. Examples are:

- Phase 1 cell tower civic address location AND Phase 2 geodetic latitude/longitude
- Dispatchable location AND geodetic latitude/longitude

NG9-1-1 standards accommodate additional combinations of multiple location data types, but this capability is limited to NG9-1-1 and is not part of the legacy E9-1-1 standards.

3.8.3.2 Originating Service Provider

Though E9-1-1 and NG9-1-1 calls are designed to deliver a company name for the Originating Service Provider, sometimes an underlying name is provided, in cases where there is multiple service providers involved in handling an emergency call, or in the case of an MVNO (Mobile Virtual Network Operator). If the test call is interactive (includes a human), it is helpful to have the test call report the service provider name, along with the service display access technology (e.g., wireless, Wi-Fi, VoIP, etc.) and service display signal strength if applicable (e.g., RSSI, or how many reception bars are displayed). A preferred approach is for this detailed information to be gathered by the person doing the testing rather than expecting the PSAP call taker to log the detail. Detailed information SHOULD be shared with the PSAP after testing is concluded and is most helpful in diagnosing failed tests.

Non-conventional means of communicating with the PSAP includes several types of technologies, devices, and networks. Is the originating device a wireless phone? Is it an IoT device reporting via SMS or wireless data? Is it an app located on a phone but communicating via wireless data? This information is received and MUST be documented during test calls.

3.9 Education

3.9.1 Education for the Public

The public safety device and application environment puts responsibility on the manufacturer to make products that align with public safety requirements and do not interfere with public safety operations. Device and application service providers are responsible for educating their users about the capabilities and appropriate uses of their products.

Device and application service providers MUST take purposeful steps to provide the resources and information to their consumers that will ensure the safe and effective use of their product. It is recommended that application service providers consider deploying the following complementary options to consumers.

Many providers have found great success in deploying resources via a web portal. Information can be included on a web page or series of pages with different training options to include video and text tutorials regarding the product. Information should include product specifications, how-tos, and FAQs. Additionally, to account for the population that does not have access to a computer, companies should include an option to get printed information included with the device and/or provide a mail option.

Information regarding the deployment of the device or application should be made available to the public. Depending on the device or application, this can be accomplished by a color-coded map illustrating coverage areas and other service details.

Additional education for the public can be achieved by the provider supplying graphics and templates for PSAP and/or field responder use in public education. This information should include graphics, video, and text information that can be used by public education personnel when describing what services will be provided. It is crucial that appropriate media options are provided to accommodate users who are hearing or visually impaired.

3.9.2 Education for the PSAP

The manufacturer or supplier will need to provide the necessary information so that the PSAP can better understand the technical details, along with expected scenarios showing how the solution is intended to work.

Prior to adding the technology, the provider will supply the following:

- The name of the product or device. This may need to include the manufacturer's name and some details about the manufacturer, including a common name of the device. Information about any required state or local licensing should be included.
- Contact information for the provider, including escalation contacts.
- For detection devices, details or description clearly define what the device detects and its operational characteristics.
- When the alert is sent, how does the vendor see this information as actionable? What recommendations does the vendor have for PSAP processing of the alert? How can this information be useful for over and above normal E9-1-1 call processing?
- If there are multiple alerts sent, how can the PSAP differentiate the alerts? Provide examples of how alerts are identified and labeled.

Training curricula should be available for the education of PSAP personnel. The information should be presented by subject matter experts. For example, there should be prerecorded training courses that can be viewed at any time. Certificates of attendance should be made available for use by PSAP staff where ongoing continuing education credits are applicable.

Reference material to be provided includes the following:

- Detailed user manuals for reference
- Quick reference guides
- Ongoing updates on changes or improvements to the devices or application. If there are different revisions of the product, there should be a list of revisions and features.

The manufacturer or supplier may choose to make these materials accessible through the NENA free training listings, located at https://www.nena.org/page/FreeTrainingResources.

3.9.3 Education for First Responders in the Field

Training material targeted to first responders in the field is needed, briefly explaining the product or application, how it works, one or more scenarios, and what personnel need to know.

4 Examples of Non-Conventional Scenarios

The examples in this section were submitted for consideration during the development of this document and are not normative requirements of this standard. Specific information in these examples may not be universally used by other similar applications.

4.1 Example 1: Alarm Company Call Center

Burglar Alarm Activation, High Probability of Criminal Activity

The scenario herein describes a burglar alarm activation where there is sufficient data to determine there is a high probability of a crime in progress, i.e., an immediate threat to life or property. This scenario describes a burglar alarm activation where an alarm monitoring center follows the *Alarm Validation Scoring Standard*, ANSI/TMA-AVS-01 2023 [18]. ANSI/TMA-AVS-01 2023 defines a process for burglar alarm signals where the monitoring center operator, either manually or assisted by the monitoring center automation system, uses available data to generate an alarm confidence scoring metric. When the AVS-01 process indicates there is a documentable immediate threat to life or property, the scenario proposes allowing those very selective calls for service to be routed by the monitoring center to the PSAP through a 9-1-1 trunk. The process defined by the standard is aggregate to existing alarm confirmation processes defined by the TMA standard *Alarm Confirmation, Verification and Notification Procedures*, TMA CS-V-01-2020 [26].

The PSAP intended for receipt of the call for service per this scenario would agree and opt in to the use of ANSI/TMA-AVS-01 2023 [18], with necessary documentation of the agreement by the PSAP and/or 9-1-1 authority.

Use of ANSI/TMA-AVS-01 2023 will assist Public Safety with resource allocation with respect to alarm events. The next version of the ANSI/TMA-AVS-01 2023 [18] standard is expected to score fire alarm events in a similar manner.

Description of incident necessitating a Call for Service

A motorcycle dealership closed for business at 19:00 hrs. The employees turned the alarm system on and locked the premises at 19:15 hrs. Approximately seven hours later at 02:23 hrs., the alarm monitoring center received a burglar alarm signal from an interior motion detector covering the showroom floor. Monitoring center agents, using video verification technology, observe masked humans hurriedly pushing motorcycles through broken plate glass at front of store.

Note: This scenario is also applicable to monitoring centers that use audio verification technology. Where audio technology is present, for purposes of this scenario, the monitoring center agent hears noise and/or voice conversation consistent with criminal activity.

The monitoring center agent follows the alarm scoring process defined by the ANSI/TMA-AVS-01 2023 [18] standard. The observed video (or audio) raises the ANSI/TMA-AVS-01 2023 alarm score to a high-priority event, i.e., human presence with a high probability of a crime in progress.

Scenario impacting call delivery, PSAP delivery, and PSAP technology and operations

Alarm monitoring centers historically use 10-digit numbers assigned by PSAPs to create alarm calls for service. When the alarm company applies the defined metric (the scoring standard as defined in ANSI/TMA-AVS-01 2023) and determines a high probability of a crime in progress, the monitoring company can deliver the call for service via 9-1-1. The ALI and CoS information associated with the 9-1-1 call can help the 9-1-1 telecommunicator understand what the call is and how to process it.

Existing telephony technology and service providers can accommodate monitoring centers, regardless of their geographic location, to access PSAP 9-1-1 trunks, where allowed and when appropriate. The use of 9-1-1 versus a 10-digit number allows access to better situational awareness.

The newer ASAP to PSAP [27] interface provides an automated method of transmitting alarms to PSAPs where available. It provides direct connectivity between the alarm company call center and the PSAP Computer-Aided Dispatch (CAD) system and does not include a voice component.

A 9-1-1 call initiated by a received alarm at a monitoring center

An alarm is activated and sends the alarm signal to the monitoring center. If the ANSI/TMA-AVS-01 2023 [18] standard is adopted by the monitoring center and PSAP, monitoring center/PSAP procedures determine if using a 9-1-1 trunk is appropriate for creating a call for service. For example, if the ANSI/TMA-AVS-01 2023 standard determines that the alarm indicates a clear threat to property or person, the monitoring center agent initiates a 9-1-1 call, which is routed based on the location of the alarm using a VPC service provider. The alarm monitoring center may be able to update the VPC location database as part of the process of placing the 9-1-1 call, allowing appropriate location information to be provided to the local 9-1-1 Service Provider.

Along with the call, ALI information is delivered to the PSAP. The ALI record may contain three sets of characters that consist of an SMS short code, a monitoring center incident number, and an authorization code. These three elements would allow a telecommunicator or first responder to retrieve a URI and access an Additional Data Repository (ADR) via a smart phone or other device, using SMS as a vehicle to do so. The information would only be accessible for a defined period of time after the alarm is activated.

ALI/CoS Recommendations

The associated ALI information, including the CoS, would define that the call originated from an alarm monitoring center agent and not from another source. The location information within ALI is the actual fixed location of the alarm event and name associated with the alarm event (e.g., business or resident name), not the monitoring center name and address. Additional information should be included so that telecommunicator/PSAP is immediately aware of which monitoring center initiated the call and how to reach the alarm company for callback.

Information can be provided in the ALI display for the Additional Data Repository (ADR). The ADR can be accessed for real-time information to support the incident. The decision about whether to provide ADR information, and how to do so, is a decision between the 9-1-1 Authority and their provider(s).

It is important for the reader to recognize that there are many ways this can be done and may be defined by the chosen methodology of individual PSAPs.

For example, the codes for the additional data repository may look like this.

X|Y|Z
X = SMS Short Code
Y = Incident Number
Z = Authcode (authorization code)
12345|4357|A2F9

In this example (12345|4357|A2F9), the message 4357 (incident number) is sent by a telecommunicator and/or first responder to phone number 12345 (short code). The sender would receive a response to send the Authcode A2F9. Upon sending the Authcode, the sender would receive a textual response or a URL that would display any relevant additional data. All transactional information would be logged for security purposes. Conceptually, many types of media could be imbedded, such as audio/video both live and recorded. Chat applications could be supported between monitoring centers, patients, telecommunicators, and first responders.

If part of the description is standards-based or best practices defined, please refer to the appropriate document that information provided references.

Per individual PSAP policy/best practice, the Alarm Validation Scoring Standard, ANSI/TMA-AVS-01 2023 [18] would define events with a documented immediate threat to life or property, allowing use of a 9-1-1 trunk.

4.2 Example 2: Personal Emergency Response System (PERS)

"Help! I've fallen and I can't get up!" has been a trademark for the PERS category of emergency communication devices for decades. They are marketed as "push of a button" technologies to gain immediate access to help. PERS include devices of varying sizes, use a variety of technologies, and are all used to request help from a private sector monitoring center. The monitoring center will then alert family or friends of the incident, and if necessary, contact a Public Safety Answering Point (PSAP) for the dispatch of emergency services to help the individual.

What many don't know is that these calls placed to the PSAP are not reported on a traditional 9-1-1 line. Instead, the monitoring center utilizes a designated 10-digit line (a different one for every dispatch center depending upon where their subscriber is located) to contact a PSAP. The time from the initial call for help to the time the alarm monitoring center contacts a PSAP who can dispatch help may take up to a couple of minutes. However, it should also be noted that over 90% of all PERS alarms transmitted to Monitoring Centers do NOT require a public safety response. They are predominately non-injury falls, false alarms, or just lonely end users. Additionally, not all calls for service are medical in nature. Many times, the event is to report fire, intrusion, or even elder abuse conditions.

Furthermore, it may take up to two more minutes for the 9-1-1 telecommunicator to establish a chief complaint and initiate a dispatch. Examples are information being conveyed that is not necessary for an initial aid response, and challenges with verbal communication of unusual place names. When a confirmed emergency is present it would be desirable for the monitoring company to be able to deliver the call via 9-1-1 along with specific ALI and CoS information such that a 9-1-1 telecommunicator understands what the call is and how to process it. In some instances, ASAP to PSAP [27] can be used to electronically report the emergency.

It is also desirable that other medical information such as allergies, medications, and other conditions be electronically available for first responders to access on demand when needed, thus shortening the time on the call for both 9-1-1 telecommunicators and monitoring center specialists.

This particular scenario covers a PERS where the monitoring center has the capability of contacting the PSAP via 9-1-1 directly. There is no standard in place on how these calls will be delivered to a PSAP, since this is not how these devices typically contact 9-1-1. This scenario also assumes that the PERS is a fixed device in a residence.

Data Security

Manufacturers of devices that are configured to contain private information (e.g., medical data) should perform a privacy impact assessment as part of their security process and be aware of all regulations that apply, including federal, state, and local requirements.

Class of Service (CoS) and ALI Data Structure

A PERS call will be received and processed as a traditional E9-1-1 call from the monitoring center to the PSAP. This approach has its limitations as it appears to the telecommunicator that it is a normal 9-1-1 call, instead of a call from the monitoring center.

Ideally this should be a unique CoS of its own, but barring that, the CoS should indicate a telematics call so at least the telecommunicator knows the caller is not the end user.

Describe how 9-1-1 call is initiated

The following data is available to transmit to the PSAP:

1. First and last name
2. Phone number(s)
3. Address
4. Special comments
    a. Door lock code
    b. Allergies
5. GPS (not available with all products)

The customer is at home alone watching TV and starts to feel some chest pain. Customer makes his/her way to the base unit and hits the emergency button on the unit. The customer is connected to a security company monitoring agent via two-way voice.

- **Everything is fine** – Security company monitoring agent is connected to the customer through the medical alert unit. The customer lets the agent know that he/she feels okay and does not need additional help. The agent confirms with the customer and ends the call.
- **Everything is not fine** – Agent connects with customer through the medical alert unit via two-way voice. The customer and agent have a discussion, and the customer lets the agent know that an ambulance is needed. Agent connects to 9-1-1 and starts the dispatch process to the customer's home. Agent confirms with the customer that an ambulance is on the way. Agent also notifies/calls emergency contacts.
- **Status unknown, escalate** – Agent is connected to the customer through the medical alert unit but is unable to get a verbal response from the customer. Agent connects to 9-1-1 and starts the dispatch process to the customer's home and notifies/calls the emergency contacts.

The customer at home decides to go down the stairs into the kitchen and get something to drink. As he/she is going down the stairs, he/she falls and triggers a fall detection signal to be sent from his/her fall detection pendant to the medical alert unit.

- **Everything is fine** – Security company agent speaks over the medical alert unit via two-way voice asking if customer is okay. Customer can hear and respond to the agent, answering that she is okay and does not need additional assistance. The agent and customer confirm that everything is okay, and the call is ended.
- **Everything is not fine** – Agent is connected to the customer through the medical alert unit via two-way voice. The customer can hear and respond to the agent, and requests EMS assistance. Agent connects to 9-1-1 and starts the dispatch process to

the customer's home. Agent confirms with the customer that an ambulance is on the way and notifies/calls the emergency contacts.

- **Status unknown, escalate** – Agent is connected to the customer through the medical alert unit via two-way voice. The agent is unable to get a response from the customer. Agent connects to 9-1-1 and starts the dispatch process to the customer's home and notifies/calls the emergency contacts.

For this scenario, the PERS system is activated and sends the signal along with a voice channel and location coordinates to the monitoring center. If there is a need for an emergency response, the monitoring center agent initiates an emergency 9-1-1 call, which is routed by a VoIP Positioning Center (VPC) service provider based on geodetic (LAT/LONG) coordinates.

The location is cached and staged by the VPC where it is accessed by the PSAP through the ALI bid process. The ALI record contains three sets of characters that consist of an SMS short code, a monitoring center incident number, and an authorization code. This would allow a first responder to access an Additional Data Repository (ADR) via a smart phone or other device, using SMS. The information would only be accessible for a predetermined period of time.

Potential Impacts

- No anticipated increase in PSAP workload, as monitoring centers continue to triage calls, only delivering truly emergent calls via 9-1-1.
- The process is expedited by calling in the emergency over 9-1-1 trunks, bypassing the ten-digit process used by monitoring centers, if desired by the 9-1-1 authority.
- The ALI record displays the civic address and location info (LAT/LONG) of the end user along with the end user's name that is on record. (It isn't always the account holder having the emergency.)
- Additional patient information can be provided to the first responders if needed on demand.

Differentiators to other technologies

PERS incidents are handled in a similar way to the procedures followed by telematics companies. The PERS provider triages the incident and calls the PSAP when necessary. The one differentiator is the ability to provide additional data on demand when needed. Care needs to be taken to differentiate PERS from devices or platforms that directly connect to 9-1-1 via direct dial from the device, or the call center routing all calls to 9-1-1.

ALI/CoS Recommendations

Information can be provided in the ALI display for the additional data repository. The additional data repository can be accessed for real-time information to support the incident.

It is important for the reader to recognize that there are many ways this can be done. The PERS provider will be responsible for communicating the chosen methodology to the PSAP.

For example, the codes for the additional data repository may look like this.

X|Y|Z
X = SMS Short Code
Y = Incident Number
Z = Authcode (authorization code)
12345|4357|A2F9

In this example (12345|4357|A2F9), the message 4357 (incident number) is sent by a telecommunicator and/or first responder to phone number 12345 (short code). The sender would receive a response to send the Authcode A2F9. Upon sending the Authcode, the sender would receive a textual response or a URL that would display any relevant additional data. All transactional information would be logged for security purposes. Conceptually, many types of media could be imbedded, such as audio/video both live and recorded. Chat applications could be supported between monitoring centers, patients, telecommunicators, and first responders.

4.3 Example 3: Mobile Personal Emergency Response System (MPERS) Device

The primary difference between PERS and MPERS devices is mobility. A PERS device is intended to be in a fixed location (such as a home), with that location information provisioned into the system. In contrast, MPERS devices are intended to be mobile. MPERS devices report their locations at the time of the call.

Additional Data for an MPERS call can also be mapping and other information such as images, media, and vehicle information.

This scenario also assumes that the MPERS is a mobile device that could be located anywhere.

MPERS scenario for mobile medical alert product (using existing technology):

The senior customer goes for a walk in the senior living community and takes the mobile medical alert unit. During the walk, the customer feels lightheaded and hits the emergency button on the unit. The customer is connected to a security company monitoring agent via two-way voice on the device. Several outcomes can unfold, such as:

- **Everything is fine** – Agent is connected to the customer through the unit via two-way voice. Agent can see the location of the customer via the GPS signal that was sent from the device when the button was hit. Customer and agent have a discussion and the customer notifies the agent that he/she is feeling okay and does not need additional assistance. The agent confirms once again that the customer is okay and the call is ended.

- **Everything is not fine** – Agent is connected to the customer through the unit via two-way voice. Agent can see the location of the customer via the GPS signal that was sent from the device when the button was hit. The customer and agent have a discussion and the customer lets the agent know that an ambulance is needed. Agent connects to 9-1-1 and starts the dispatch process to the customer's confirmed GPS location. The agent confirms with the customer that the appropriate assistance is on the way. Agent also notifies/call emergency contacts.
- **Status unknown, escalate** – Agent is connected to the customer through the unit. Agent can see the location of the customer via the GPS signal that was sent from the device when the button was hit. The agent is unable to get a verbal response from the customer. Agent connects to 9-1-1 and starts the dispatch process to the GPS location that populated when the emergency signal was activated and notifies/calls the emergency contacts.

The desired workflow for an MPERS call is functionally identical to the PERS call described above.

4.4 Example 4: Medical Devices

Overview of the Scenarios

These scenarios illustrate the examples of a medical device, such as an automated external defibrillator (AED), that makes a call[2] to 9-1-1. There are emerging AEDs which have a communications device included in the unit, capable of transmitting data as well as supporting a voice call. When there is no embedded device, 9-1-1 is not automatically called when the AED is used. Bystanders are generally instructed to make a voice call to 9-1-1.

When a 9-1-1 call connects with a Public Safety Answering Point (PSAP) directly from a medical device, location information, data and/or voice communication is transmitted from the device in a variety of ways, including:

- A microphone is opened on the AED device allowing a bystander to audibly describe what is happening at the incident in a one-way message (live or recorded) but voice interaction with the PSAP is not supported.
- A two-way interactive voice call is opened on the AED device allowing a bystander to report the incident and, in some cases, also receive additional medical instruction from the telecommunicator.
- A pre-recorded, automated voice message alerts PSAP personnel of the AED activation and suspected emergency situation.

[2] The point of activation by the device is vendor-dependent and may occur at removal of the unit from its mount, removal of the paddles from the unit, energizing the unit, or discharging the unit.

- A pre-scripted text is transmitted to the PSAP, alerting personnel of the AED activation and suspected emergency situation.

Not to be confused with wearable technology, e.g., Apple Watch, this particular scenario will cover a *dedicated medical alarm* device that has the capability of contacting 9-1-1 directly with a 9-1-1 call.

The AED device with wireless communication capability is able to make a voice or data (text or recorded audio) call to 9-1-1. The capabilities of that device and supporting network determine if one-way or two-way transmissions can occur. This impacts the receiving PSAP's ability to process the call information in the following ways:

One-way transmission Scenario

- A one-way automated message reduces the telecommunicator's ability to legitimize the data received.
    - ANI/ALI data may provide only a coarse location (Phase 1) which may not be sufficient for a dispatch of resources, unless the device is GPS enabled and has an assigned telephone number. Additional 9-1-1 call(s) from the scene may be needed in order to obtain a dispatchable location.
    - Even if a phone number is assigned, the device may not be capable of receiving a call back.
- Depending on the script of the one-way message, the amount and type of resources to be dispatched cannot be accurately determined.
- A one-way microphone that transmits live input from bystanders allows the telecommunicator to have increased situational awareness.
- If the device only transmits to text, the telecommunicator has limited situational awareness and the inability to communicate with the initiator of the 9-1-1 call.
- Example:
    1. A person has a medical emergency incident.
    2. A bystander uses an available AED device.
    3. When the AED device is powered on, the device activates the embedded phone device to initiate a one-way call to 9-1-1.
    4. The embedded phone device uses a mobile data network to initiate a VoIP based call to 9-1-1 via a VPC service provider.
        - Optional: include lat/long of the call
    5. The VPC service provider routes the call to the appropriate PSAP.
    6. A one-way voice channel is established so that the telecommunicator can hear what's going on at the scene.
        - Optional: a pre-scripted message is transmitted to the telecommunicator announcing the situation and listing the lat/long of the location of the event.

7. An ALI record can be created for the call to transmit to a provisioned location or the lat/long of the call.

It should be noted that a one-way call with a recorded message to 9-1-1 can conflict with statutory restrictions in many states and municipalities.

Two-Way transmission Scenario

- ANI/ALI data may only provide coarse (Phase 1) location data unless the device is GPS enabled and has an assigned telephone number.
- A two-way voice communication device transmits live input from people on scene and allows the telecommunicator to converse with them, providing a better sense of situational awareness and, in most cases, allowing the telecommunicator to provide enhanced medical instruction or transfer the call to the appropriate PSAP.
- Example:

1. A person has a medical emergency incident.
2. A person on scene uses an available AED device.
3. When the AED device is powered on, the device activates the embedded phone device to initiate a call to 9-1-1.
4. The embedded phone device uses a mobile data network to initiate a VoIP based call to 9-1-1 via a VPC service provider.
    - Optional: include lat/long of the call
5. The VPC service provider routes the call to the appropriate PSAP.
6. A two-way voice channel is established so that the telecommunicator can communicate with the person on the scene.
    - Optional: a pre-scripted message is transmitted to the telecommunicator announcing the situation and listing the lat/long of the location of the event.
7. An ALI record can be created using information from the VPC to transmit a provisioned location or the lat/long of the call.

Recommendations based on best case scenario such as additional information for ALI display

Using the i2 method to deliver ALI dynamically for a call, the COS, Name, Address (both Line 1 and Line 2) and the X/Y fields can be manipulated to provide maximum information relevance to the telecommunicator. Several examples follow.

Examples:

- One-Way Transmission using VoIP
    - COS: VOIP
    - Name: AED-Lincoln High School
    - Address Line 1: 123 Main St

    - Address Line 2: Main Hallway
    - X/Y: LAT, LONG (Actual)
- Two-Way Transmission using VoIP
    - COS: VOIP
    - Name: Manuf AED-County Bldg
    - Address Line 1: 456 Elm St
    - Address Line 2: Comm Ofc
    - X/Y: LAT, LONG (Actual)
- Two-Way Transmission using wireless/mobile device
    - COS: WPH2
    - Name: AED-XYZ Ball Field
    - Address Line 1: n/a or Base Station Address
    - Address Line 2: n/a
    - X/Y: LAT, LONG (Actual)

Because of the automated capability of this technology, emergency response can be improved by getting medical help dispatched quicker than waiting for someone to initiate a 9-1-1 session. However, although this type of device-initiated call can be accomplished without its own COS, classifying this type of call as a wireless or VOIP call could be confusing to telecommunicators who will most certainly be handling more calls with this type of technology. Depending upon the method of communication chosen for this type of call, there is risk that the telecommunicator may not receive the appropriate information to generate the correct response or may not be able to determine what type of response is necessary based upon the dynamics of the incident.

4.5 Example 5: Vehicle-Initiated E9-1-1 Calls

Overview of the Scenarios

There are several types of Vehicle-Initiated E9-1-1 calls, predominantly advanced automatic crash notification (AACN) calls initiated by sensors or device(s), or human-initiated calls using the vehicle communications infrastructure.

Until widespread adoption of NG9-1-1, a call placed directly from a vehicle will be an E9-1-1 call, which comes with certain limitations.

Scenario 1

The first example shows a call that is initiated from a vehicle, either from a cellular device embedded in the vehicle, or from a personal wireless device linked to the vehicle. The device places a conventional wireless emergency call through a carrier network, and the PSAP is provided wireless location information delivered via ALI in a standard wireless call flow. The ability to initiate a direct callback to the vehicle may be limited by the configuration of the vehicle and the embedded CMRS device within it, as the device may be capable only of outbound emergency calls and not for general-purpose cellular use.

Scenario 2

Another example is an autonomous or conventional vehicle with a continuous data connection. In this example the vehicle has a data-only connection via any (CMRS or non-CMRS) wireless network that is primarily used for non-voice data transmission. In the case of an emergency call initiated by a person in the vehicle, the person can use an app or an interface to call 9-1-1 using the wireless data connection. The vehicle provider (or designated contact center) initiates a VoIP call to the appropriate PSAP/ECC via 9-1-1. In this example the delivered CoS is TLMA, and the Customer Name/Service field indicates that the call is coming from a vehicle and is human-initiated (not an AACN-related call).

Recommendations based on best case scenario such as additional information for ALI display

Acknowledging these issues, and to prevent confusion by the telecommunicator handling these calls, the following recommendations are established. Vehicle-initiated calls to 9-1-1 with associated ALI should indicate in the Customer Name/Service field that the call is being placed by a vehicle and not by a cell phone.

- Vehicle-initiated 9-1-1 calls can imply in the Customer Name/Service field that the call is being placed by a cell phone, such as by listing the wireless service provider who carried the call.
- Vehicle-initiated 9-1-1 calls can use the CoS of TLMA for either calls initiated from a wireless device over a CMRS network or a VoIP Device over a data network.
- Vehicle-initiated 9-1-1 calls can provide a valid callback number. It is recommended that this number be reachable for at least 60 minutes from the time that the call was originally received.
- Telecommunicators should be able to recognize and understand the limitations of vehicle-initiated 9-1-1 calls. The ability to call back via text may be limited in some cases, and the available window for callbacks may be time limited.

These recommendations provide guidance for manufacturers, service providers, PSAPS and other 9-1-1 entities in ensuring that vehicle-initiated 9-1-1 calls can be safely and efficiently handled.

Using the legacy E9-1-1 E2/ESP (or NENA i2) methods to deliver ALI dynamically for a call, the CoS, Name, Address (both Line 1 and Line 2) and the X/Y fields can be manipulated to provide maximum information relevance to the telecommunicator. Several examples follow:

- Vehicle-initiated using an embedded CMRS device
    - CoS: TLMA
    - Name: [Company Call Center or Customer Name] + [Call Category Type]
    - Address Line 1: n/a or Base Station Address
    - Address Line 2: n/a
    - X/Y: LAT, LONG (Actual)

    - Note: CBN might be unavailable
- Vehicle-initiated using VoIP
    - CoS: TLMA
    - Name: [Company Call Center or Customer Name] + [Call Category Type]
    - Address Line 1: Hwy 24
    - Address Line 2: Mile 231
    - X/Y: LAT, LONG (Actual)
    - Note: CBN might be unavailable
- Vehicle-initiated using linked wireless/mobile device
    - CoS: WPH2
    - Name: Provider Name
    - Address Line 1: n/a or Base Station Address
    - Address Line 2: n/a
    - X/Y: LAT, LONG (Actual)
    - CBN would be TN of the attached device

4.6 Example 6: Panic SOS Solutions for Schools

The Panic SOS Alarm scenario illustrates the impact of third-party technology which offers a platform to paying subscribers (herein referred to as 'users') that can contact the appropriate PSAP when they (users) activate an emergency alert or request for assistance. These alert systems can generically be called "Panic SOS", school, or campus emergency systems. Technical architecture depends on the vendor used, including vendors that connect to or interface with core PSAP technology such as CAD or Call handling systems (CHS). In some cases, CHS vendors integrate this type of alerting into their systems, relieving PSAPs of incorporating independent equipment to accommodate the prescribed workflow.

In addition to the system described in the scenario, other like systems exist on campus environments that also have direct impact on PSAPs but are not detailed in this specific scenario. In general, some of the other systems are called "Blue Light Alarms" which can be found on college campuses, public and private parking structures, and a variety of locations in which devices are connected to the assigned PSAP. There are also programmable lanyards or wall button devices that activate one-way alerts to a PSAP. These technologies and devices present non-traditional delivery of information to the PSAP. Receiving and processing necessary information to enter a call for service can take more time to decipher and dispatch emergency resources.

Background

This specific scenario is based on *Alyssa's Law* [28] in the State of Florida which was in response to a school shooting at the Marjory Stoneman Douglas High School where 17 students and/or facility were killed and another 17 wounded. The legislation mandates that a panic alarm device (such as a cell phone that is capable of a direct connection to 9-1-1 services) be available in every classroom in a school. Legislation further dictates that the panic alarm must have a way to communicate with others on campus to notify them that an activation is in progress. The Florida Department of Education was charged with overseeing the project, where stakeholders developed and issued system requirements to 9-1-1 coordinators in each of the 67 counties and required that one of nine solutions be implemented by the start of the 2021 school year.

Scenario – Sunset Intermediate School – Gun threat on campus

Sunset Intermediate School is in an urban-suburban area, in a mixed commercial and residential neighborhood. The school campus has nine separate buildings, some of which are connected, and some that stand alone from other buildings. The school enrolls approximately 1,200 students from ages ten through thirteen, and a total of 130 staff. There are 53 different classrooms and/or assembly rooms. Cell phone devices have been assigned to each of the 53 rooms, and instructions on their use are posted should emergency services need to be called to the campus.

During the lunch hour, Teacher Smith returns to her assigned classroom, and is confronted by a former student who hid in her classroom waiting for her return. Once in the room, the former student threatens Ms. Smith by telling her that he has a gun in his backpack and will shoot her and others if she doesn't follow his instructions. During this period, Teacher Smith accesses the assigned classroom cell phone and activates the SOS application that is on its home screen.

When Ms. Smith activated the panic button, two (or three) simultaneous processes occurred in (near) real time.

Application Alert	9-1-1 Voice Call	SMS to 9-1-1

By pushing the alert button on the cell phone home screen, an activation transmits a signal (not via 9-1-1) to a third-party application that packages the data to be received by a (personal) computer (PC) located in the assigned PSAP. Once the alert and data are received, the software is awakened, audible tones are activated, and the PC screen displays an emergency alert from the subscriber's location. The alert message provides the address and city of the activation and may also provide the location on the campus the alert was activated; however, it may not provide a responsible party and/or call back number (depending on provider). This display at the PSAP enables two-way data exchange but is limited to receiving pre-programmed data and transmitting back acknowledgements that the message was received.	Once the panic button is activated, the application prompts the user to call 9-1-1. If this option is chosen, the PSAP receives a Phase 1 or 2 wireless voice call (CoS) that may or may not have detailed location information. It should be kept in mind that if this option is activated, the caller may not be able to have a direct conversation with telecommunicators but can leave the line open so telecommunicators can hear background noise or conversations.	Once the panic button screen is activated, and depending on the vendor used, the screen may also provide an icon to access text to 9-1-1. This option may be exercised if the user is unable to have a conversation with the telecommunicator without putting themselves at further risk. The transmission of this data is received by the PSAP. This assumes that the PSAP is enabled to receive text to 9-1-1 calls.
Impacts to the PSAP		
Specific to the above-described scenario and the background of this technology, the impacts to 9-1-1 operations are identified in the following: • 67 Florida State counties may choose one of nine state-approved (via the State Board of Education) vendors, and while similar, are disparate in system applications and workflows, potentially creating a lack of uniformity and expectation. • In some PSAPs, the data transmitted via the single application can be received by three different PSAP personnel, who may not know that other methods of call information are being transmitted simultaneously until an incident has been entered into the CAD system. This may result in multiple entries, causing initial confusion as to exact location until the incident and its location can be verified. • Depending on routing, the various types of notifications could be received by different PSAPs, further complicating the entry process and emergency response.		

- Data associated with each communication path may be different, generating confusion at the PSAP(s) as to incident type and location.
- The Class of Service as delivered in the ALI may be configured to represent a wireless caller. It may not represent that the reporting party activated the alert through this specific (proprietary) application when it's received at the PSAP.
- Depending on the vendor, a callback feature may not be included in the PSAP application, and a callback number may not be displayed. If that is the only activation received, it presents challenges for PSAP personnel attempting to validate activation.
- Delays may be caused by accessing the appropriate icon vs. directly using the Emergency SOS feature on cellular device.

While this scenario is specific to schools in Florida, there are many other panic SOS scenarios and technologies in existence. The majority of these technologies are answered today by monitoring centers and are evaluated prior to contact with emergency response. Providers of these solutions and PSAP personnel should evaluate options for connectivity to emergency response, including training and thorough testing.

4.7 Example 7: Voice-Activated Emergency Calling System

This example describes a voice-activated emergency calling system (a dedicated device) which gets activated when an enrolled or trusted user speaks the voice commands for assistance. The call can be placed directly to a PSAP, where permitted, or routed by an alarm monitoring center to the PSAP, so that those in an emergency situation can be provided the safety, security and more accurate response ultimately resulting in better outcomes.

During the user enrollment process, the user can set any desired custom wake words, trigger command phrases and duress code words of his/her choice and can choose the pre-determined Call to Action (CTA) such as "Call 9-1-1" or response measures for each trigger command.

In an emergency situation, the enrolled or trusted user speaks the custom wake word followed by a trigger command like "Hey My Voice Call 9-1-1" where "Hey My Voice" is the custom wake word and "Call 9-1-1" is the trigger command. If it is unsafe for the user to say, "Call 9-1-1", the user can speak any custom trigger command of his or her choice, such as "Help me", "Ahoy", or "Voila", so the intruder is not aware that the system is calling 9-1-1. Both the wake command and the trigger command must be used together in order to activate the device. An acknowledgment, such as an audible or visual indication, voice feedback, and/or tactile vibration feedback, can be programmed to verify that the device has received and acted upon the request.

The voice-activated security device is always in listening mode. It continuously listens for user voice commands that include valid wake words and utilizes trigger command recognition using Automatic Speech Recognition (ASR) technology. If ASR recognizes valid wake and command words, then the system will check for enrolled or trusted user recognition using voice biometrics technology. If a biometric match is detected, the device will then process the command, i.e., place an emergency call directly to a 9-1-1 PSAP where permitted, or route the call through an alarm monitoring center to the PSAP. In addition, a notification of the emergency can be sent concurrently by the device to family, friends, or neighbors using SMS or the customer's messaging application(s).

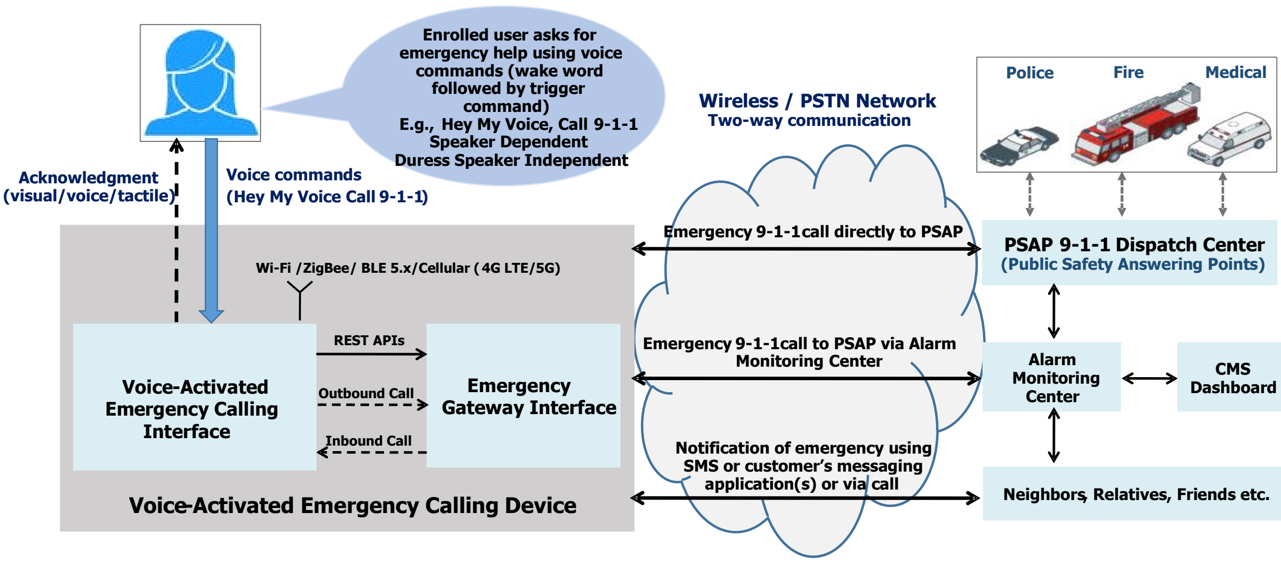

Figure 14: Scenario 8 Flow Diagram

The voice-activated emergency calling device is operating the SIP client, the ASR engine, the Text-To-Speech (TTS) engine, and the voice biometrics engine. The call can be placed using either a wireless or a VoIP network.

The emergency gateway interface provides various services for providers (such as alarm monitoring centers, telecom providers, or campus alerting system vendors) to create custom device end points, configure, handle and route the emergency calls and other notifications. The voice-activated emergency calling device makes Representational State Transfer (REST) API calls or requests to access these services for outbound and inbound calling to achieve two-way communication. If the 9-1-1 PSAP is disconnected from a call and wants to call back, the PSAP can call the displayed phone number. The callback is then routed to the device using an inbound request. The device can automatically answer the call and respond with the voice message programmed, or the user can have two-way live voice/video communication with the PSAP or alarm monitoring center through this device where permitted.

As an example, during a medical emergency, which is detected by the device based on specific voice commands from the user, the device will activate the one or more predetermined response measure(s) such as two-way voice/video communication with a PSAP or a medical call center. The device transmits stored personal information such as medical history, names, ages, addresses of the user that spoke the trigger word as a voice message. The PSAP or medical call center can provide instructions to the user who triggered the alert, giving specific instructions to guide the user in specific steps to be taken. Also, if any text message notification is sent to the device number, the device reads the text message audibly and/or displays it on the screen. In some situations, the text read feature can be disabled for specific voice commands / duress code words.

It is also possible to activate the device using sound triggers (e.g., gunshots, breaking glass, siren sounds, etc.)

Below are the services provided by the emergency gateway interface.

- Create the device endpoint credentials
- Create emergency calling domain and enable device endpoint registration
- Authenticate the device end points with emergency calling domain
- Configure outbound calling and/or notification from device endpoint to external phone number(s) (to family / friends / neighbors)
- Configure inbound calling to device endpoint (if PSAP needs to call back)
- Configure notification of the emergency situation that can be sent by the device to family, friends, or neighbors using SMS or the customer's messaging application(s).
- Configure the actions taken when calls are made - what should happen when the other party answers the call. The system can respond with an automated voice message giving details of the emergency.
- Configure emergency 9-1-1 calling
- Create and validate the emergency calling address of the 9-1-1 caller.
    - Associate emergency address with the device number
    - Enable emergency 9-1-1 calling in domain
    - Set the emergency caller ID for call-back from PSAP.
    - Initiate call to 9-1-1 and share the call back number and address to PSAP (outbound calling).
    - Responding to the calls from PSAP with programmed voice message (inbound calling)

Emergency 9-1-1 calling to PSAP via alarm monitoring center

The emergency calling device makes contact with the alarm monitoring center and transmits location information. The location can be a civic location pre-programmed at setup, a determined lat/long (2D or 3D) location, or a civic location entered by the user. The monitoring center can then place a 9-1-1 call to the PSAP, providing the ALI and CoS information. If the PSAP is disconnected from a call, the telecommunicator can call the displayed device number. Also, 9-1-1 calls made from the emergency calling system are logged in the monitoring center's Central Management System (CMS) dashboard, along with additional information that can be made available to the telecommunicator.

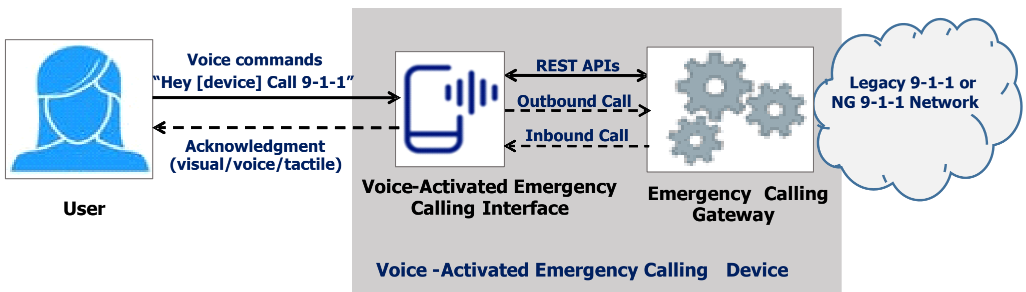

Figure 15: Voice-activated Call Flow

VoIP calling services infrastructure can be used from anywhere using an internet connection for inbound and outbound calls without the need of a SIM card. However, SIM-less VoIP calling does not provide the emergency location services that are required for mobile phones that rely on a SIM card. In order to provide the caller's location, the emergency location of the 9-1-1 caller is associated with the device calling number and is made available within the call signaling.

5 Impacts and Considerations

5.1 Operations Impacts Summary

Non-Conventional 9-1-1 calls can require many changes to the processes and protocols of PSAP telecommunicators, responders, administrators, and other roles and entities. The standards specified in this document are intended to reduce the impact of non-conventional 9-1-1 calls on PSAP operations, and to make the impact more uniform across the offerings of various vendors.

Both Application Service Providers and PSAP management MUST work closely with other key stakeholders as defined in this standard, to ensure that the standards identified in this document are implemented. Additionally, training is needed for PSAP personnel as specified in Section 3.7 and 3.9.

5.2 Technical Impacts Summary

This document attempts to define the limitations of the legacy E9-1-1 environment with regard to non-conventional methods of accessing emergency assistance. Compliance with the standards in this document may require significant effort on the part of developers and vendors. Some work may be required by PSAP systems vendors to extract and process additional information that arrives via the ALI record, or to access additional information that is made available by reference within the legacy record structure.

5.3 Security Impacts Summary

Data security is a crucial aspect of the viability of 9-1-1 systems. To ensure the confidentiality, integrity, and availability of emergency data, it is necessary to protect all data in transmission, storage, and computation from threats, and to mitigate vulnerabilities. The availability of more intensive applications and expanded device mobility increases these potential threats.

Many PSAPs do not provide public internet access from their call-handling equipment. As specified in section 3.3.1, solution developers are strongly cautioned against embedding internet URLs in the ALI record as a part of any proposed solution. PSAPs and 9-1-1 authorities are strongly discouraged from accepting any such proposed solution.

While the use of over-the-top (OTT) solutions is out of scope for this document, developers and 9-1-1 authorities are urged to carefully assess the security issues involved with any proposed OTT solutions, since these solutions fall outside the security environment of the E9-1-1 or NG9-1-1 ecosystems.

5.4 Recommendation for Additional Development Work

This working group recommends that NENA make an effort to work with applicable app stores to inform developers of “911” apps, emergency services apps, or apps that access a 9-1-1 network, about this Standard’s existence.

NENA SHOULD define and provide a registration process for ASPs to access the NENA Company ID Registry in order to provision the Company ID 2 field in the ALI with the Data Provider’s appropriate company ID.

5.5 Anticipated Timeline

The requirements in this standards document are applicable upon publication. The need for these requirements will continue until completion of the end-to-end migration to NG9-1-1.

5.6 Cost Factors

The Working Group developed the standard under the assumption that any significant funding for 9-1-1 will be allocated to the implementation of Next Generation 9-1-1 (NG9-1-1). It was deemed unrealistic to assume that providers and PSAP personnel will invest in enhancements to legacy 9-1-1. Every effort has been made to create a standard utilizing existing resources, documents, networks, and databases associated to the legacy environment. It was also recognized that most costs of implementation would be incurred as part of the product development, connectivity, and deployment by the Application Service Provider (ASP).

5.7 Additional Impacts (non-cost related)

The information contained in this standard is expected to have both technical and operational impacts. These may include the following depending on the adoption. This is not an exhaustive list.

- PSAP personnel education on non-conventional calls and devices, changes made to databases and/or customer premise equipment to support, new ALI information, and possibly the need to modify or adopt policy to support.
- Public education on what to expect from 9-1-1 as part of a non-conventional call.
- PSAP connectivity considerations for alarm and other types of non-conventional calls.
- The ALI data improvements to include adoption of existing but previously unused Classes of Service and improved location information.
- Participation in deployments.

Additional analysis may be necessary to determine if there are any non-cost related impacts that were not considered during the development of this document once information is made available as a result of first adopter implementation.

6 Abbreviations, Terms, and Definitions

See the NENA Knowledge Base (NENAkb) [1] for a Glossary of terms and abbreviations used in NENA documents. Abbreviations and terms used in this document are listed below with their definitions.

Term or Abbreviation (Expansion)	Definition / Description
9-1-1 SSP (9-1-1 System Service Provider)	An entity that provides systems and support necessary to enable 9-1-1 calling for one or more Public Safety Answering Points (PSAPs) in a specific geographic area. A 9-1-1 SSP may provide the systems and support

Term or Abbreviation (Expansion)	Definition / Description
	for either E9-1-1 or NG9-1-1. In the context of E9-1-1, it is typically, but not always, an Incumbent Local Exchange Carrier (ILEC).
AACN (Advanced Automatic Collision Notification)	An emergency call placed by a vehicle, initiated either automatically or manually, conveying telematics data. "Advanced" indicates that the call carries advanced telematics data such as information about a crash, rollover, fire, or other incident, the vehicle description and location, etc.
Additional Data	*Additional Data* further describe the nature of how the call was placed, the person(s) associated with the device placing the call, or the location the call was placed from. There are three types of Additional Data: • Additional Data for the Call • Additional Data for the Caller • Additional Data for the Location See IETF RFC 7852 [4]
ADR (Additional Data Repository)	A data retrieval facility for Additional Data. The ADR dereferences a URI passed in a Call-Info header field or PIDF-LO <provided-by> and returns an Additional Data object block. An Identity-Searchable Additional Data Repository (IS-ADR) returns Additional Data associated with an identity.
AED (Automated External Defibrillator)	A portable device designed to monitor heart activity and deliver an electrical shock to a cardiac arrest victim.
ALI (Automatic Location Identification)	The automatic display at the PSAP of the caller's telephone number, the address/location of the telephone, and supplementary emergency services information of the location from which a call originates.
ALI SP (ALI Service Provider)	A type of Data Base Management System Provider that operates an ALI database. The ALI database is required to be provisioned with MSAG-validated addresses (Wireline) and/or with ALI shell records (Wireless/VoIP). (NENA 02-011 v7.1)
ANI (Automatic Number Identification)	The telephone number associated with the call origination, originally associated with the access line of the caller.

Term or Abbreviation (Expansion)	Definition / Description
API (Application Programming Interface)	A set of routines, protocols, and tools for building software applications. The API specifies how software components should interact and APIs may be used when programming GUI (Graphical User Interface) components.
ASAP (Automated Secure Alarm Protocol)	A mechanism to electronically transmit information between an Alarm Monitoring Company and a PSAP/ECC.
ASP (Application Service Provider)	An entity that provides to its customers a non-conventional means of contacting 9-1-1, typically through a device or a smartphone app.
ASR (Automatic Speech Recognition)	The recognition and translation of spoken language into text by computers.
CAMA (Centralized Automated Message Accounting)	A type of in-band analog transmission protocol that transmits telephone number via multi-frequency encoding. Originally designed for billing purposes.
CBN (Callback Number, Call Back Number)	A common term for the phone number that can be used by the PSAP to reach a specific calling party subsequent to the release of an emergency call. The Callback Number is a dialable number and conforms to the international telephone number plan (E.164), but may be represented in IP signaling by a uniform resource identifier (URI). The Callback number can differ from the Calling Party Number.
CMRS (Commercial Mobile Radio Service)	A US FCC designation for any carrier or licensee whose wireless network is connected to the public switched telephone network; for practical purposes, this is the same as a "cellular network."
CoS (Class of Service)	A designation in E9-1-1 that defines the service category of the telephony service. A few examples are residential, business, Centrex, coin, PBX, VoIP and wireless Phase II (WPH2).
DBH (Device-Based Hybrid)	DBH Location uses a mix of location methods available to the device including crowd-sourced WiFi, A-GNSS, and handset-based sensors. It also includes an associated uncertainty estimate reflective of the quality of the returned location.

Term or Abbreviation (Expansion)	Definition / Description
E2 Interface	An industry standard interface (defined in J-STD-036) used between a Mobile Positioning Center (MPC/GMLC) and an ALI database server.
E9-1-1 (Enhanced 9-1-1)	A telephone system which includes network switching, database(s), Public Safety Answering Point premise elements capable of providing automatic location identification data, selective routing, selective transfer, fixed transfer, and a call back number. The term also includes any enhanced 9-1-1 service so designated by the Federal Communications Commission in its Report and Order in WC Docket Nos. 04-36 and 05-196, or any successor proceeding.
eCall	See Pan-European eCall Minimum Set of Data (MSD) as described in RFC 8147 [9]
ECC (Emergency Communications Center)	ECC (Emergency Communications Center) is a facility designated to receive and process requests for emergency assistance, which may include 9-1-1 calls, determine the appropriate emergency response based on available resources, and coordinate the emergency response according to a specific operational policy. Note: The term "ECC" does not have the same meaning as "PSAP."
ELT (English Language Translation)	An alphanumeric description of the primary Law Enforcement, Fire and Emergency Medical Service agencies associated with a given Emergency Services Zone/Number. The ELT includes the name of the first-responder agency, and may include their station number (for dispatch purposes) and telephone number.
ESGW (Emergency Services Gateway)	The signaling and media interworking point between the IP domain and conventional trunks to the E9-1-1 SR that use either Multi-Frequency (MF) or Signaling System No. 7 (SS7) signaling. The ESGW uses the routing information provided in the received call setup signaling to select the appropriate trunk (group) and proceeds to signal call setup toward the SR using

Term or Abbreviation (Expansion)	Definition / Description
	the ESQK (Emergency Services Query Key) to represent the Calling Party Number/Automatic Number Identification (ANI) information.
ESInet (Emergency Services IP Network)	A managed IP network that is used for emergency services communications, and which can be shared by all public safety agencies. It provides the IP transport infrastructure upon which independent application platforms and core services can be deployed, including, but not restricted to, those necessary for providing NG9-1-1 services. ESInets may be constructed from a mix of dedicated and shared facilities. ESInets may be interconnected at local, regional, state, federal, national, and international levels to form an IP-based internetwork (network of networks). The term ESInet designates the network, not the services that ride on the network. See NGCS (Next Generation 9-1-1 Core Services).
ESN (Emergency Service Number)	A 3-5 digit number that represents one or more ESZs (Emergency Service Zone), stored as a 3-5 character numeric string in a GIS database. An ESN is defined as one of two types: Administrative ESN and Routing ESN.
ESP (Emergency Service Protocol)	A telecommunications protocol defined by J-STD-036 for the exchange of data through the E2 interface.
ESQK (Emergency Services Query Key)	An ESQK identifies a call instance at a VPC, and is associated with a particular SR/ESN combination. The ESQK is delivered to the E9-1-1 SR and as the calling number/ANI for the call to the PSAP. The ESQK is used by the SR as the key to the Selective Routing data associated with the call. The ESQK is delivered by the SR to the PSAP as the calling number/ANI for the call, and is subsequently used by the PSAP to request ALI information for the call. The ALI database includes the ESQK in location requests sent to the VPC. The ESQK is used by the VPC as a key to look up the location object and other call information associated with an emergency call instance. The ESQK is a non-dialable North American Numbering Plan (NANP) number in the format of NPA-NXX-XXXX. They are currently being

Term or Abbreviation (Expansion)	Definition / Description
	allocated from NPA-211-XXXX and NPA-511-XXXX number sets.
ESRK (Emergency Services Routing Key)	A 10-digit North American Numbering Plan number that uniquely identifies a wireless emergency call, is used to route the call through the network, and used to retrieve the associated ALI data.
GMLC	See MPC/GMLC
HELD (HTTP Enabled Location Delivery)	A protocol that can be used to acquire Location Information (LI) from a LIS (Location Information Server) within an access network as defined in IETF RFC 5985.
i2	An archived NENA standard for the i2 architecture [16] to support the interconnection of VoIP domains with the existing Emergency Services Network infrastructure in support of the migration toward end-to-end emergency calling over the VoIP networks between callers and PSAPs.
i3	"i3" refers to the NG9-1-1 system architecture defined by NENA, which standardizes the structure and design of Functional Elements making up the set of software services, databases, network elements and interfaces needed to process multi-media emergency calls and data for NG9-1-1. See NGCS (Next Generation 9-1-1 Core Services), ESInet (Emergency Services IP Network), and NG9-1-1 (Next Generation 9-1-1).
ILEC (Incumbent Local Exchange Carrier)	A telephone company that had the initial telephone company franchise in an area.
IoT (Internet of Things)	IoT devices are capable of communication using Internet protocols.
Legacy PSAP	A PSAP that cannot process calls received via i3-defined call interfaces (IP-based calls) and still requires the use of CAMA or ISDN trunk technology for delivery of 9-1-1 emergency calls.
LNG (Legacy Network Gateway)	An NG9-1-1 Functional Element that provides an interface between a non-IP originating network and a Next Generation Core Services (NGCS) enabled network.
LPG (Legacy PSAP Gateway)	A signaling and media interconnection point between an ESInet and a legacy PSAP. It plays a role in the delivery

Term or Abbreviation (Expansion)	Definition / Description
	of emergency calls that traverse an i3 ESInet to get to a legacy PSAP, as well as in the transfer and alternate routing of emergency calls between legacy PSAPs and NG9-1-1 PSAPs. The Legacy PSAP Gateway supports an IP (i.e., SIP) interface towards the ESInet on one side, and a traditional MF or Enhanced MF interface (comparable to the interface between a traditional Selective Router and a legacy PSAP) on the other.
LSRG (Legacy Selective Router Gateway)	Provides an interface between a 9-1-1 Selective Router and an ESInet, enabling calls to be routed and/or transferred between Legacy and NG networks. A tool for the transition process from Legacy 9-1-1 to NG9-1-1.
MPC/GMLC (Mobile Positioning Center / Gateway Mobile Location Center)	A Functional Entity that provides an interface between the wireless originating network and the Emergency Services Network. The MPC/GMLC retrieves, forwards, stores and controls position data within the location services network. It interfaces with the location server (e.g., Position Determining Entity (PDE)) for initial and updated position determination. The MPC/GMLC restricts access to provide position information only while an emergency call is active.
MPERS (Mobile Personal Emergency Response System)	Similar to a PERS device, but with wireless connectivity to the monitoring center. An MPERS device reports its location to the monitoring center when activated, since it is not tied to a fixed location.
MSAG (Master Street Address Guide)	A database of street names and house number ranges within their associated communities defining Emergency Service Zones (ESZs) and their associated Emergency Service Numbers (ESNs) to enable proper routing of 9-1-1 calls.

Term or Abbreviation (Expansion)	Definition / Description
NG9-1-1 (Next Generation 9-1-1)	An IP-based system comprised of hardware, software, data, and operational policies and procedures that: (A) provides standardized interfaces from emergency call and message services to support emergency communications; (B) processes all types of emergency calls, including voice, data, and multimedia information; (C) acquires and integrates additional emergency call data useful to call routing and handling; (D) delivers the emergency calls, messages, and data to the appropriate public safety answering point and other appropriate emergency entities; (E) supports data or video communications needs for coordinated incident response and management.
NGCS (Next Generation 9-1-1 Core Services)	The set of services needed to process a 9-1-1 call on an ESInet. It includes, but is not limited to, the ESRP, ECRF, LVF, BCF, Bridge, Policy Store, Logging Services, and typical IP services such as DNS and DHCP. The term NG9-1-1 Core Services includes the services and not the network on which they operate. See ESInet (Emergency Services IP Network).
NI-LR (Network-Induced Location Requests)	A procedure defined in the European Telecommunications Standards Institute (ETSI) Technical Standard 5G; 5G System (5GS) Location Services (LCS); Stage 2 (3GPP TS 23.273 version 16.4.0 Release 16). [30]
NPA (Numbering Plan Area)	The NPA is encoded numerically with a three-digit telephone number prefix, commonly called the area code. Each telephone is assigned a seven-digit telephone number unique only within its respective plan area. The telephone number consists of a three-digit central office code and a four-digit station number. The combination of an area code and the telephone number serves as a destination routing address in the public switched telephone network (PSTN).
NSI (Non-Service Initialized)	A mobile device for which there is no valid service contract with any CMRS provider. As such, NSI devices

Term or Abbreviation (Expansion)	Definition / Description
	have no associated subscriber name and address, do not provide a call-back number, and may not provide location.
NXX	NXX is most commonly used to refer to three-digit code that forms the second part of a 10-digit North American phone number (digits 4-6). This is also known as the "central office code" or "exchange." Traditionally, in the age of competing phone companies, each NXX is assigned to one company.
OSP (Originating Service Provider)	A communications provider that allows its users or subscribers to originate 9-1-1 voice or nonvoice messages from the public to public safety answering points, including but not limited to wireline, wireless, and voice over internet protocol services.
OTT (over-the-top)	A technology that bypasses traditional network distribution approaches and runs over, or on top of, core Internet networks.
PAM (PSAP to ALI Message)	PSAP to ALI messaging protocol – can also be used between a Positioning Center and an ALI database provider.
pANI (Pseudo Automatic Number Identification)	A telephone number used to support routing of wireless 9-1-1 calls. It may identify a wireless cell, cell sector or PSAP to which the call should be routed.
Panic SOS	An alert system that contacts the appropriate PSAP/ECC when the user activates an emergency alert or request for assistance. These systems are commonly used as school or campus emergency systems.
PERS (Personal Emergency Response System)	A wearable device that allows the user to call for help in an emergency by pushing a button. The system includes a receiver, connected to a phone line, that notifies a monitoring center when the system is activated.
PSAP (Public Safety Answering Point)	A PSAP (Public Safety Answering Point) is a physical or virtual entity where 9-1-1 calls are delivered by the 9-1-1 Service Provider.
PSTN (Public Switched Telephone Network)	The network of equipment, lines, and controls assembled to establish communication paths between calling and called parties in North America.

Term or Abbreviation (Expansion)	Definition / Description
REST (Representational State Transfer)	An interface that transmits domain-specific data over HTTP without an additional messaging layer such as SOAP or session tracking via HTTP cookies.
SIP (Session Initiation Protocol)	A protocol specified by the IETF (RFC 3261) that defines a method for establishing multimedia sessions over the Internet. Used as the call signaling protocol in VoIP, NENA i2, and NENA i3.
SMS (Short Message Service)	A service typically provided by mobile carriers that sends short (160 characters or fewer) messages to an endpoint. SMS is often fast but is not real time.
SSP (System Service Provider)	See 9-1-1 SSP
TDM (Time Division Multiplexing)	A digital multiplexing technique for combining a number of signals into a single transmission facility by interweaving pieces from each source into separate time slots. TDM is a predecessor to IP signaling.
TPSP (Third Party Service Provider)	A call relay center that provides operator-assisted call routing services to subscribers using apps or devices provisioned by an Application Service Provider (ASP). Typically, a TPSP operates between ASP and OSP networks, and provides mediated emergency call routing capabilities.
TTS (Text to Speech)	A system that converts normal language text into speech.
URI (Uniform Resource Identifier)	An identifier consisting of a sequence of characters matching the syntax rule that is named <URI> in RFC 3986. It enables uniform identification of resources via a set of naming schemes. A URI can be further classified as a locator, a name, or both. The term "Uniform Resource Locator" (URL) refers to the subset of URIs that, in addition to identifying a resource, provides a means of locating the resource by describing its primary access mechanism (e.g., its network "location"). The term "Uniform Resource Name" (URN) has been used historically to refer to both URIs under the "urn" scheme [RFC2141], which are required to remain globally unique and persistent even when the resource ceases to exist or becomes unavailable, and to any

Term or Abbreviation (Expansion)	Definition / Description
	other URI with the properties of a name. An example of a URI that is neither a URL nor a URN is sip:psap@example.com.
VEDS (Vehicle Emergency Data Sets)	A uniform data set for the collection and transmission of Advanced Automatic Collision Notification (AACN) data by automotive Telematics Service Providers (TSPs).
VoIP (Voice over Internet Protocol)	A technology that permits delivery of voice calls and other real-time multimedia sessions over IP networks.
VPC (VoIP Positioning Center)	The element that provides routing information to support the routing of VoIP emergency calls, and cooperates in delivering location information to the PSAP over the existing ALI DB infrastructure.
Wireless Phase I & II	Refers to the delivery of a wireless 9-1-1 call with callback number and identification of the cell-tower from which the call originated. Call routing is usually determined by cell-sector. Required by FCC Report and Order 96-264 pursuant to Notice of Proposed Rulemaking (NPRM) 94-102.The delivery of a wireless 9-1-1 call with Phase I requirements plus location of the caller within 125 meters 67% of the time and Selective Routing based upon those coordinates. Subsequent FCC rulings have redefined the accuracy requirements.

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8 Appendix

This questionnaire is suggested for use during initial discussions between PSAPs and ASPs about potential applications. PSAPs may use all or portions of the questionnaire at their discretion.

1. How familiar are you with the 9-1-1 system and PSAPs/ECCs?
   ____ Please rate your familiarity from 1 (Not Familiar) to 5 (Very Familiar)

2. Does your app provide multimedia in the form of text, pictures, or video (check all that apply)?

   ____ text

   ____ pictures

   ____ video

3. If the app provides text, pictures, or video to a 9-1-1 PSAP/ECC, describe how it will be delivered.

   a. How will the telecommunicator receive the data (check as appropriate)?

____ ALI

____ NG9-1-1 Additional Data

____ Web browser

____ Other (describe)

b. For PSAPs/ECCs that currently **CANNOT** directly accept text to 9-1-1 messages, how does your app take this into consideration?
____ Explain how your app accommodates this constraint?

c. Most 9-1-1 PSAPs/ECCs currently **CANNOT** directly accept pictures or videos, nor can they receive additional data such as personal information, medical history or building floor plans. Explain how your app takes this constraint into consideration.
____ (describe)

d. For those 9-1-1 PSAPs/ECCs that may not currently have policies and procedures in place that support receiving these types of messages, how have you taken this into consideration?

4. Does the app require the 9-1-1 PSAP/ECC to have an Internet interface to receive information?

    a. Describe the connectivity requirements that your app needs.

    b. For delivery of information through the Internet, does the app need a specific type of browser (if used)?

    c. Is the app developer willing to provide the workstation and any infrastructure needed to access the internet without charge?
    ____Yes
    ____ No, please explain.

5. Is there a fee or per-transaction charge for the application user or the 9-1-1 PSAP/ECC to use the application?

    ____ No
    ____ Yes, please explain.

6. How does the app ensure the emergency call is delivered to the jurisdictionally appropriate (based on caller location) 9-1-1 PSAP/ECC?

7. What is the routing process?

   a. Is the call routed through:

      ____ **9-1-1 routing**

      Is the call routed using dialed digits through the existing mobile network?

      ____ No
      ____ Yes - if yes, please explain.

      Is the call routed through an API to 9-1-1?

      ____ No
      ____ Yes - if yes, please explain.

      If it is not routed by these methods, explain how it is routed (e.g., by some type of web service)?

      ____ (describe)

      Does the service require a Wi-Fi Connection?
      ____ No
      ____ Yes - if yes, please explain.
      ____ **10-digit routing**

      If the call uses 10-digit routing, where does it get the caller location data and how it is routed?

      What is your source for the 10-digit emergency number for the 9-1-1 PSAP/ECC?

      ____ **Third Party Call Center routing**

      What methodology does that third party call center use to identify the proper 9-1-1 PSAP/ECC (e.g., based on the caller location)?
      Is the call transferred/conferenced to 9-1-1 or a ten-digit number by the third-party call center?

      ____ **Alternative Routing Mechanism**

If it is not routed by one of the three methods above, please explain how the call is routed and delivered to the PSAP

8. Will this app provide location information and if so, what type of location is it providing?

    a. If location is provided – is it a requirement of the user's device to enable Location Services (e.g., GPS)?
    ____ If Yes, please state the specific location requirements that need to be enabled.
    ___ If No, please explain how location is determined and/or acquired.

    b. How is the mobile app generating location (e.g., cell ID, GPS, AGPS, Wi-Fi, other)?

    c. Is location provided in the form, 2D (X/Y), 3D (X/Y/Z) or civic address?

9. Is the app initially routing to a third-party call center?
___ If No, skip to next question.
___ If Yes, please answer the following questions:

    a. Is the third-party call center transferring the call or will they be remaining in the call path and relaying information to the PSAP/ECC?

    b. Is the third-party call center providing nationally recognized Emergency Medical Dispatch (EMD) services?
    ____ No ____ Yes If yes, please explain.

    c. Does the third-party call center follow either the NENA or APCO Best Practices Model for Emergency Medical Dispatch Services?
    ____ No ____ Yes If yes, please explain which one.

    d. What type of training is provided for Fire and Police related calls?

    e. Is there a notification to the user that there will be a delay, due to the call going to a third-party call center prior to the appropriate 9-1-1 PSAP/ECC?
    ____ No ____ Yes - What type of notification?

    f. Does the third-party call center record calls with the 9-1-1 PSAP/ECC?
    ____ No ____ Yes - What is the retention period?

    g. How does the third-party call center deal with an open line or hang up call?

h. How does the third-party call center handle a caller that has a speech or hearing disability?

i. What is the third-party call center's procedure if they are unable to identify the correct 9-1-1 PSAP/ECC to route the call to?

j. Does the third-party call center provide foreign language translation services?

____ No ____ Yes - If yes, does the call center use in-house translation or an outside service?

10. Does the app developer retain written or audio documentation of the interaction between the user and the 9-1-1 PSAP/ECC?
____ No ____ Yes - If yes, how is the information retained and for what period (how long)?

11. Is it a feature of the app to notify individuals other than the 9-1-1 PSAP/ECC?
____ No ____ Yes - please explain.

a. If the app notifies friends and family, does the app also include a message encouraging the receiver NOT to call 9-1-1? ____ No ____ Yes – if yes, what is the message?

b. If the app notifies friends and family, what is the content of the message?

c. If the app notifies friends and family, is the app providing some method for those individuals to obtain additional information? ____No ____ Yes - If yes, please explain.

d. Does the app block incoming phone calls when the app is in use? ____ No ____ Yes
If yes, how does the app allow the 9-1-1 Telecommunicator uninterrupted communication with the caller?

e. What information does the app provide to the friends/family, i.e., GPS coordinates of last location?

f. Is the app developer recording any interactions between the app during notifications?

____No ____ Yes - If yes, please explain.

g. Is the developer aware of the fact that such transactions may be evidentiary in nature and subject to subpoena?

____No ____ Yes - If yes, please explain your records retention policies.

12. Does this app require special or proprietary hardware or software at the 9-1-1 PSAP/ECC?

    ____ No

    ____ Yes - If yes, please explain what hardware or software is required, keeping in mind Internet access may not be available at the 9-1-1 PSAP/ECC – see question #3 and #4.

    Is there an additional cost involved?

    ____ No

    ____ Yes, please explain.

13. Is there any type of interface with ancillary programs located in the 9-1-1 PSAP/ECC (i.e., CAD, mapping, etc.)?

    ____ No

    ____ Yes, please explain the interface.
14. What type of training would the app require the 9-1-1 PSAP/ECC to conduct and maintain?

    a. Does the app developer provide training for the 9-1-1 PSAP/ECC?
       ____ No
       ____ Yes, please explain the method of training.

15. Is there a 24/7 number to contact an app point of contact?

16. How is the app downloaded?

    ____ App store

    ____ Developer's site

    ____ 9-1-1 PSAP/ECC website

    ____ Other, please explain.

17. If the app attempts to contact a 9-1-1 PSAP/ECC and is unsuccessful, is a message relayed to the user indicating such?

    ____ No, is there any feedback to notify the user that the attempt was unsuccessful or is an alternate method, such as a voice call attempted?

____ Yes, what is the message?

App Developer Contact Information

Name – Primary point of contact:
Company Name:
Phone Number:
Email:
Company Mailing Address:

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