

Next Generation 9-1-1 Readiness Assessment

Final Report

Prepared September 2025

State of Hawai'i



Table of Contents

Executive Summary	1
1 Introduction	4
2 Approach	4
3 Current State	6
3.1 Governance	7
3.3 Emergency Services IP Network	20
3.4 Call-handling Equipment.....	26
3.5 Security	33
3.6 Geographic Information Systems	37
3.7 Operations	44
4 Recommendations.....	50
4.1 Governance	54
4.2 Next Generation Core Services	55
4.3 Emergency Services IP Network	56
4.4 Call-handling Equipment.....	57
4.5 Security	59
4.6 Geographic Information Systems	60
4.7 Operations	61
5 Conclusion	62
Appendix A: State 9-1-1 Fee Comparison	64

Executive Summary

In 2021, the State of Hawai'i initiated planning for the transition to Next Generation 9-1-1 (NG9-1-1), building on its existing shared 9-1-1 call-handling equipment (CHE) and statewide 9-1-1 network. Recognizing the need for a structured approach, the State of Hawai'i 9-1-1 Board (9-1-1 Board) identified the importance of developing a plan with clear, actionable steps to guide the transition to full NG9-1-1 services. As a foundational step, it is essential to assess the current state of 9-1-1 operations. To support this effort, the 9-1-1 Board engaged Mission Critical Partners® (MCP) to conduct a comprehensive NG9-1-1 readiness assessment and cost analysis.

MCP conducted interviews with staff, stakeholders, and 9-1-1 vendors, leveraging its proprietary Model for Advancing Public Safety® (MAPS®) tool to assess Hawai'i's readiness for transitioning to an NG9-1-1 environment.

To quantify readiness, MAPS applies a continuum scale ranging from 1 to 10—where “1” indicates a foundational level, “5” reflects a transitional phase, and “10” denotes full NG9-1-1 readiness. Based on this model, Hawai'i received an overall score of 5.46, signifying that it has entered the transitional stage and is actively taking steps toward NG9-1-1 implementation.

The MAPS assessment methodology aligns with the Federal Communications Commission's (FCC) Task Force on Optimal Public Safety Answering Point (PSAP) Architecture (TFOPA) framework. TFOPA outlines a maturation pathway from foundational readiness to full NG9-1-1 deployment consistent with the National Emergency Number Association (NENA) i3 standard. The MAPS tool overlays this framework with national best practices and industry standards, enabling the creation of a readiness baseline to guide transition planning, strategy coordination, and technology improvement.

The graphic below illustrates the state's placement on the readiness continuum across several critical components:

- Governance
- Next Generation Core Services (NGCS)
- Emergency Services Internet Protocol (IP) network (ESInet)
- Call-handling Equipment (CHE)
- Security
- Geographic Information System (GIS)
- Operations

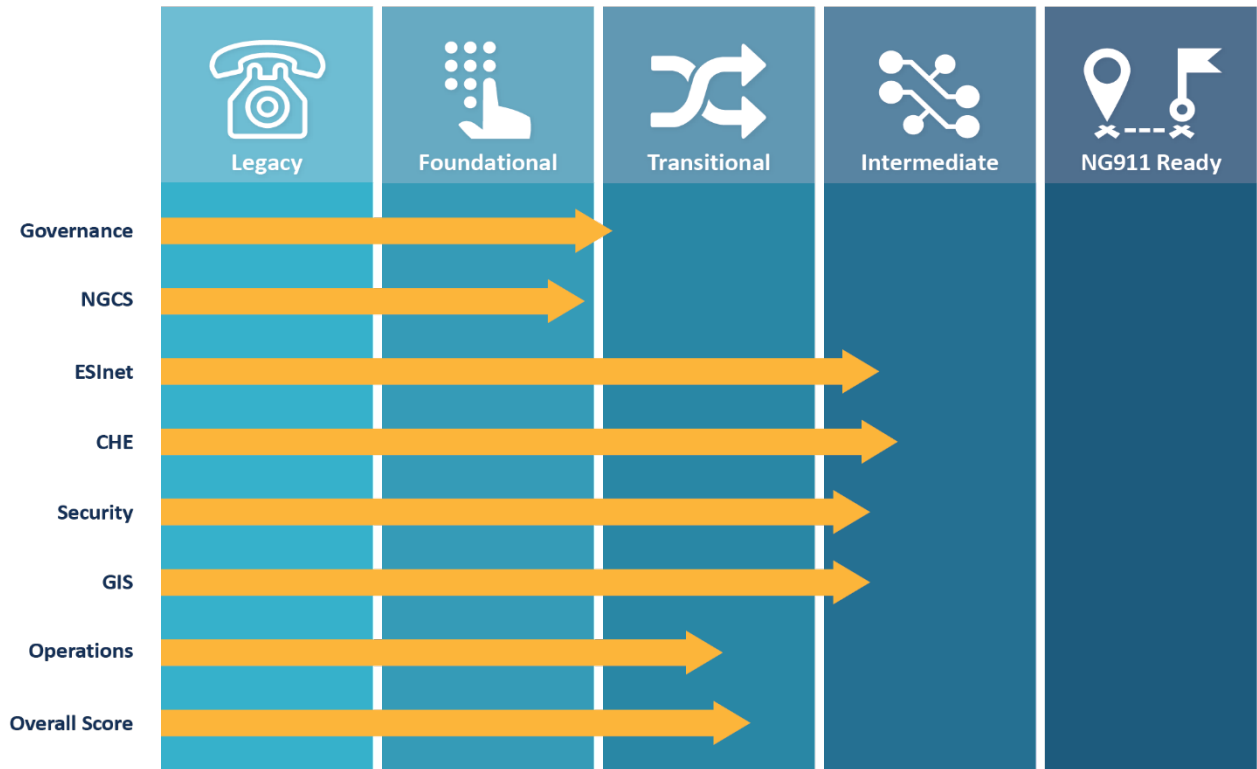


Figure 1: Hawai'i NG9-1-1 Continuum Stages

Hawai'i has laid important groundwork for the transition to NG9-1-1 and is now entering the transitional phase of the NG9-1-1 continuum. Notable progress has been made in several key areas, including call handling, GIS, and security. These developments reflect a proactive and forward-thinking approach that aligns with early-stage national benchmarks.

To continue building momentum and ensure a successful and sustainable implementation of NG9-1-1, the following priorities have been identified:

- Enhance Governance Structure
 - Update enabling legislation to support NG9-1-1 operations
 - Provide technical assistance and vendor management support
- Develop a Statewide Strategic Plan
 - Establish measurable goals, milestones, and performance indicators
 - Create a communication strategy
- Formalize Operational Frameworks
 - Define and implement service-level agreements (SLAs) specific to NG9-1-1
 - Standardize processes through a dedicated policy committee and statewide templates

- Advance Technology Capabilities
 - Deploy next-generation features such as text-to-9-1-1, Real-Time Text (RTT), and multimedia call handling
- Strengthen Cybersecurity Posture
 - Ensure each county adopts a documented cybersecurity policy
 - Clarify conditions under which external cybersecurity resources are engaged
- Align and Integrate GIS Efforts
 - Coordinate local GIS initiatives with statewide objectives
 - Promote regional GIS collaboration to enhance data accuracy

By addressing these strategic action areas, Hawai'i will be well-positioned for a successful NG9-1-1 deployment—fostering interoperable, resilient, and future-ready emergency communications infrastructure across all jurisdictions.

1 Introduction

Recognizing the importance of understanding what is required for a successful transition to NG9-1-1, Hawai'i has partnered with MCP to support this strategic initiative. The partnership focuses on two primary objectives:

- Assessing Hawai'i's readiness to transition to NG9-1-1 and identifying the most effective path forward
- Developing comprehensive cost projections for the implementation of full NG9-1-1 services

To accomplish this, MCP conducted a holistic assessment of Hawai'i's 9-1-1 environment, grounded in a broad spectrum of mature, widely recognized public safety and information technology (IT) standards. This assessment also incorporated formal accreditation frameworks and public safety industry best practices to ensure a thorough and credible evaluation.

The ultimate goal of this engagement is to provide the state with a clear, actionable roadmap that will guide and accelerate the successful deployment of NG9-1-1 capabilities—ensuring enhanced emergency communications and public safety outcomes across the state.

2 Approach

To comprehensively evaluate Hawai'i's readiness for NG9-1-1, MCP conducted a detailed review of information provided by the 9-1-1 Board's executive director, public safety answering points (PSAPs), and GIS and 9-1-1 vendors. This review encompassed the full 9-1-1 landscape across all Hawaiian islands.

MCP further engaged stakeholders by conducting interviews with PSAP staff, key stakeholders, and Hawaiian Telcom representatives. These interviews were guided by MCP's proprietary MAPS tool, which is designed to assess readiness for an NG9-1-1 environment. Recognizing that the transition from legacy 9-1-1 systems is a complex undertaking that extends beyond simple technology replacement, the MAPS process also evaluates operational processes, staffing levels, governance (including policies, procedures, and bylaws), funding structures, and the technical architecture and networking in place.

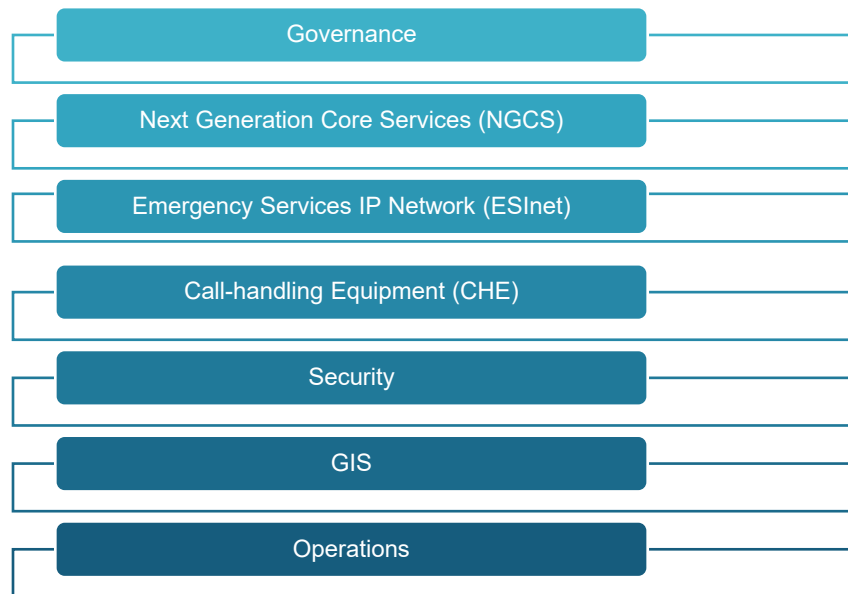


Figure 2: NG9-1-1 Readiness Categories

The MAPS tool incorporates customized, topic-specific questions—more than 50—that are aligned with public safety best practices and industry standards. These standards are informed by nationally recognized organizations and working groups, including the FCC’s TFOPA, the National Institute of Standards and Technology (NIST), NENA, and the Association of Public-Safety Communications Officials (APCO) International.

[TFOPA](#), in particular, provides a maturity framework for NG9-1-1 readiness, spanning from foundational stages to full implementation of the NENA i3 architecture. MCP’s MAPS assessment overlays this framework—along with other industry benchmarks—to create a comprehensive baseline. This baseline informs the development of coordinated transition strategies and supports procurement decisions that advance Hawai‘i’s NG9-1-1 readiness.

The interview responses were scored, and the resulting chart (see Section 3) offers a high-level overview of Hawai‘i’s performance across key readiness areas—highlighting where targeted focus and improvement efforts are most needed.

3 Current State

To quantify readiness, MAPS applies a continuum scale ranging from 1 to 10—where “1” indicates a foundational level, “5” reflects a transitional phase, and “10” denotes full NG9-1-1 readiness. Based on this model, Hawai‘i received an overall score of 5.46 (see Table 1), signifying that it has entered the transitional stage and is actively taking steps toward NG9-1-1 implementation.

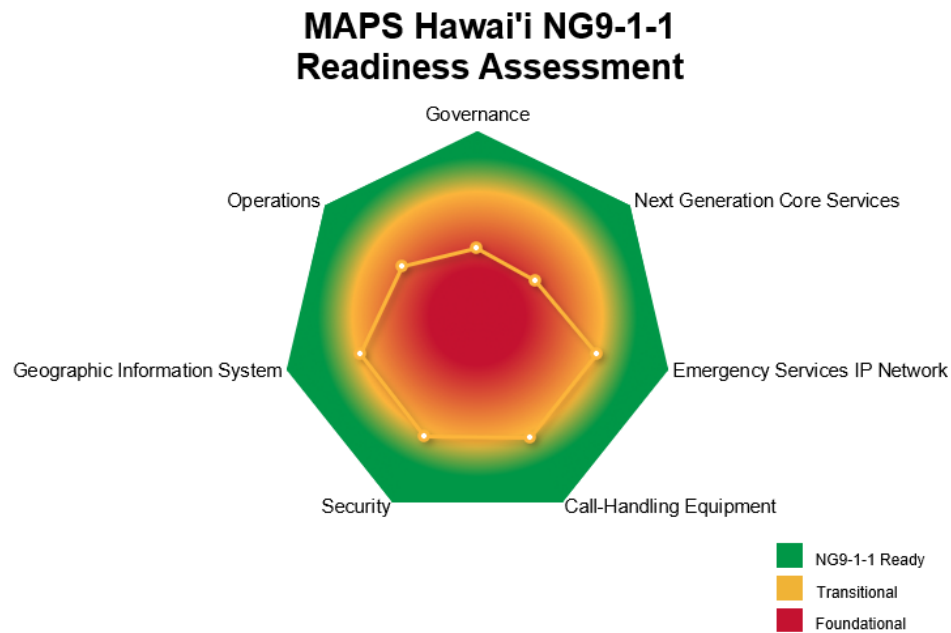


Figure 3: Hawai‘i NG9-1-1 Readiness Assessment

Table 1: Hawai‘i NG9-1-1 Readiness Scores

Lever	Overall Score
Governance	4.10
Next Generation Core Services	3.82
Emergency Services IP Network	6.36
Call-Handling Equipment	6.40
Security	6.29
Geographic Information System	6.26
Operations	5.00
Overall Score	5.46

3.1 Governance

Migrating fully to an NG9-1-1 emergency communications system is complex. Among the most critical success factors in this transition is the presence of a robust governance structure. Governance is essential because the NG9-1-1 transition affects every component of the emergency communications ecosystem—from evolving network technologies outside the PSAP to the hardware, software, and operational workflows within it.

A well-structured governance framework helps address interoperability challenges and strengthens the consistency and effectiveness of policies, procedures, and decision-making through the project lifecycle. By clearly defining roles, responsibilities, and authority, governance structures foster alignment among stakeholders, support standardization, and promote effective communication. This, in turn, improves system integration, minimizes operational risks, and enables the successful implementation of complex, multi-faceted initiatives.

As part of the evaluation, the MAPS tool examines ten key governance-related areas that influence or require oversight to assess a jurisdiction's readiness for NG9-1-1 implementation:

- Documentation
- Strategic Planning
- Communication
- Coordination
- Technology
- Budgeting
- Funding
- Staffing
- Procurement
- Standards and best Practices

Based on the MAPS assessment and interviews with staff and stakeholders, Hawai'i received a composite Governance score of 4.10, placing it within the foundational stage on the NG9-1-1 readiness continuum.

Table 2: Governance Readiness Scores

Lever	Overall Score	Documentation	Strategic Planning	Communication	Coordination	Technology	Budgeting	Funding	Staffing	Procurement	Standards and Best Practices
Governance	4.10	2.0	2.0	6.0	8.0	8.0	6.0	3.0	2.0	2.0	2.0

Documentation

Score: 2.0

Act 168, Session Laws of Hawai'i 2011, created an Enhanced 9-1-1 Board. Act 066, Session Laws of 2024, removed the term “enhanced” in reference to 9-1-1 services.¹ The recent legislative changes have effectively

¹ [Department of Accounting and General Services | Aloha! Welcome to the State of Hawaii 9-1-1 Board Website!](#)

expanded the 9-1-1 Board's authority to include oversight of NG9-1-1 services. Given the complexity and interdependent nature of NG9-1-1, a statewide contract administered under the Board's oversight would provide valuable structure and consistency during deployment and ongoing operations. MCP has observed that the most successful NGCS implementations occur when a statewide contract for ESInet/NGCS is in place, given the complexity of these projects and the need for consistency in holding the vendor accountable. While the 9-1-1 Board does not have statutory authority to exercise central control over counties, it does have the authority to facilitate the migration to NG9-1-1 and to support PSAPs in collaborating to manage the NG9-1-1 service provider.

The 9-1-1 Board currently operates through three appointed standing committees—Communications, Technical and Finance—each of which focuses on specific aspects of 9-1-1 service delivery to ensure effective and reliable public access. Committee members are appointed by their respective committee chair and confirmed by the full Board, in accordance with established membership criteria.

MCP recommends leveraging these standing committees to convene stakeholders from across the state to develop model policies and standardized processes. This approach would promote consistent and interoperable 9-1-1 operations statewide, a key component of successful NG9-1-1 implementation.

While the existing legislation provides sufficient flexibility to advance NG9-1-1, it still includes legacy 9-1-1 language—such as provisions related to cost recovery—that are no longer applicable in the NG9-1-1 environment. MCP recommends that the 9-1-1 Board consider modernizing these legislative references to align with current standards and expectations. This will help prevent confusion among NG9-1-1 service providers and originating service providers (OSPs), especially in light of the FCC's position clarifying the respective responsibilities of these entities in the NG9-1-1 ecosystem.

Strategic Planning

Score: 2.0

Having a strategic plan in place for a large technical project is essential, as it directly influences the project's success, efficient resource allocation, risk mitigation, and alignment with the broader objectives of all stakeholders involved. A strategic plan:

- Defines what the project aims to achieve, why the project is important, and how the project will be conducted
- Ensures all stakeholders have a shared understanding of the project scope and priorities
- Helps identify the human, financial, and technical resources needed
- Allows for early identification of potential risks and dependencies to put strategies in place to prevent and address them
- Reduces delays, budget overruns, and technical failures
- Establishes a communications plan
- Improves coordination by defining the project, responsibilities, roles, and decision-making authority
- Provides a schedule with key deliverables and milestones
- Facilitates progress tracking and reporting
- Enables justification of expenditures to stakeholders and elected officials
- Builds stakeholder engagement, buy-in, and trust

While the 9-1-1 Board maintains a strategic budget plan, it does not currently encompass the mission, vision, or specific tasks required to achieve full implementation of NG9-1-1. MCP recommends that Hawai'i develop a comprehensive, documented strategic plan that clearly articulates these elements. This plan should also include defined metrics and performance measures to track progress toward achieving the end-state NG9-1-1 environment.

Communication

Score: 6.0

A communications plan is a critical strategic tool that defines how information will be shared with both internal and external stakeholders. Effective communications is not simply about delivering messages—it is about delivering the right message to the right people at the right time. In the context of a complex initiative such as NG9-1-1, a well-crafted communications plan is instrumental in shaping perceptions, aligning stakeholder efforts, and building trust throughout the transition.

The 9-1-1 Board maintains a public-facing website that outlines its roles and responsibilities. This site also serves as a repository for meeting minutes, and recordings of Board meetings are made accessible to stakeholders and the public via YouTube. In addition, the executive director maintains ongoing communication with the PSAPs to support operational alignment.

MCP recommends creating a comprehensive communications plan that addresses the unique challenges of implementing a complex project like NG9-1-1. The plan should focus on the following key components:

- Clear and consistent messaging
 - Given that projects of this scale often span months or longer—and may encounter delays—it is critical to regularly communicate the project timeline and provide timely updates when schedules change.
- Targeted messaging
 - Different stakeholders have varying concerns and interests. Messaging should be tailored to meet the information needs of each audience.
- Goal alignment
 - The overarching goals of the NG9-1-1 project should be communicated early and reinforced often.
- Efficiency and coordination
 - A structured plan prevents redundant or contradictory communication. It ensures messaging is coordinated across platforms and among team members.
- Measurement and continuous improvement
 - The plan should include mechanisms for tracking communication effectiveness and gauging stakeholder understanding.
- Crisis communication
 - During an event, outage, or unforeseen issue, rapid and coordinated communication is vital. A well-defined plan should outline roles, responsibilities, and channels to be used during

such situations. Feedback mechanisms should be available to evaluate the response and improve future efforts.

- Stakeholder engagement and trust
 - Transparent, two-way communication fosters trust and stakeholder buy-in. The plan should incorporate feedback loops that allow stakeholders to share their experiences, raise concerns, and suggest improvements. This engagement helps manage expectations, reduce frustration, and build long-term support.

Coordination

Score: 8.0

Currently, the PSAPs across the state operate with a significant degree of independence, in part due to their geographic separation. However, the implementation of NG9-1-1 presents a valuable opportunity to enhance coordination, especially during large-scale incidents that could disrupt 9-1-1 services.

To ensure seamless interoperability, it is essential to adopt a holistic approach to planning and managing emergency communications technology.

MCP recommends that the 9-1-1 Board work collaboratively with the NG9-1-1 vendor and island PSAPs to develop a statewide continuity of operations (COOP) plan that fully leverages NG9-1-1 capabilities. In addition, each PSAP should develop its own COOP plan aligned with the statewide framework to ensure consistent response protocols.

To promote ongoing readiness and familiarity with continuity procedures, these COOP plans should be exercised at least annually through drills or tabletop exercises involving all relevant stakeholders.

Technology

Score: 8.0

The 9-1-1 Board's Technology Committee primarily focuses on reviewing reimbursement requests related to the delivery of 9-1-1 services. This review process helps ensure that all requests meet established technical standards and legal requirements. Additionally, PSAPs may engage with the committee to address and resolve technical questions or issues.

MCP recommends expanding the role of the Technology Committee to further support the NG9-1-1 transition. Specifically, the Board should consider leveraging this committee to:

- Develop technical best practices for consistent statewide implementation
- Establish robust SLAs that clearly define performance expectations
- Support decision-making related to the deployment and use of NG9-1-1 capabilities
- Assist in the development of a comprehensive NG9-1-1 transition plan

Budgeting

Score: 6.0

The 9-1-1 Board holds the authority to establish a budget for the migration to a fully compliant i3 NG9-1-1 system and is responsible for developing a plan to allocate those funds. Currently, the Board is evaluating the

costs associated with transitioning to an i3-compliant NG9-1-1 solution to gain a clearer understanding of the budgetary requirements for implementation.

It is crucial that the Board not only understands the full scope of transition costs but also helps 9-1-1 stakeholders plan for appropriate funding levels, both for near-term implementation and for long-term capital equipment replacement.

Funding

Score: 3.0

9-1-1 services in Hawai'i are funded through surcharge as defined in Act 066, Session Laws of Hawai'i 2024. The 9-1-1 Fund is established outside the state treasury as a special fund administered by the 9-1-1 Board. The fund consists of monthly 9-1-1 surcharge collections imposed on each communications service connection—excluding connections provided by the public utility offering telecommunications services and landline enhanced 9-1-1 service under Section 269-16.95. The surcharge is currently set at \$0.66 per month per connection.

As noted in a previous report, MCP recommends updating the legislation to ensure the surcharge is collected from all service providers, regardless of whether the provider is a public utility. This change is critical as NG9-1-1 services may not always be delivered through traditional utility providers, and equitable funding is essential to support the long-term sustainability of the NG9-1-1 system.

It is important to note, a 911 surcharge is a fee collected specifically to fund emergency communication services—such as 911 call centers (PSAPs), dispatch systems, and related infrastructure. It's not for general government use. In contrast, taxes go into general revenue and can be spent on a wide range of government functions—schools, roads, law enforcement, etc.

Staffing

Score: 2.0

The 9-1-1 Board employs an executive director—whose primary role is to support the Board and facilitate the work of its three committees—and an assistant. The Board's primary responsibilities include administering 9-1-1 fee collection and distribution, overseeing Board operations, and providing technical advisory support.

In alignment with Act 168, Session Laws of Hawai'i 2011, and Act 066, Session Laws of 2024, two full-time staff members may be sufficient under the current structure. As the Board evaluates the migration to a fully compliant i3 NG9-1-1 solution, it should also consider the need for statewide technical and contract management support. This support will be essential to effectively manage the NG9-1-1 vendor and ensure accountability throughout implementation and ongoing operations.

Based on MCP's experience, most states employ dedicated technical resources to provide oversight of the vendor, ensure compliance with contractual obligations, and monitor the overall health and performance of the NG9-1-1 system. Currently, the PSAPs do not have the technical capacity or resources required to fulfill this role independently.

Establishing centralized technical oversight will help safeguard system reliability, promote consistency, and support successful statewide deployment.

Procurement

Score: 2.0

9-1-1 service in Hawai'i was not obtained through a procurement; rather it is provided by Hawaiian Telcom through a tariff. Currently, the individual PSAPs maintain their own contracts with Hawaiian Telcom for 9-1-1 service and hosted CHE. The PSAPs regularly participate in meetings with Hawaiian Telcom and in a permitted interaction group (PIG). These contracts are based solely on the tariff and do not include SLAs, which are crucial for ensuring vendor accountability. (The importance of SLAs is explained in more detail in Section 3.2.)

At present, the PSAPs do not possess the technical expertise or resources necessary to manage a vendor delivering a solution of this scale and complexity. Based on MCP's experience, even the most capable and conscientious vendors require active oversight to ensure transparency, contract compliance, and reliable system performance.

The Hawaiian Telcom and Intrado solution may represent a viable path forward, provided that a robust backup plan is developed. This plan must include sufficient diversity and redundancy to ensure continuity of operations in the event of a disruption—particularly one that could isolate Hawai'i from the mainland.

Standards and Best Practices

Score: 2.0

Standards and best practices are essential for promoting consistency, quality, efficiency, and public trust across emergency services. Standard operating procedures (SOPs) enhance interagency communication and collaboration, which are vital during high-stress incidents and multi-agency responses.

As NG9-1-1 solutions introduce new features and functionality, the development of well-defined best practices and updated SOPs are essential. These resources help ensure that personnel are properly trained and operationally prepared, resulting in more confident and effective decision-making, especially under pressure.

As Hawai'i transitions to NG9-1-1, establishing a joint operations working group or committee would greatly benefit the PSAPs. This group could serve as a platform for sharing documented policies, procedures, and best practices, fostering interoperable communications and operational consistency across jurisdictions.

3.2 Next Generation Core Services

NGCS is the set of services or functional elements needed to process and route a 9-1-1 call on an ESInet. NENA-STA-010.3f, *NENA i3 Standard for Next Generation 9-1-1*, (as well as its successor and related documents), describes the NGCS functional elements that support transitional and end-state NG9-1-1 architectures.

During the transition to NG9-1-1, it is common for agencies to implement some or all NG9-1-1 routing functionality while still maintaining interconnection with legacy call-routing infrastructure. This results in a spectrum of readiness, ranging from foundational capabilities to full end-state NG9-1-1 implementation.

A key objective of this report is to assess the current state of NG9-1-1 readiness in Hawai'i and to identify the technologies required to support NG9-1-1 call routing, as well as the delivery of calls and associated data within an NG9-1-1 environment.

As part of the evaluation, the MAPS tool examines eleven key NGCS-related areas to assess a jurisdiction's readiness for NG9-1-1 implementation:

- Technology procurement
- Functional elements
- Routing solutions
- MSAG² and GIS – Address Validation
- MSAG and GIS – MSAG Conversion Service (MCS)
- Service Level Agreements (SLAs)
- Reporting and Management Information Systems (MIS)
- Portal/Dashboard
- Interoperability
- Additional Data Repository (ADR)
- Policy routing

Based on the MAPS assessment and interviews with representatives from the 9-1-1 Board, Hawaiian Telcom, and Intrado, Hawai'i received a composite NGCS score of 3.64, placing it within the foundational state on the NG9-1-1 readiness continuum.

Table 3: NGCS Readiness Scores

Lever	Overall Score	Technology Procurement	Functional Elements	Routing Solutions	MSAG and GIS – Address Validation	MSAG and GIS - MCS	SLAs	Reporting and MIS	Portal/Dashboard	Interoperability	ADR	Policy Routing
NGCS	3.64	2.0	4.0	4.0	4.0	2.0	2.0	2.0	4.0	4.0	6.0	6.0

This score reflects a state in which NGCS functional elements have been identified and planning and early implementation efforts are underway, yet legacy call-routing infrastructure remains in use. The foundational rating assigned to this aspect of the assessment underscores a key opportunity to fully implement a standards-based NG9-1-1 solution that meets the long-term operational needs of Hawai'i and its PSAPs.

By evaluating NG9-1-1 readiness against a baseline set of nationally recognized requirements and capabilities, the 9-1-1 Board is uniquely positioned to elevate system performance, promote consistency, and create a more equitable emergency communications environment—one that benefits all PSAPs and all users across Hawai'i.

² Master Street Address Guide

Technology Procurement

Score: 2.0

A key objective of this assessment is to identify the specific technologies required to support a standards-based NG9-1-1 implementation. The information gathered will help reveal gaps in call routing and data delivery capabilities within the planned NGCS solution. This insight will assist Hawai'i in defining a clear path forward toward achieving an end-state, NG9-1-1-capable service architecture.

Although Hawai'i has conducted an NG9-1-1 needs assessment, no centralized procurement is planned. As discussed in Section 3.1, Governance, Procurement subsection, 9-1-1 services in Hawai'i are obtained via tariff and the PSAPs will receive NG9-1-1 services through individual arrangements with Hawaiian Telcom and its partner, Intrado.

While it is an industry best practice to conduct procurement at a state or regional level, obtaining services via a tariff will work—provided SLAs are addressed and secured. MCP recommends that the 9-1-1 Board work collaboratively with Hawaiian Telcom and Intrado to ensure SLAs are incorporated into all NG9-1-1 agreements.

Functional Elements

Score: 4.0

The NG9-1-1 solution implemented across Hawai'i must include the standards-compliant NGCS functional elements described below.

- **Border Control Function (BCF)** — A functional element that provides a secure entry into the ESInet for emergency calls presented to the network. The BCF incorporates session border control and firewall functionality, and may include media anchoring as well as other security mechanisms to prevent deliberate or malicious attacks on PSAPs or other entities connected to the ESInet.
- **Emergency Call Routing Function (ECRF)** — A functional element that supports GIS-based call routing in response to queries from authenticated entities to direct an emergency call toward the appropriate PSAP for the caller's location or toward a responder agency.
- **Emergency Service Routing Proxy (ESRP)** — A functional element that interacts with the ECRF and selects the next-hop routing within the ESInet based on location and policy.
- **Policy Routing Function (PRF)** — A functional component of an ESRP that determines the next hop in the call path using policy routing rules (PRRs) defined by the 9-1-1 authority.
- **Location Validation Function (LVF)** — A functional element that supports the validation of civic location (street addresses) against authoritative GIS database information.

In addition, to support the evolution toward an end-state NENA i3 architecture, the functional elements described below may be included in an NG9-1-1 solution during the transitional phase.

- **Legacy Network Gateway (LNG)** — Provides a signaling and media interconnection point between callers in legacy wireline and wireless originating networks and the i3 architecture.
- **Legacy PSAP Gateway (LPG)** — Provides a signaling and media interconnection point between an ESInet/NGCS and a legacy PSAP. It plays a role in the delivery of emergency calls that traverse an i3 ESInet to reach a legacy PSAP, as well as in the transfer and alternate routing of emergency calls between legacy PSAPs and NG9-1-1 PSAPs.

- Legacy Selective Router Gateway (LSRG) — Provides a signaling and media connection point between a legacy selective router and an i3 ESInet/NGCS, enabling calls to be routed and/or transferred between legacy Enhanced 9-1-1 (E9-1-1) and NG9-1-1 networks.
- MSAG Conversion Service (MCS) — Provides conversion between MSAG-formatted location information and NG9-1-1-formatted location information.

NGCS functional elements interact with each other and with elements in interconnecting networks as well as with PSAP CHE using standard signaling protocols such as Session Initiation Protocol (SIP) for call delivery, Location to Service Translation (LoST) to access ECRFs and LVFs for routing determination and civic location validation, respectively, and Hypertext Transfer Protocol Secure (HTTPS) for retrieving additional data and location information.

Hawaiian Telcom's NG9-1-1 solution has not yet been deployed. The planned NG9-1-1 solution is characterized as a hybrid approach, in which some NGCS functional elements, such as BCFs and media servers, will be located on-island, while the majority of NGCS components—including the ECRF, LVF, ESRP, PRF, and gateway functionality—will remain hosted on the mainland.

These functional elements are currently considered to be in a transitional phase on the NG9-1-1 readiness continuum. Currently, 9-1-1 calls are delivered to PSAPs in Hawai'i using the Request for Assistance Interface (RFAl), which supports IP-based call delivery but does not comply with NG9-1-1 standards.

The implementation plan developed by Hawaiian Telcom and Intrado involved a phased upgrade strategy. The first step is to upgrade the CHE to ensure NG9-1-1 standards compliance. Following that, Hawaiian Telcom will complete the necessary reconfiguration to support NG9-1-1-compliant call routing and call delivery.

The final phase will involve enabling standards-based ingress to the ESInet/NGCS from OSP networks operating within the state, in accordance with the FCC's recent Report and Order³. This step is critical to achieving full NG9-1-1 compliance and ensuring statewide interoperability.

The proposed hybrid NG9-1-1 architecture raises important resiliency concerns, particularly if connectivity to the NGCS elements on the mainland is disrupted. To address this, Intrado has proposed the deployment of a Call Feature Server (CFS), and Call Protect Routing (CPR) functionality within its hybrid solution to provide additional resiliency in call routing and delivery.

However, it is important to note that CFS and CPR are not part of the standard NG9-1-1 architecture. These components rely on legacy technologies, including automatic number identification (ANI), automatic location identification (ALI), and selective routing database (SRDB) information. While these backup elements may enhance resiliency, their dependence on outdated infrastructure could limit their ability to fully support NG9-1-1 capabilities.

Therefore, it is critical that the backup mechanisms included in the Hawaiian Telcom/Intrado hybrid solution meet, at a minimum, E9-1-1 standards. This includes ensuring reliable call delivery, callback capability, and location information for fixed, nomadic, and wireless callers.

³ FCC Report and Order in the Matter of Facilitating Implementation of Next Generation 911 Services (NG911) (PS Docket No. 21-479) <https://www.fcc.gov/document/fcc-takes-action-expedite-transition-next-generation-911-0>

Routing Solutions

Score: 4.0

The current technologies used to route 9-1-1 calls in Hawai'i are rated as transitional. Legacy selective routers (LSRs) provided by Hawaiian Telcom route 9-1-1 calls between originating networks and the PSAPs. Although the NGCS functional elements on the mainland provided by Intrado support geospatial routing of 9-1-1 calls, this functionality is not yet available in Hawai'i for 9-1-1 calls.

Geospatial routing is a core feature of NG9-1-1 that leverages highly accurate GIS data to route emergency calls based on the caller's actual physical location, rather than relying on static call-routing databases. This approach significantly reduces the risk of misrouted calls caused by outdated or imprecise call-routing tables. Additionally, geospatial routing can accelerate call delivery, ensuring that calls are directed to the most appropriate PSAP.

The GIS section of this document (Section 3.6) describes, in more detail, the current state and opportunities that Hawai'i must develop a coordinated, statewide GIS program in support of its NG9-1-1 objectives.

MSAG and GIS – Address Validation

Score: 4.0

PSAPs within Hawai'i are currently supported by legacy 9-1-1 location data management solutions. Today, the ALI database management system (DBMS) uses MSAG data to validate civic locations (i.e., street addresses) for later use during the processing of a 9-1-1 call. In an NG9-1-1 environment, the LVF facilitates machine-to-machine validation using a standard interface. Implementation of an end-state LVF requires provisioning of authoritative GIS data by the 9-1-1 authority. During the transition to end-state NG9-1-1, an LVF may be deployed with only MSAG data, necessitating downstream routing elements that can map between the legacy MSAG data and NG9-1-1-formatted addresses used to route the call forward.

In a legacy environment, DBMSs perform a variety of quality checks on incoming service order data before a record can be modified or added to the ALI database. During the transition to NG9-1-1, 9-1-1 authorities will migrate from MSAG validation to LVF validation, possibly requiring that the DBMS be able to utilize LVF validation in coordination with MSAG processing. Ultimately, the LVF will contain civic location information that is derived from GIS data, which has been reconciled to the corresponding MSAG data.

Since the civic location validation mechanism currently used in Hawai'i is an MSAG-based DBMS process, Hawai'i is in a transitional state with respect to civic location validation. With the deployment of the hybrid NGCS solution provided by Hawaiian Telecom and Intrado, Hawai'i will be able to provide LVF-based validation of civic locations.

MSAG and GIS – MCS

Score: 2.0

As outlined in the NENA NG9-1-1 standard (NENA-STA-010), the MCS facilitates the conversion between MSAG-formatted locations and i3-formatted locations (specifically, Presence Information Data Format – Location Object [PIDF-LO]) during the transition to NG9-1-1.

The MCS enables bi-directional mapping:

- From an MSAG address (formatted per NENA 02-010 Version 4) to a PIDF-LO, and

- From a PIDF-LO to a conforming MSAG address, allowing upgraded and legacy systems to exchange location information seamlessly.

Like other NGCS elements—such as the ECRF and LVF—the MCS is provisioned using the Spatial Interface (SI) and relies on GIS layers. These include:

- All layers necessary to construct a PIDF-LO, and
- A table containing MSAG field content used before NG9-1-1 deployment.

Given the variability in MSAG fields across PSAPs, the MCS requires a complete set of MSAG records, along with links to corresponding street or address point records within the ECRF/LVF.

When converting from PIDF-LO to MSAG, the MCS locates the relevant point in the GIS database and retrieves the associated MSAG data to construct a valid MSAG address. The reverse process—MSAG to PIDF-LO—follows a similar method, identifying the location represented by the MSAG address and generating a corresponding PIDF-LO using the same GIS layers.

As standard MCS functionality is not supported in the state, Hawai'i is in the foundational stage. Hawaiian Telecom and Intrado are targeting 2026 to support standard MCS functionality in their hybrid NG9-1-1 solution.

SLAs

Score: 2.0

SLAs are essential tools for ensuring that solution and service providers remain accountable to their contractual commitments. Within the context of NG9-1-1, SLAs serve to define the specific performance requirements expected by the 9-1-1 authority and are tailored to the particular component(s) of the NG9-1-1 system being implemented.

SLAs for NG9-1-1 deployments commonly address critical elements such as:

- Service quality
- System capacity and performance
- Availability and uptime
- Geographic coverage
- Maintenance and support protocols

Adopting and enforcing SLAs is widely recognized as an industry best practice, helping to ensure reliable service delivery, transparency, and long-term operational success of NG9-1-1 systems.

The current arrangement between Hawai'i and Hawaiian Telcom is governed by a tariff-based agreement, which does not include specific SLAs related to NG9-1-1 support. To strengthen oversight and ensure consistent performance, it is recommended that the 9-1-1 Board develop a comprehensive set of service-level requirements. These requirements would provide a foundation for holding the NG9-1-1 solution provider accountable for maintaining reliable system performance, service availability, and operational consistency statewide.

Reporting and MIS

Score: 2.0

It is essential that 9-1-1 authorities have visibility into the performance and activity of the call-routing infrastructure responsible for delivering emergency calls to PSAPs across the state. As Hawai'i moves forward with the deployment of an NG9-1-1 solution, the implementation of automated data collection, integration, and analysis tools across the ESInet and NGCS will be critical. Access to real-time and near-real-time performance data will significantly enhance Hawai'i's and the PSAPs' ability to monitor daily operations, quickly detect anomalies, and proactively address potential issues—reducing the risk of service disruptions or system outages.

Today, standard or canned reports related to call routing are generated but are not available to the PSAPs. The Intrado VIPER® call-handling system, which is being implemented by PSAPs in Hawai'i, supports both canned and ad hoc call metric report. It is expected that this capability will become available to PSAPs once the hybrid NG9-1-1 solution has been implemented.

The 9-1-1 Board should ensure that, moving forward, the hybrid NG9-1-1 solution supports industry NG9-1-1 standards for reporting, monitoring, and MIS—allowing visibility into system health and metric tracking at both the state and local levels.

Portal/Dashboard

Score: 4.0

PSAPs in Hawai'i would benefit from access to an online portal with an executive dashboard that provides real-time visibility into key operational data. This dashboard should offer access to call data, network and systems status indicators, discrepancy reports, and include the ability to implement policy routing changes as needed.

Additionally, such a portal could support an enhanced ticketing system, enabling PSAPs to easily submit trouble tickets and receive real-time or near-real-time updates on their status. This level of transparency and operational control would improve issue resolution, communication, and accountability.

Hawaiian Telcom, in coordination with Intrado, plans to provide a portal in the future as part of its NG9-1-1 hybrid solution. The 9-1-1 Board should ensure that this capability is available to all PSAPs once the hybrid solution has been implemented.

Interoperability

Score: 4.0

Developing standard guidelines, requirements, and recommendations that align NGCS solutions with NENA's i3 standard and other industry best practices will help ensure the highest level of interoperability between the PSAPs. Interoperability with outside agencies—such as the Coast Guard or other military installations—will facilitate the seamless exchange of data and improve coordination during emergencies. The ability to communicate and share information with other emergency services organizations can also improve response times.

The interconnection of NG9-1-1 ESInets and NGCS may be necessary to support initial call delivery (e.g., when alternate routing is in effect), as well as emergency call transfers. In addition, the NG9-1-1 solution will need to support interoperability with legacy, transitional, and i3-compliant solutions.

Today, connectivity exists to support alternate and backup routing of emergency calls between PSAPs through legacy E9-1-1 mechanisms. In some cases, the PSAPs rely on “white phones” to reroute 9-1-1 calls to administrative lines or other numbers via the public switched telephone network (PSTN); however, these rerouted calls do not include accompanying data, such as caller location or callback information.

As the legacy time division multiplexing (TDM) infrastructure is phased out in favor of IP-based telecommunications, the NG9-1-1 solution must support on-island alternate routing and transfer capabilities using next-generation technologies.

With the hybrid NG9-1-1 solution being deployed by Hawaiian Telcom and Intrado, it will be technically possible to alternate route and transfer calls between PSAPs on an intranet and an internet. However, new processes will need to be defined to support on-island alternate routing and transfer due to difficulties with dispatch. As noted previously, the hybrid NG9-1-1 solution being deployed in Hawai‘i needs to include a plan for addressing scenarios where connectivity to the NGCS elements on the mainland is lost. If such a failure occurs, Hawaiian Telcom needs to be able to support the routing and delivery of emergency calls on-island. Currently, default routing is determined by the trunk group used to deliver the 9-1-1 call to the LSR. Under the proposed hybrid architecture, Intrado’s CPR functionality will be used in scenarios where connectivity to the mainland is lost. CPR functions as a fallback mechanism by default-routing calls to the appropriate island, leveraging the legacy E9-1-1 infrastructure to complete the call.

Moving forward, it is critical to develop a modern alternate and backup routing strategy that is built on IP-based or multi-protocol label switching (MPLS) infrastructure. This solution should enable the delivery of all types of 9-1-1 calls, along with essential data elements to the PSAP.

Additional Data

Score: 6.0

When a 9-1-1 call progresses toward a PSAP, the originating device, the access network provider to which the device is connected, and all service providers in the path of the call have information about the call, caller, or location that may be useful to the receiving PSAP. Gateway systems in the call path may also create and convey additional data associated with an emergency call during the transition to end-state NG9-1-1.

Similar to location information, NG9-1-1 supports the delivery of additional data with the 9-1-1 call either “by value” (i.e., the data is included in the SIP signaling associated with the call) or “by reference” (i.e., a pointer to the data is provided in the SIP signaling associated with call). Industry standards define the format for additional data and the protocols used to convey this information with the call and to retrieve it from an ADR.

Although this functionality is not in place today, the NG9-1-1 solution supports additional data conveyance “by value” or “by reference”, as well as the ability to interact with ADRs to dereference additional data that is conveyed “by reference”. Using Intrado’s “emergency data broker” functionality, the hybrid NG9-1-1 solution also supports the creation of additional data by gateway systems, such as the LNG. Once the NG9-1-1 solution has been implemented, access to additional data will be supported.

Policy Routing

Score: 6.0

Currently, PSAPs may establish mutual aid agreements with neighboring PSAPs to ensure continued call-taking capability during times when they are unable to handle calls themselves. These situations may occur due to scheduled maintenance, after-hours coverage, or, more commonly, due to unexpected equipment failures,

network outages, or PSAP evacuation. The need to divert 9-1-1 calls during both scheduled and unscheduled disruptions will persist in an NG9-1-1 environment.

In an NG9-1-1 environment, call diversion policies and practices will be established by 9-1-1 authorities in collaboration with PSAPs and implemented through PRRs. These rules are enforced by the PRF—a critical component of the ESRP—which helps determine the next hop in the call routing path.

Beyond the caller's geospatial location, the ESRP evaluates additional data, such as the operational status of the target PSAP, and consults the PRF to apply the appropriate PRRs. This enables the system to make informed, dynamic routing decisions.

PSAPs in Hawai'i currently support alternate routing of emergency calls based on routing tables in the selective routers that are invoked under a limited set of conditions. The hybrid NG9-1-1 solution includes a PRF that supports primary and alternate routing of 9-1-1 calls under a variety of conditions, including PSAP abandon and special event routing. In the future, the hybrid NG9-1-1 solution will also support geospatial-based policy routing, where 9-1-1 calls in an area that is affected by a disaster can be divided among different target destinations based on the location from which they originate. This policy-based routing mechanism will support real-time changes and facilitate call management across a wider range of operational situations—ensuring that 9-1-1 calls are delivered to a PSAP that is capable of assisting.

The NG9-1-1 i3 standard (NENA-STA-010) enables policy-based call routing based on additional conditions, extending beyond those currently identified by Intrado. These conditions may include the content of the SIP signaling message and the media associated with the 9-1-1 call.

As the NG9-1-1 solution evolves, the 9-1-1 Board should ensure that the policy routing capabilities fully align with the i3 standard—supporting real-time routing adjustments and enabling call management across the entire range of scenarios and conditions defined by the standard.

3.3 Emergency Services IP Network

An ESInet is a managed IP network that is used for emergency services communications, and which can be shared by all public safety agencies. An ESInet provides the IP transport infrastructure upon which the NGCS are deployed. In addition to transport, an ESInet provides interoperability, security, and other related services.

As part of the evaluation, the MAPS tool examines 11 key ESInet-related areas associated with the current state of the network infrastructure to assess a jurisdiction's readiness for NG9-1-1 implementation:

- Carrier Ingress – Request for Service (RFS)
- Carrier Ingress – LSR/Tandem
- Interconnectivity
- Survivability
- Monitoring
- Change management
- Reporting and MIS
- Bandwidth
- Network Clock (Netclock)
- Quality of Service (QoS)
- Documentation

Based on the MAPS assessment, Hawai'i received a composite ESInet score of 6.36, placing it within the transitional state on the NG9-1-1 readiness continuum.

Table 4: ESInet Readiness Scores

Lever	Overall Score	Carrier Ingress – RFS	Carrier Ingress – LSR/Tandem	Interconnectivity	Survivability	Monitoring	Change Management	Reporting and MIS	Bandwidth	Netclock	QoS	Documentation
ESInet	6.36	8.0	2.0	2.0	4.0	10	10	4.0	6.0	6.0	10	8.0

Carrier Ingress – RFS

Score: 8.0

The recent FCC Report and Order, *Facilitating Implementation of Next Generation 911 Services (NG911)*⁴, requires OSPs to support a two-phased approach to transitioning to NG9-1-1 in response to a valid request from a 9-1-1 authority. In Phase 1, OSPs are required to deliver 9-1-1 traffic in IP-based SIP format (i.e., “basic SIP”) to one or more in-state delivery points or other delivery points designated by the 9-1-1 authority per mutual agreement by the 9-1-1 authority and OSP. “Basic SIP” is generally interpreted to mean the encoding of E9-1-1 information using SIP headers.

Upon receiving a valid request from a 9-1-1 authority for Phase 2, OSPs are required to deliver 9-1-1 traffic to the designated in-state NG9-1-1 delivery point(s) identified by the 9-1-1 authority in an IP-based SIP format that complies with commonly accepted NG9-1-1 standards for call routing and emergency location delivery. During Phase 2, the OSP is also required to implement the necessary infrastructure to support emergency location acquisition.

The Report and Order does not require OSPs to originate 9-1-1 traffic in an IP format to achieve compliance with Phase 1 requirements. During the transition, legacy originating networks may utilize a gateway system—such as an LNG or LSRG—to support the translation of legacy TDM signaling to the required IP-/SIP-based signaling prior to delivering the call to the ESInet.

Hawai‘i’s current 9-1-1 system supports all types of legacy interfaces from OSPs, including TDM multi-frequency (MF), Signaling System 7 (SS7), and primary rate interfaces (PRIs). IP selective routers in the current 9-1-1 network deliver emergency calls to PSAPs via MPLS connections using the IP-based RFAI. The current network infrastructure is capable of supporting FCC Phase 1 9-1-1 call delivery, even though the existing system is not compliant with i3 standards. The hybrid NG9-1-1 solution being deployed by Hawaiian Telcom and Intrado will be fully i3-capable and will accept 9-1-1 calls from OSPs in alignment with FCC Phase 2 as well as Phase 1 requirements.

Ongoing effort is required to identify where the points of interconnection (POIs) will be made in Hawai‘i. This will require agreements among key stakeholders—including OSPs, Hawaiian Telcom and Intrado (as the NG9-1-1

⁴ <https://www.fcc.gov/document/fcc-takes-action-expedite-transition-next-generation-911-0>

solution providers), 9-1-1 authorities, and the State—and will be influenced by existing tariffs and FCC requirements for in-state NG9-1-1 delivery points.

In Hawai'i, each island has an LSR; the switches that originate 9-1-1 calls, including end offices and mobile switching centers (MSCs) are not SIP-capable. Hawai'i has only one Session Border Controller (SBC), located on O'ahu, that handles incoming SIP traffic. When a 9-1-1 call originates from a wireless service provider's network, it is initially routed to the SBC on O'ahu. If the call is intended for a PSAP on another island and connectivity between O'ahu and that island is disrupted, there is currently no mechanism to reroute the call to the appropriate PSAP, resulting in a potential loss of service.

Additionally, there is no current pathway for an OSP to order SIP interconnection to an SBC, as existing tariffs do not address IP-based POIs.

To address these limitations, MCP recommends:

- Deploying SBCs on each of the islands to enhance inter-island connectivity and resiliency for wireless, wireline, and Voice over IP (VoIP) 9-1-1 calls.
- Establishing the necessary contracts and tariffs to support SIP-based interconnection and facilitate access to IP-based POIs.

These actions are essential for building a robust, fault-tolerant NG9-1-1 infrastructure capable of maintaining reliable call delivery under a range of conditions.

Carrier Ingress – LSR/Tandem

Score: 2.0

Today, 9-1-1 calls in Hawai'i are routed from wireline end offices or wireless MSCs to a selective router using TDM interfaces. Emergency call traffic is aggregated at the selective router, where it is then processed by Intrado's functionality that converts TDM calls into SIP signaling and Real-time Transport Protocol (RTP) media. These calls are subsequently routed to the appropriate IP-enabled PSAP over MPLS circuits using RFAI.

The IP selective routing function routes continues to use legacy telephone number (TN)-based routing mechanisms, directing calls to the designated PSAP along with a 10-digit "location key." Consistent with legacy E9-1-1 call flows, the PSAP uses this key to query an ALI database to retrieve the caller's initial location and receive subsequent location updates.

The transition of carrier ingress traffic from TDM-based signaling delivered to LSRs to SIP-based delivery over ESInets must comply with the requirements and timelines established in the FCC Report and Order titled *Facilitating Implementation of Next Generation 911 Services*, referenced above. Discussions with Hawaiian Telcom and Intrado revealed no specific target date for decommissioning selective routers and eliminating associated costs.

Interconnectivity

Score: 2.0

The interconnection of NG9-1-1 ESInets and NGCS may be necessary to enable initial call delivery—particularly during alternate routing scenarios—as well as to support emergency call transfers and the exchange of associated call and incident data.

Establishing interconnection between ESNets, and between other ESNets and legacy emergency services networks, will enhance the ability of PSAPs across Hawai'i to coordinate during large-scale incidents, manage high call volumes, and mutually support each other during service disruptions or emergencies.

While Hawai'i is in the process of implementing an ESNet, there is currently no interconnectivity with other ESNets. This interconnectivity will facilitate the exchange of critical data between PSAPs in Hawai'i and other agencies such as the Coast Guard or military installations outside of Hawai'i.

Hawai'i should be prepared to connect to other ESNets as soon as its ESNet is operational. MCP recommends that Hawai'i require its ESNet provider to comply with industry standards and best practices for network-to-network interfaces (NNIs) used to interconnect with other ESNets. This requirement should be accompanied by the expectation that all interconnecting networks adhere to the same standards, ensuring interoperability, reliability, and seamless data exchange.

Survivability

Score: 4.0

9-1-1 networks must be both redundant and diverse. IP technologies underlying ESNets possess a critical characteristic that distinguishes them from legacy networks—they automatically discover routes and use the most efficient routes based on learned metrics. This built-in route diversity eliminates the need for pre-engineered backup pathways. ESNets should be designed with redundant interconnectivity to PSAPs, leveraging IP routing characteristics to maintain connectivity during times of disasters or infrastructure damage. PSAPs should have as many independent connections as possible. Physical diversity, the use of varied technologies, and supplier diversity are all crucial contributors to the survivability of an NG9-1-1 solution. Ensuring that connections from multiple providers do not share the same physical infrastructure, particularly in the “last mile” connection from the service provider to the destination facility, is essential.

Entrance diversity is achieved when physical circuits are delivered through separate areas of a building's physical infrastructure. When planning for entrance connectivity, it is important to consider different physical technologies such as wireless, satellite, and/or cable providers with above-ground options.

Survivability must be a key consideration in the network design of an ESNet. Hawai'i's unique geography and its distance from the mainland introduce additional challenges in deploying a redundant and geographically diverse NG9-1-1 infrastructure that is resilient and robust.

Today, all 9-1-1 calls are backhauled to a hardened Hawaiian Telcom facility in Honolulu that contains high availability selective routers that are used to route all 9-1-1 traffic to the appropriate island. While there might be some redundancy in the 9-1-1 components housed in this facility, there is no geographic diversity in the existing 9-1-1 infrastructure. The current 9-1-1 architecture does, however, include multiple physically diverse connections from the existing network to the VIPER CHE.

Hawaiian Telcom and Intrado's hybrid approach raises resiliency concerns if connectivity to NGCS elements on the mainland is disrupted. While Intrado's CPR functionality provides additional resiliency in 9-1-1 call routing and delivery in Hawai'i, it is not a standard element in the NENA i3 architecture. Additionally, CPR relies on legacy ANI/ALI and SRDB information.

MCP recommends that Hawai'i pursue a more robust mechanism for ensuring the resiliency of its NG9-1-1 service architecture—one that will support the ongoing delivery of 9-1-1 calls and associated data even when connectivity issues, service outages, or interruptions occur.

Monitoring

Score: 10

It is critical that NG9-1-1 solutions include both a network operations center (NOC) and security operations center (SOC) to ensure 24/7/365 monitoring, analysis, and response to network and cybersecurity activity. In addition, physical access monitoring and reporting capabilities should be included to enhance overall system security.

An NG9-1-1 solution must also feature an integrated alarming and ticketing system, along with a dashboard interface that delivers near-real-time updates on ticket status, alarms, and overall network health.

Currently, Hawaiian Telcom and Intrado each have a NOC and SOC, staffed 24/7/365. However, as previously noted, PSAPs within Hawai'i do not currently have access to a portal or dashboard that provides transparency and visibility into network performance or system security. Hawaiian Telcom, working collaboratively with Intrado, intends to provide a portal or dashboard in the future as part of its NG9-1-1 hybrid solution.

Change Management

Score: 10

An NG9-1-1 solution must be implemented in such a way that system changes can be managed without negatively impacting system availability. A documented change management process should be provided that covers both scheduled and emergency changes. Additionally, a mechanism must be in place to allow entities like the 9-1-1 Board to request changes from the NG9-1-1 solution provider and to receive status updates.

Currently, Intrado utilizes an integrated platform for all its IT service management processes, including change management, incident management, problem management, and customer service request management. Intrado currently provides notifications to Hawaiian Telcom for planned changes. Hawaiian Telcom, in turn, communicates with the PSAPs regarding system changes. Hawaiian Telcom uses the Information Technology Infrastructure Library (ITIL) 4 framework as the basis for service and change management.

Hawai'i would benefit from a more integrated change management system as it deploys the hybrid ESInet and NGCS solution. This would help ensure that system updates and modifications are applied uniformly across the NG9-1-1 infrastructure, reducing the risk of unexpected outages caused by version incompatibilities between system components. The change management system should provide transparency and visibility for PSAPs, allowing them to track the status of changes being made to the ESInet and NGCS.

Reporting and MIS

Score: 4.0

NG9-1-1 solutions must include reporting tools that provide real-time or near-real-time network performance data. Additionally, QoS reporting must be available on-demand by traffic type, including, at a minimum, statistics related to latency, jitter, packet loss, and bandwidth utilization.

Intrado currently supports MIS functionality via its Power Metrics product, which is integrated with the VIPER CHE platform. Power Metrics provides reporting and analytics to PSAPs based on call, incident, response, and resource data, helping PSAPs generate statistical reports.

As PSAPs migrate their CHE to VIPER 7, they will have access to Intrado's Emergency Call Tracking System (ECaTS) for reporting.

While these Intrado products provide reporting that is focused on call data, the hybrid NG9-1-1 solution provided by Hawaiian Telcom and Intrado should include the ability to obtain canned and ad hoc reports related to network performance and share this data with the 9-1-1 Board.

Bandwidth

Score: 6.0

NG9-1-1 solutions must include sufficient bandwidth to support voice, video, and text communications. Additionally, the bandwidth should be scalable to accommodate future growth and enhanced services. [NENA-INF-016.2-2018](#) recommends that “a fundamental best practice is to provision as much bandwidth capacity during an ESInet design phase as is reasonable for application use to cover at least a two (2) year planning horizon, and that is economically feasible.”⁵

The procured ESInet core currently has sufficient bandwidth to support 9-1-1 voice and text communications. However, the introduction of video capabilities may expose limitations in the last mile circuits. To ensure long-term scalability, it will be necessary to re-evaluate bandwidth requirements in relation to existing infrastructure capabilities to ensure that the NG9-1-1 solution has the necessary flexibility to support future increases in data capacity and quality.

Netclock

Score: 6.0

It is essential that all ESInet and NGCS elements have a synchronized notion of time. An ESInet must provide a Network Time Protocol (NTP) service for time-of-day information via a hardware clock or by synchronizing with another NTP time service.

Taking time signals from the global positioning system (GPS) satellite constellation is an easy and cost-effective way to synchronize systems separated by vast distances. GPS satellites are considered Stratum 0—essentially the original source. As devices receive GPS signals and forward them to other devices, each hop in that chain increases the stratum number, which can lead to a potential loss in traceability, reliability, and accuracy. In public safety, it is a best practice to have every physical facility where system elements are housed equipped with its own Stratum 1 time source—an onsite netclock that directly receives GPS signals via a GPS antenna.

While Hawaiian Telcom uses a clock system within its network, this clock is not accessible to supported devices within the public safety agencies. All VIPER CHE is synchronized to the ESInet netclock. Intrado indicated that it could potentially expose the ESInet netclock to Hawaiian Telcom. This would improve the consistency of the timing used by various systems within Hawai'i's NG9-1-1 solution.

QoS

Score: 10

QoS is a mechanism for defining and enforcing relative priorities between different types of data traversing the same network. In an ESInet, Differentiated Services (DiffServ) are used to classify and manage network traffic. For example, 9-1-1 calls are marked to receive a higher priority than non-emergency calls that are exchanged between agencies. QoS rules not only mark packets based on their priority but also enforce those priorities by

⁵ NENA-INF-016.2-2018, NENA Emergency Services IP Network Design (ESIND) Information Document.

delaying or even dropping lower-priority data when necessary, ensuring the timely delivery of higher-priority data. A QoS scheme based on industry best practices can greatly improve the perceived quality of voice communication—also known as the Mean Opinion Score (MOS) for VoIP—leading to clearer and more effective communication between all parties on the call.

In their NG9-1-1 solution, Hawaiian Telcom and Intrado follow the NENA recommendations for Differentiated Services Code Point (DSCP) usage and values. This provides an essential tool for network administrators to manage and optimize network traffic, ensuring that different types of traffic receive the appropriate level of service and priority.

Documentation

Score: 8.0

The 9-1-1 Board would benefit from receiving detailed network design diagrams that clearly illustrate both physical and virtual IP paths to each PSAP, including connections provided by subcontracted last-mile providers and resellers. These diagrams should depict all relevant functional elements and interfaces, covering both intra-network and inter-network connectivity during the transition phase and within the end-state NG9-1-1 architecture. Detailed network diagrams are essential for effective fault isolation, performance troubleshooting, and cybersecurity incident response.

As part of the NG9-1-1 solution, Intrado is responsible for maintaining up-to-date architectural and network diagrams, reflecting ongoing changes and enhancement to the system. Intrado has indicated that it will provide as-built diagrams illustrating network connectivity to the VIPER 7 CHE.

3.4 Call-handling Equipment

CHE is a key component of an NG9-1-1 solution and can be a stumbling block for many jurisdictions financially, technologically, and/or operationally when implementing NG9-1-1. Older analog technology may not be capable of processing the available features and data associated with an NG9-1-1 call, thus limiting the information and functionality available to a telecommunicator.

Given the cyclical nature of contractual agreements, it is common for states to have a mix of call-handling capabilities in place, ranging from foundational to end-state NG9-1-1.

In Hawai'i, all PSAPs have the same CHE.

As part of the evaluation, the MAPS tool examines 15 key CHE-related areas to assess a jurisdiction's readiness for NG9-1-1 implementation:

- i3-capable Call Handling
- Connectivity
- Funding Management
- Text-to-9-1-1
- Text-from-9-1-1
- Real-time Text (RTT)
- Logging and Recording
- Mapping
- Multimedia
- Grounding
- Transient Voltage Surge Suppression (TVSS)
- Supplemental Information
- Additional Data – ADR
- Additional Data – Emergency Incident Data Object (EIDO)

- MIS

Based on the MAPS assessment, a review of the documentation provided, and interviews with staff, Hawai'i received a composite CHE score of 6.4, placing it within the transitional state on the NG9-1-1 readiness continuum.

Table 5: CHE Readiness Scores

Lever	Overall Score	i3-capable Call Handling	Connectivity	Funding Management	Text-to-9-1-1	Text-from-9-1-1	RTT	Logging and Recording	Mapping	MIS	Multimedia	Grounding	TVSS	Supplemental Information	Additional Data – ADR	Additional Data – EIDO
CHE	6.4	6.0	4.0	6.0	8.0	8.0	6.0	4.0	10	6.0	2.0	10	10	10	2.0	4.0

i3-capable Call Handling

Rating: 6.0

CHE is viewed as “i3-capable” when it can receive and process multimedia 9-1-1 calls—calls that may include text, imagery, and video as well as voice communications—with associated callback and location information provided in incoming SIP signaling, and deliver those calls to the appropriate agent. Additionally, i3-capable CHE supports the processing of additional data associated with a 9-1-1 call. Additional data consists of information such as service type (similar to the Class of Service) and service provider identification and contact information.

When location or additional data is delivered by the ESInet and NGCS to the CHE “by reference,” i3-capable CHE must be able to interact with the appropriate NGCS element or an element outside of the ESInet, such as a Location Information Server (LIS) or ADR, to obtain the location object or additional data blocks.

i3-capable CHE also supports logging and test call capabilities.

In addition to handling initial 9-1-1 calls, i3-capable CHE must support emergency call transfer capabilities, including access to network bridging functionality and the automatic delivery of incident data to the transfer-to PSAP. Like legacy customer premises equipment (CPE), i3-capable CHE must be able to handle 9-1-1 calls that originate as teletypewriter (TTY) calls and PSAP-originated calls, such as emergency callbacks or support calls.

To support essential call-handling functions—such as emergency call transfers; location acquisitions, updates, and validation; as well as logging and recording—the CHE must have access to network-based functionalities. These include conference bridges, location servers, LVFs, and logging systems.

Most PSAPs in Hawai'i use VIPER 5.1 CHE. These PSAPs are not i3-capable and currently receive calls via interfaces that use the RFAI protocol. Several PSAPs have been upgraded to VIPER 7, which supports i3-compliant call delivery and enables integration with LISs and ADRs. The earlier RFAI-based VIPER 5.1 presents challenges in supporting text-to-9-1-1 and RTT functionalities. These limitations are mitigated in the VIPER 7 platform.

It is anticipated that all PSAPs will be operating on VIPER 7 CHE within a hosted environment by the end of this calendar year.

Connectivity

Score: 4.0

The ESInet and NGCS solution must support standard interfaces that will allow PSAPs in Hawai'i to receive multimedia 9-1-1 calls, transfer such 9-1-1 calls, and obtain the critical data necessary to perform call handling and dispatch functions. Specifically, the ESInet and NGCS must support a standard i3 SIP call delivery interface to PSAP CHE that will allow multimedia 9-1-1 calls to be delivered with callback and location information. Location and other additional data may be conveyed to the PSAP either "by value" in the SIP signaling associated with the call or "by reference," where only a "pointer" or "key" to data stored in an external system (e.g., ADR, LIS) is included in the SIP call signaling. When information is delivered by reference, the ESInet will also provide connectivity to the systems that hold critical location and non-location data. This connectivity will require support for HTTP-based interfaces.

In addition, SIP connectivity to PSAP CHE will enable call transfers to other PSAPs, including the delivery of the original call and related incident data received by the primary PSAP in incoming signaling or gathered during the call. To support selective transfers, i3-capable CHE must also support connectivity to an ECRF in the ESInet using a LoST interface, which helps identify the appropriate transfer destination. Additionally, a standard i3 SIP interface will be used to call 9-1-1 callers back if needed and support voice communications between call-takers across interconnected ESInets.

While standard i3 interfaces associated with CHE are a required aspect of an end-state NG9-1-1 solution, most CHE in use in Hawai'i is not i3-capable—with PSAPs still receiving calls via RFAI. With the deployment of the i3 ESInet and NGCS and the upgrade to VIPER 7 CHE, the PSAPs will begin using standard i3 call delivery from the ESInet and NGCS, as well as supporting other i3 call-handling functionality and interfaces.

Funding Management

Score: 6.0

In Hawai'i, funding of CHE and 9-1-1 services in general is currently based on tariffs. Nine locations are covered under a wireline tariff, with a separate wireless tariff in effect. Cost recovery is calculated on a per-seat per-month basis for the delivery of 9-1-1 calls. This includes call routing as well as call handling, such as through the VIPER platform. Sites not under tariff—non-tariffed locations such as backup sites—have VIPER connections that are handled under a separate contract services project. Fees are collected by service providers and are submitted to the 9-1-1 Board/9-1-1 Fund. The counties pay for 9-1-1 services and submit invoices to the Board for reimbursement.

Further evaluation is needed to determine whether the current tariffs and pricing structure are adequate to support both the transition to NG9-1-1 and its ongoing operational needs. It may be necessary to update these funding mechanisms to align with the financial requirements. At a minimum, tariff language should be revised to explicitly address IP-based connectivity.

Text-to-9-1-1

Score: 8.0

The ability to support text-to-9-1-1 is a critical aspect of 9-1-1 communications. PSAPs within the state that have deployed text-to-9-1-1 typically use an RFAI-based solution. This solution, however, does not support the full integration of Short Message Service (SMS)-based texts or RTT with the CHE.

The NG9-1-1 solution must support integrated text-to-9-1-1 functionality. The hybrid ESInet and NGCS solution being deployed in Hawai'i has the capability to deliver SMS texts to the PSAPs from text control centers (TCCs) using the Message Session Relay Protocol (MSRP). However, most CHE is not yet capable of receiving those texts. Once the CHE has been upgraded to VIPER 7, MSRP delivery of SMS texts and RTT will be supported.

Statewide alignment with industry best practices and standards for receiving and processing text-to-9-1-1 messages can significantly enhance processing speed and simplify the sharing of text messages—and entire text sessions—between agencies and jurisdictions. This is best achieved through a common text sharing architecture and standardized protocols.

Text-from-9-1-1

Score: 8.0

There may be circumstances when a PSAP needs to initiate a text conversation. While not widely supported currently, this capability is generally realized through an over-the-top (OTT) solution. Moving forward, support for RTT will provide PSAPs with a more integrated means of initiating text messages.

While, technically, Intrado's NGCS and VIPER 7 solutions support the ability to process and deliver texts from 9-1-1, this capability is not yet available to PSAPs in Hawai'i.

Implementing a statewide NG9-1-1 solution aligned with industry standards, including support for RTT, will enable PSAP-originated text conversations and enhance overall accessibility.

RTT

Score: 6.0

RTT capability provides PSAPs with text information in real-time, improves accessibility, and conveys a conversational tone with the 9-1-1 caller. RTT technology allows users to send and receive text characters—as they are typed—simultaneously with audio. This capability allows call-takers to hear background noise in addition to receiving text characters.

The ability to communicate natively with 9-1-1 callers who are using RTT, particularly members of the deaf, deaf-blind, hard of hearing, and speech disabled communities, is required by the NENA i3 standard.

In 2016, the FCC amended its rules to allow IP-based wireless carriers and manufacturers to support RTT on IP-based wireless networks and equipment as an acceptable alternative to TTY technology. In Hawai'i, there is no IP connectivity from carriers currently.

While PSAPs in Hawai'i are not currently capable of receiving RTT communications, the ESInet and NGCS solution being implemented enables the transmission of RTT. Once upgraded to VIPER 7, the CHE will also support RTT.

In a fully deployed end-state NG9-1-1 environment, RTT communications are expected to be supported by IP-capable originating networks, transmitted through the ESInet and NGCS, and delivered to and processed by i3-capable PSAPs.

Logging and Recording

Score: 4.0

It is critical that logging recorders support both event logging—which captures data related to an emergency call or incident—and media recording, such as voice. This capability is a core requirement of the i3 NG9-1-1 standards.

Although PSAPs in Hawai'i currently perform logging and recording functions today, these are typically supported through legacy computer-aided dispatch (CAD) spills or call detail record (CDR) feeds. Evolving NG9-1-1 standards specify the use of a "Logging Service", which must capture all significant call and incident processing steps until the call and any related incidents are concluded.

The 9-1-1 Board should recommend alignment with i3-compliant logging and recording requirements in the upgraded CHE utilized by its PSAPs.

Mapping

Score: 10

Some of the PSAPs in Hawai'i currently use Intrado's MapFlex service, a server-based public safety mapping application integrated with the CHE; and some have transitioned to the newer mapping product. MapFlex displays the location of 9-1-1 callers on a map, enabling call-takers to triage 9-1-1 calls based on spatial information. This integration supports faster and more accurate incident response.

i3 standards specify the support of a Mapping Data Service (MDS) that PSAPs can use when answering out-of-area calls. The MDS enables an appropriate map display of the area in which the caller is located—just as if the call was received from an in-area caller. For consistency and ease of use, it is highly desirable that all systems within a PSAP requiring map display utilize a common mapping interface. An MDS can serve this purpose by providing a uniform display across all PSAP elements.

The MDS is provisioned with GIS data from the same layers used by the ECRF, along with additional layers defined in the NENA NG9-1-1 GIS Data Model standard. Agencies may choose to share a common MDS or deploy separate MDS instances.

Part of the transition to NG9-1-1 will include evolution for the remaining PSAPs to Intrado's Spatial Command and Control (SCC) product, which is an integrated web-based mapping solution. SCC provides shared, precise mapping that utilizes authoritative GIS data and search tools. It provides the information needed to locate callers and dispatch services quickly and accurately, and provides for enhanced situational awareness across jurisdictions.

MIS

Score: 6.0

An MIS collects, stores and correlates data from multiple systems, such as logging recorders. This data enables PSAP staff to make informed operational and strategic decisions, based on performance trends, call volume, and system capacity metrics.

MIS is widely recognized as a vital management tool within the NG9-1-1 ecosystem, offering the visibility and transparency necessary to hold service providers accountable to state requirements. Moreover, MIS-generated call metrics are essential for completing surveys for the FCC and the National Highway Traffic Safety Administration (NHTSA).

Establishing a statewide MIS capability would enable Hawai'i to collect accurate information for both state and federal reporting.

In an i3 PSAP, MIS capability provides reporting services by aggregating data from various NG9-1-1 functional elements. The resulting reports can be used to analyze statistics, identify patterns, and support data-driven management and planning efforts. MIS functionality should be a required component of Hawai'i's NG9-1-1 solution.

PSAPs in Hawai'i currently use Intrado's Power MIS product for reporting and analysis. Currently, the reports are primarily canned. V2X, Hawai'i's GIS contractor, has access to Power MIS reports and is capable of pulling and providing those reports on behalf of the PSAPs. With the upgrade to VIPER 7, ECaTS will be used for reporting. ECaTS proprietary software parses each call into a standard format, providing consistent and easy to read data. ECaTS supports i3 call delivery reporting and analysis and includes some ad hoc reporting functionality. It also supports dashboards for situational awareness.

Historically, the 9-1-1 Board has not had access to the MIS reports. Once ECaTS is available, the Board could be given access to available data, if desired.

Multimedia

Score: 2.0

In an NG9-1-1 environment, 9-1-1 calls may include text, imagery, and video, in addition to voice communications. Accepting multimedia—particularly video and images—is typically a PSAP-by-PSAP decision. Those PSAPs that support the receipt of imagery typically do so using OTT arrangements.

PSAPs in Hawai'i receive voice 9-1-1 calls and SMS text-to-9-1-1 messages, but do not currently support other media.

MCP recommends that the 9-1-1 Board ensure the NG9-1-1 solution fully supports the conveyance and delivery of multimedia 9-1-1 calls—including voice, text, and imagery—to all PSAPs statewide. In addition, CHE operating in an NG9-1-1 environment should be capable of seamlessly integrating video and image handling functionality.

Grounding

Score: 10

PSAPs in Hawai'i protect their personnel and equipment from shock hazards by properly grounding backroom and workstation equipment. Any CHE installed in PSAP facilities must comply with all applicable national, state, and local codes related to grounding.

While Hawai'i does not control the installation of PSAP equipment, Intrado has indicated that its standard installations include ensuring PSAP equipment and racks are properly grounded.

TVSS

Score: 10

Ingress and egress metallic connections at PSAP facilities should be equipped with primary and secondary TVSS devices to protect against transient power and lightning strikes per industry standards and best practices for telecommunications equipment.

While Hawai'i does not control the installation of PSAP equipment, Intrado has indicated that its standard installations include ensuring that connections are protected via TVSS.

Supplemental Information

Score 10

Supplemental information is data received from external sources—such as location data from RapidSOS or critical-care information available via Smart911—that can be made available to public safety entities outside of the emergency call flow via OTT solutions. Such information can improve the effectiveness of emergency response.

In Hawai'i, Smart911 integration is currently supported, although Intrado has indicated that some changes will occur with the upgrade to VIPER 7. With VIPER 7, Smart911 will be less integrated—although the results will still be visible via the PSAP's user interface. Smart911 servers will still be present in the data centers.

Technically, with the current Intrado VIPER platform, RapidSOS can be queried using the Power 911 product, which can pass the data to MapFlex. The County of Maui PSAP uses RapidSOS Portal, which is a free service. This requires a separate interface for information delivery as it is not currently integrated with the CHE. Intrado indicated that it could provide a more integrated solution, if requested by the PSAP.

Additional Data – ADR

Score: 2.0

When a 9-1-1 call progress toward a PSAP, the originating device, the access network provider to which the device is connected, and all service providers in the path of the call have information about the call, caller, or location that may be useful to the receiving PSAP. This information may be conveyed “by value” in the SIP signaling associated with the call or “by reference,” where only a “pointer” or “key” to data stored in an external system—such as an ADR—is included in the SIP call signaling.

CHE operating in an NG9-1-1 environment must be capable of receiving and processing additional data that accompanies a 9-1-1 call, as well as requesting supplemental information stored in an ADR. Integrated support for these capabilities ensures that any additional data—whether delivered automatically or retrieved on demand—can be accurately associated with the corresponding call or incident.

While an integrated additional data capability is not available currently in Hawai'i, once the NG9-1-1 solution has been implemented, it will be supported.

Additional Data – EIDO

Score: 4.0

If a 9-1-1 call is transferred, it is crucial that additional data received with the call, along with other information related to the incident gathered by the call-taker, is conveyed to the transfer-to PSAP. In an NG9-1-1 environment, the standard mechanism for conveying this information is the EIDO. An EIDO contains information about a single incident including:

- The calls related to that incident
- The responders assigned to the incident
- The participants and vehicles involved in the incident

EIDOs will often include information about the caller such as the caller's name, telephone number, and location. EIDOs can also include agents' notes, information about responder equipment, agencies involved in the incident, and other incident-related information.

In the context of a transferred emergency call, EIDOs are passed “by reference” in the SIP signaling associated with the transferred call. The transfer-to PSAP must then send a dereference request to the transferring PSAP to obtain the EIDO.

Industry standards related to NG9-1-1 describe the use of EIDOs to pass incident data between the CHE and other applications at the PSAP, such as incident handling and dispatch functions associated with a CAD system. EIDOs can be “pushed,” where the element that creates the EIDO sends it to another element without any prior action by the recipient. This approach is used in a typical dispatch operation, where the sending CHE sends an EIDO to, for example, a CAD system, to request dispatch. There is also a “pull” mechanism where the receiver asks (in advance), via a subscription mechanism, to receive EIDOs based on a set of criteria. The subscription mechanism is also typically used to get updated data related to the incident as it progresses. The “pull” mechanism can also be used to inform an agency of new incidents opened by the sender that match a set of criteria specified in the subscription.

Currently, PSAPs in Hawai'i do not support the exchange of EIDOs within an agency or between agencies. MCP recommend that the 9-1-1 Board require support for EIDOs as part of the NG9-1-1 solution. Intrado has indicated that support for EIDOs has been tested. The ability to create, convey, and dereference EIDOs is expected to be included in VIPER 7's next update. Additionally, the ESInet and NGCS solution must support conveyance and dereferencing of EIDOs in the context of emergency call transfers.

3.5 Security

Cybersecurity is critically important for all broadband-enabled devices and networks, but it is of even greater significance for NG9-1-1 systems, particularly the ESInet. The number of cyberattacks already perpetrated against corporations and public safety entities the world over is staggering; with each passing year, the number of these attacks continues to grow as does the severity of the attacks.⁶

As noted earlier, the MAPS assessment relies on the TFOPA framework, as well as NIST and other standards, to develop a baseline from which to plan and coordinate transition strategies and operational effectiveness to

⁶ [157 Cybersecurity Statistics and Trends \[updated 2024\]](#)

improve security for NG9-1-1 readiness. Public safety agencies are encouraged to follow both TFOPA and NIST standards and recommendations as a framework to build a successful cybersecurity management process.

The NIST [Cybersecurity Framework](#) provides a framework and methodology for improving and protecting the public safety infrastructure from cyberthreats. The framework suggests a phased approach to cybersecurity preparedness:

1. Govern—establish, communicate, and monitor the cybersecurity risk management strategy, expectations, and policy
2. Identify—understand the current cybersecurity risks
3. Protect—use safeguards to manage the cybersecurity risks
4. Detect—find and analyze possible cybersecurity attacks and compromises
5. Respond—take actions regarding a detected cybersecurity incident
6. Recover—restore assets and operations affected by a cybersecurity incident

TFOPA's [NG9-1-1 Readiness Scorecard](#), Section 4.4, Security, identifies six comprehensive steps for creating a cybersecurity plan that complements the NIST phases:

1. Identification/Discovery—inventory all existing systems and applications
2. Assess/Prioritize—conduct risk assessments and establish security controls
3. Implement/Operate—document policies, procedures, and controls and administer security controls
4. Monitor and evaluate—monitor and examine operational environments
5. Test/Evaluate—audit and verify findings
6. Improve/Evolve—reassess and reevaluate policies, procedures, and security controls

As part of the evaluation, the MAPS tool examines seven key security-related areas to assess a jurisdiction's readiness for NG9-1-1 implementation:

- Cybersecurity Plan
- Cybersecurity Policy and Procedure
- Proactive Monitoring
- Risk Assessment
- Network Security
- Physical Security
- Staff Security

Based on the MAPS assessment, a review of the documentation provided, and interviews with staff and stakeholders, Hawai'i received a composite Security score of 6.29, placing it within the transitional state on the NG9-1-1 readiness continuum.

Table 6: Security Readiness Scores

Lever	Overall Score	Cybersecurity Plan	Cybersecurity Policy and Procedure	Proactive Monitoring	Risk Assessment	Network Security	Physical Security	Staff Security
Security	6.29	8.0	2.0	4.0	4.0	10	8.0	8.0

Cybersecurity Plan

Score: 8.0

A cybersecurity plan specifies the security policies, procedures, and controls required to protect an organization against cyberthreats and vulnerabilities. It encompasses multiple aspects, including network security, data protection, risk management, and incident response. A cybersecurity plan is designed to ensure the integrity of operations at an organization and the security of the organization's critical assets.

Intrado's A911 routing platform has a standard security plan associated with it, but no penetration testing is currently done to exercise it.

The Hawai'i Office of Homeland Security has documented and implemented a statewide cybersecurity plan⁷ but has not yet instituted an annual assessment process or a comprehensive cybersecurity exercise program. Support for an annual assessment program, as well as exercise and training programs are part of the cybersecurity plan. MCP highly recommends that the 9-1-1 Board pursue implementation of these planned cybersecurity activities.

Cybersecurity Policy and Procedure

Score: 2.0

According to NENA-STA-040.2-2024, *NENA Security for Next Generation 9-1-1 Standard (NG-SEC)*:

A cybersecurity policy is a documented strategy defining an Entity's purpose, scope, roles, responsibilities, management commitment, coordination, and compliance in relation to securing NG9-1-1. Cybersecurity policy is the sum-total of security policies vital to a security program.

This includes the specification of a Cybersecurity Incident Response Policy, which defines actions and procedures to take in the event of a cybersecurity incident, as well as when and how to bring in outside assistance.

Currently, Hawai'i has no statewide cybersecurity policies or procedures in place; instead, each county is responsible for maintaining its own cybersecurity policies and procedures. MCP recommends that each PSAP develop and document formal cybersecurity policies that clearly define the procedures and actions to be taken in the event of a cybersecurity incident. These policies should include guidance on when and how to engage external cybersecurity support.

Proactive Monitoring

Score: 4.0

Proactive and continuous monitoring are important tools in maintaining the security of an NG9-1-1 system. Such monitoring provides information on the system status and can be used to detect anomalies, track down root

⁷ <https://law.hawaii.gov/ohs/plans-ops/cybersecurity/>

causes, and aid in incident response. As a best practice, a comprehensive continuous monitoring program can be utilized to assess changes that could impact security in NG9-1-1 systems.

Intrado monitors its A911 platform and does not currently support third-party monitoring. MCP recommends that the 9-1-1 Board include proactive monitoring as a required capability of the NG9-1-1 solution. Additionally, the Board should consider support for regular third-party monitoring of systems, networks, and facilities as well as regular reviews of security policies and procedures to maintain a strong security posture for all systems that play a role in providing 9-1-1 service.

Risk Assessment

Score: 4.0

In the context of NG9-1-1, risk assessments should include a review of state and/or local cybersecurity policies, processes, and procedures as compared to government and industry cybersecurity best practices and standards. In addition, NIST provides a cybersecurity framework self-assessment tool that PSAPs can use to better understand the effectiveness of their cybersecurity efforts.

Currently, vulnerability scans are not conducted in Hawai'i. Hawaiian Telcom has an InfoSec group that performs comprehensive monitoring of the security of the overall network. Hawaiian Telcom has asked that group to begin monitoring the 9-1-1 network; however, InfoSec is waiting until the ESInet, NGCS, and VIPER 7 CHE have been deployed before initiating 9-1-1 network monitoring. For the CHE, Intrado conducts vulnerability scans via a third party as part of its quality assurance (QA) processes.

During the deployment of a statewide NG9-1-1 solution, MCP recommends that the 9-1-1 Board work closely with all entities that will interconnect with the ESInet and NGCS—including PSAPs and OSPs—to identify and address potential cybersecurity vulnerabilities within the end-to-end NG9-1-1 architecture.

As additional entities connect to the statewide ESInet, it is important to recognize that the overall security of the network will only be as strong as its weakest link. Therefore, establishing consistent, high-standard security practices across all interconnected entities is essential.

Network Security

Score: 10

Firewalls are a key tool in supporting network security. They are typically positioned at the edges of a network, between network segments, and on host systems, where they monitor traffic and allow or deny access based on a set of user-defined or predetermined security rules.

Firewalls help prevent unauthorized individuals or systems from accessing the network and can also identify and block malicious traffic or cyberattacks.

Next-generation firewalls go beyond basic packet filtering by providing stateful inspection, which allows them to monitor and track the state of network connections and make more informed decisions about which packets to allow or block. In addition, next-generation firewalls may support application-level data inspection and often include advanced features such as intrusion detection system (IDS) and intrusion protection system (IPS) to further enhance network protection.

In the NG9-1-1 system, firewall protections are in place, with Intrado responsible for providing and managing firewall functionality. Intrado monitors security alerts in real time and determines how to resolve identified issues.

However, feedback from these monitoring activities is currently not shared with other stakeholders, including the PSAPs.

MCP recommends that the 9-1-1 Board require all entities providing NG9-1-1 services to implement NG9-1-1-compliant security processes for both network personnel and equipment. These security measures should be aligned with statewide policies and procedures applicable to all systems interfacing with the NG9-1-1 solution.

Physical Security

Score: 8.0

In addition to network security, physical security measures should be in place to protect sensitive equipment. Physical security involves restricting physical access to rooms containing network infrastructure to authorized individuals with a valid business need. In addition to monitoring physical access, procedures need to be in place to detect and respond to physical security incidents.

Physical access control can involve the use of identification badges and authentication of visitors before authorizing escorted access to any physically secure location—except for those areas designated as publicly accessible. The use of entry and exit logs associated with access to controlled areas should also be maintained.

In Hawai'i, secure data centers currently house equipment critical to the support of 9-1-1 services, including Intrado's A911 call-routing platform and VIPER hosts. These data centers have appropriate physical access controls in place, which include the use of secure doors with video cameras.

Staff Security

Score: 8.0

Staff security can be achieved through an access control system that allows only cleared and badged personnel to require no escort and all visitors to be identified, logged, and escorted.

In Hawai'i, PSAP facilities utilize badging and key card access to maintain staff security. Equipment at PSAP facilities is also protected by secure doors with cameras mounted on/near them.

3.6 Geographic Information Systems

Tabular 9-1-1 call routing was implemented decades before cellular technology allowed the public to connect with PSAPs from virtually anywhere. While communications, GIS, and other technologies rapidly advanced, 9-1-1 has remained nearly stagnant for the past 30 years. The hardware and systems supporting 9-1-1 have reached end of life and can no longer support a very different customer base than what existed when 9-1-1 first was implemented in Hawai'i in the 1970s. NG9-1-1 was designed systematically from the ground up to support the nomadic lifestyle of today's public. For example, roughly 78% of calls to 9-1-1 on the big island⁸ are made using cellular phones.

Geospatial data provides the foundation for NG9-1-1 systems. Spatial queries replace flat tables and provide a precise point in polygon locations. The GIS not only locates the caller but also recommends responders from each response type to assist in expediting the delivery of emergency services.

⁸ <https://ags.hawaii.gov/wp-content/uploads/2025/03/Hawaii-County-February-2025-Status-Report-v2x-E9-1-1.pdf>

This GIS data now is at the forefront of public safety, and local and regional data accuracy is vital to the success of NG9-1-1. Hawai'i plays a critical role in developing the implementation path and the final NG9-1-1 architecture for the island state.

GIS data and analytics drive NG9-1-1 call routing and location services. The geospatial data enable the analytics that find the 9-1-1 caller—such as the LVF—and determine the appropriate PSAP to which the emergency call should be routed, such as the ECRF. GIS datasets employed to fulfill these functions must be refined to public-safety-grade with exact geospatial accuracy and complete attribution of all information necessary for completing the complex queries that drive emergency call routing decisions. This refinement extends beyond individual PSAPs, necessitating broad collaboration between neighboring jurisdictions across North America.

There are seven core GIS datasets required for NG9-1-1 operation: address points, road centerlines, and PSAP, provisioning, fire, law, and emergency medical services (EMS) boundary polygons. These data will interact within the NGCS functional elements to provide location validation, 9-1-1 call routing on the ESInet, and first responder recommendation functions. Errors in any dataset potentially could delay 9-1-1 call delivery or result in the call being routed to the incorrect PSAP.

In addition to complete and accurate attribution of every GIS dataset, geo-positional accuracy is vital to the proper functionality of the NG9-1-1 system. This GIS data now is at the forefront of public safety, and local and regional data accuracy is vital to success in NG9-1-1 implementation and ongoing operations.

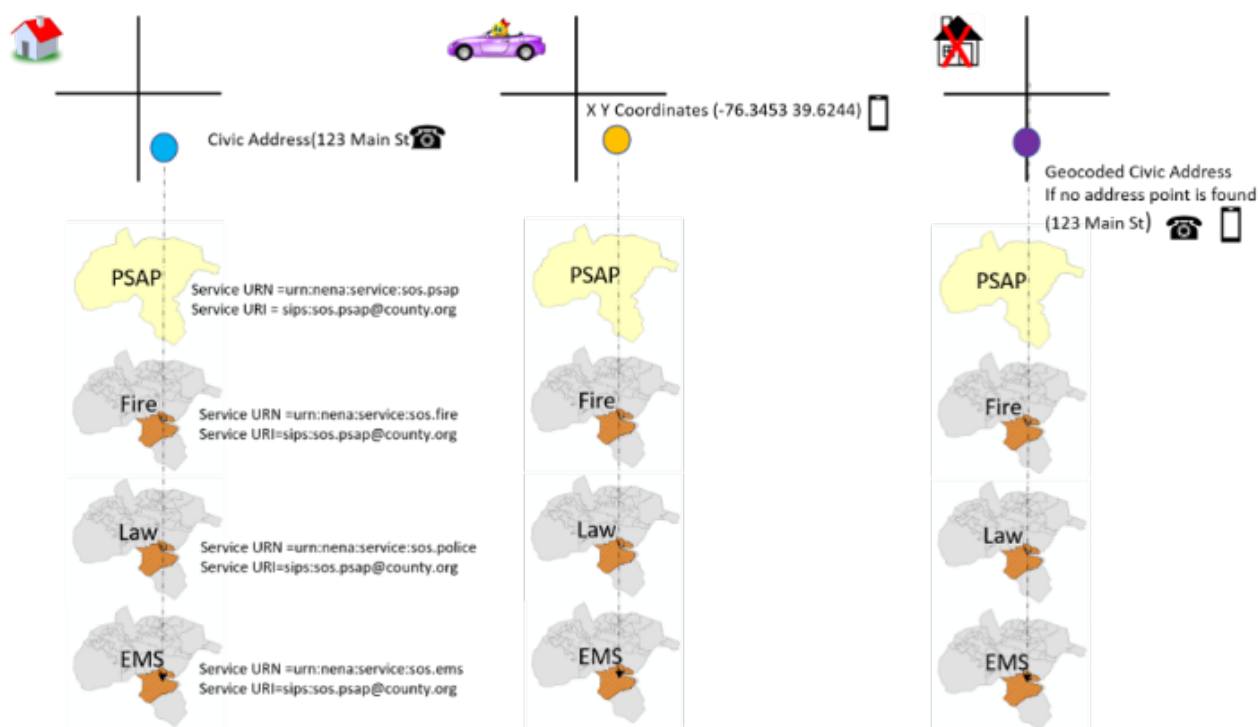


Figure 4: Geospatial Queries in NG9-1-1

As part of the evaluation, the MAPS tool examines seven key GIS-related areas to assess a jurisdiction's readiness for NG9-1-1 implementation:

- Production Environment
- Policies and Processes
- Regional Coordination
- Training
- Support
- Addressing
- Data Readiness

Based on the MAPS assessment, Hawai'i received a composite GIS score of 6.26, placing it within the transitional state on the NG9-1-1 readiness continuum.

It is important to note that all capabilities measured in MAPS are assessed using post NG9-1-1 migration metrics. The findings and recommendations in this report represent a baseline assessment and the path to NG9-1-1 operational status, respectfully. Hawai'i and its GIS contractor, V2X, have a long and successful partnership that can meet all NG9-1-1 geospatial needs by improving areas highlighted below.

Table 7: GIS Readiness Scores

Lever	Overall Score	Production Environment	Policies and Processes	Regional Coordination	Training	Support	Addressing	Data Readiness
GIS	6.26	8.5	5.5	4.5	6.0	5.3	4.5	9.5

To achieve GIS data readiness (Factor 7), all GIS resources supporting 9-1-1 must receive training (Factor 4) and be supported by current and robust technology in a well-performing production environment (Factor 1). Beyond the GIS team, a high level of regional coordination (Factor 3) is necessary to ensure that GIS data and addressing (Factor 6) are accurate within each member jurisdiction, as well as with neighboring stakeholders—Coast Guard for surrounding waters and federal and military campuses across the islands.

Finally, the production environment should be capable of maintaining the GIS data to strict standards within a very tight schedule. The long-term target within the GIS community (and in alignment with the existing quick-turn requirements for MSAG updates) for GIS data production to deployment in the NGCS is within 72 hours of discovering an error or receiving planned development notice. The rollout of NG9-1-1 dramatically changes the 9-1-1 landscape. The PSAPs in Hawai'i no longer are individual entities but will be part of a statewide network of 9-1-1 authorities, digitally connected to each other. This interconnection requires federal, state, local, Tribal, and territorial, (collectively FSLTT) collaborative GIS data development and maintenance to provide the highest quality of GIS data without coverage overlaps or gaps, which could delay the delivery of 9-1-1 services.

Statewide NG9-1-1 operations in Hawai'i are at risk. Neither local nor statewide GIS capabilities are completely prepared for NG9-1-1, and some workflows between local and state GIS and vendors have what are considered blocking factors—factors with scores low enough to prohibit NG9-1-1 operations for at least one PSAP until the issue is properly mitigated.

The GIS needs of 9-1-1 at the state level—and some local levels—in Hawai'i are provided by a dedicated team of contractors from V2X, who have been in place for roughly 20 years. This group excels at exceeding the GIS needs of the current 9-1-1 system. MCP recommends Hawai'i work closely with the current GIS service provider to grow its capabilities to meet NG9-1-1 needs.

The average score for the production environment factor was near the top of all ranking factors—8.5 out of a possible 10 points. The V2X contractors are provided with sufficient hardware, software, and networks to create and maintain GIS data to NG9-1-1 standards in a collaborative environment. Robust communications capabilities between the state, contractor, and local environments are the most needed improvements in this category.

However, only two of the seven factors averaged across the state are high enough to be considered NG9-1-1 ready, while four factors scored below transitioning to NG9-1-1 and one scored as transitional. The two factors presenting as a high risk to NG9-1-1 success are addressing and regional coordination. Most results were as expected and aligned to national averages for rural versus urban jurisdictions and level of service related to tax base.

Production Environment

Score: 8.5

The GIS data production environment in Hawai'i is complex but highly functional. GIS services are provided through a contract with a team of GIS professionals from V2X to support the State. Counties also are supported by the same team through separate contracts with each county. Some counties have GIS staff, others do not. No county has a dedicated GIS resource supporting 9-1-1.

The State, counties, and V2X all use the latest Esri suite of products. Capabilities with the Esri software vary between jurisdictions and some counties are only end users of the GIS data provided by GIS contractors. All GIS data is maintained in Esri format and stored in a spatial database. This allows for the easy sharing of GIS data between jurisdictions and with the State. GIS data storage across Hawai'i is sufficient for the NG9-1-1 migration and is nearly ready to support the ongoing operations of NG9-1-1.

By contracting GIS services, Hawai'i can scale resources appropriately with changes in development patterns without assuming the responsibility of taking on multiple full-time employees. The downside to utilizing contracted services is the risk of contract services expiring, gaps in funding availability for renewing contracts, and other business risks associated with not fully controlling the resources. The longevity of the contracts between V2X and the State (and counties where appropriate) is a testament to the commitment of all parties to 9-1-1. However, the risk still exists. Because 9-1-1 call routing is driven by GIS data in the NG9-1-1 environment, it is imperative that all PSAPs in Hawai'i have high-quality GIS data. This need is placed at risk through the use of separate contracting offices, separate accounting agencies, and multiple contracts. MCP recommends the 9-1-1 Board consider contracting services at the state level for local GIS services in addition to the State's support to ensure all PSAPs receive the same level of service.

To further mitigate this risk, Hawai'i can:

- Enter into multi-year contracts with vendors supporting 9-1-1
- Begin renewal of contracts at the beginning of the final year of the existing contract
- Fund 9-1-1 contracts from the operational budget
- Identify and deploy contracting opportunities through the State for local jurisdictions

Policies and Processes

Score: 5.5

As is the case with most GIS programs across the country, Hawai'i and its GIS provider(s) are lacking in written policies and processes.

The COVID-19 pandemic highlighted the need for written, tested, and regularly exercised COOP plans and alternative work arrangements. Systems used by Hawai'i must be available to the GIS contractors, PSAPs, and other public safety agencies even when State facilities and staff are inaccessible due to natural or human-influenced events, in steady-state operations, and emergency situations. All 9-1-1 stakeholders should participate in the development and exercising of a COOP plan that includes the maintenance and availability of the GIS data.

Although the same contractor has provided GIS support to Hawai'i for two decades, there is a risk of turnover in the company's staff or a need to change contractors. The workflows and procedures used to develop, maintain, coordinate, and provision the GIS data into the systems supporting 9-1-1 operations should be recorded, documented, and updated regularly to ensure that no delays in service occur due to staff or company changes.

Additionally, Hawai'i should review the metadata of the seven core GIS datasets to ensure compliance with NENA, Federal Geographic Data Committee (FGDC), and State recording standards and best practice guidance. Metadata is used by many NG9-1-1 NGCS solutions to verify the datasets are being kept current and as a secondary source for provisioning responsibility.

Regional Coordination

Score: 4.5

Hawai'i is unique in the provisioning of NG9-1-1 GIS data in that there is very little edge matching of polygons and snapping of road centerline end points with neighboring jurisdictions. The GIS data that supports NG9-1-1 creates a seamless web of lines and polygons across the whole of North America. However, since Hawai'i is an island state, the edges of the polygons need only to be coordinated between the PSAPs in the state and with the federal response agencies in the open waters surrounding the state.

PSAP polygons are not legal boundaries and do not need to follow municipal, county, or tax districts. The PSAP boundary is a logical polygon used to route 9-1-1 calls to the proper PSAP. In cases where a gated community or other campus with limited ingress crosses between multiple PSAPs, all services may be provided by a single PSAP based on the entrance point(s) into the community or campus. Careful coordination between PSAP leadership and GIS is necessary to resolve these occurrences and provide the most accurate call routing polygon dataset.

The 9-1-1 stakeholders should, through a subcommittee or workgroup within the governance structure of either the 9-1-1 Board or the [Hawai'i Geographic Information Coordinating Council](#) (HIGICC), coordinate the development and maintenance of 9-1-1-specific GIS data.

Training

Score: 6.0

The merger of 9-1-1 and GIS in the NG9-1-1 environment necessitates technical GIS training, collaborative training for public safety adjacent technical staff, and leadership training on the new, intertwined missions of GIS

and 9-1-1. While the GIS resources are provided with ample Esri software training, training on other systems and training beyond the GIS team are lacking.

The GIS resources also support the CAD systems used by the six PSAPs across the islands. GIS and mapping training is readily available for the Intergraph CAD system, but not for the Spillman or TriTech CAD systems. To provide the highest level of service and meet the needs of these PSAPs, GIS resources should be included in the training programs for the Spillman and TriTech CAD systems when offered by the respective vendors.

GIS data is expensive to create and maintain. The road centerline and address point data used in 9-1-1 also is used by most state and local departments from transportation to public works to recreation. Additionally, these data may be redundantly created or maintained by other agencies across the state. By sharing the GIS data needs of 9-1-1 and the standards to which the GIS data must be created and maintained throughout the GIS community, Hawai'i likely will find opportunities for collaborative GIS data maintenance that would reduce the cost of these data.

Leadership beyond the 9-1-1 disciplines are likely to inhibit the timely development and maintenance of GIS data for 9-1-1 due to a lack of understanding of the importance of these data to the 9-1-1 mission, the need for the data to be constantly and collaboratively maintained, or the level of commitment necessary to meet the needs of 9-1-1. Outreach from the State through organizations such as the Hawai'i State Association of Counties (HSAC) and other industry groups can mitigate this knowledge gap. Reporting on the progress of the 9-1-1 to NG9-1-1 migration, the needs of NG9-1-1, and the expectations of and for the counties at the annual HSAC conference will expand local participation in the effort and raise awareness of the collaborative needs of NG9-1-1 GIS.

Support

Score: 5.3

The support category is all encompassing—from IT to fiscal to public opinion. Hawai'i, 9-1-1, and the contractors supporting the state's 9-1-1 efforts are not receiving the requisite support necessary to successfully maintain NG9-1-1 operations and geospatial services.

GIS data, from the local source, drives 9-1-1 call routing. Yet local GIS capabilities are lacking and none of the state's six primary PSAPs have a dedicated GIS resource. Local support is varied across the islands and is done under individual contracts. Although the contractors are highly skilled and committed to the work, the contracting vehicles in place and the lack of local resources to provide the nuanced local knowledge and shepherd the GIS data from the data stewards to the State places NG9-1-1 and CAD operations at risk.

Addressing workflows for several counties rely on personal relationships and the good intentions of those involved. While this approach is working today, it is not sustainable in the long-term and remains vulnerable to staff turnover, competing priorities, and a lack of awareness among leadership regarding the critical nature of GIS support to 9-1-1 services. Hawai'i must standardize the workflow and secure the participation of every addressing authority through written agreements—at least a memorandum of understanding, and preferably an intergovernmental agreement with performance metrics.

Public perception of the 9-1-1 systems plays a significant role in shaping emotional decision-making—both by the public and the elected officials influenced by that sentiment. To ensure continued support and appropriate expectations, a comprehensive education and outreach program is essential. The program should address:

- The critical role of accurate addressing in 9-1-1 service delivery
- System upgrades

- Managing public and leadership expectations regarding performance and capabilities

Such efforts are vital to ensuring that success is accurately measured in the public eye, which in turn has a direct impact on funding, political backing, and support for future improvements to the 9-1-1 system.

Addressing

Score: 4.5

The delivery of life-safety services is all about where.

- Where is the emergency?
- Where should the 9-1-1 call be routed?
- Where is the closest responder?
- Where do the responders need to be sent?

Accurate, robust addressing is paramount to the success of NG9-1-1 and the life-safety mission of 9-1-1.

Addressing authorities across the state all follow an addressing schema that includes a tax map key (TMK) and a street address number. The part of the TMK included in the address represents the district (and island) where the address is located. In the 9-1-1 and NG9-1-1 environments, the dash separating the TMK and the physical address is replaced with zeros as shown in the figure to the right. While this format is critical to accurately determining the caller's location, it causes some issues matching a physical address to ALI and MSAG records.



The most concerning issue with addressing across the state is the widely varied methods addressing authorities employ for reporting address additions and edits to the State (GIS contractors) for inclusion in the statewide address point dataset. O'ahu and Hawai'i both provide the addresses in digital format. Hawaiian Homelands and private departments do not regularly report addressing edits to the State. These changes most frequently are reported by fire departments as they are discovered through road surveys or calls for service that do not match an existing address.

Maintaining accurate and up-to-date addressing information in near real time is critical to both 9-1-1 call routing and incident location processes. To address this need, several mitigation options may be considered.

One approach is to establish memoranda of understanding between the State and each addressing authority, clearly outlining the expectations for creating and sharing address information. Another option involves the development and deployment of a shared addressing tool, which allows each addressing authority to enter and transmit address updates directly to the State as changes are made locally. This solution should be paired with an intergovernmental agreement that binds both the State and the local addressing authority to specific performance metrics.

Without drastic changes to standardize and expedite the sharing of addressing updates from every addressing authority, this performance metric will remain well below NG9-1-1 ready and put NG9-1-1 operations at risk.

GIS Data Readiness

Score: 9.5

The GIS data across the state is ready for NG9-1-1 operations and maintained to a standard above NENA and industry best practices. The GIS to legacy match rates for each jurisdiction are validated quarterly. The latest results are shown below.

Table 8: GIS Match Rates

Jurisdiction	Match Rates	
	MSAG	ALI
Honolulu Police	99.93%	100%
Hawai'i County	99.98%	99.86%
Maui County	100%	100%
Kauai County	99.20%	100%

Hawai'i could achieve a perfect score in GIS data readiness by implementing an open GIS data policy, allowing the sharing of 9-1-1 GIS data to other state and local agencies and by improving the GIS data update schedule from every other week to once a week for every jurisdiction. The weekly updates must include addressing changes and likely would include the need to sponsor GIS staff at each PSAP to assist with the data development and workflow to the State.

3.7 Operations

One of the most transformative benefits of a fully implemented NG9-1-1 system is the ability for PSAPs to operate collaboratively rather than in isolation. NG9-1-1 enables seamless information and resource sharing among PSAPs—including staffing, technology platforms, call routing, and incident prioritization. This modern interoperable infrastructure enhances situational awareness and allows for dynamic support during large-scale emergencies, infrastructure disruptions, or natural disasters. While many regions face cultural and logistical challenges in transitioning from independent operations to a more interconnected model, those PSAPs that adopt NG9-1-1 typically come to rely on its increased flexibility and resilience.

Hawai'i presents a unique case in NG9-1-1 planning and operations. Unlike many states with multiple primary PSAPs that share boundaries and consequently work with each other daily, Hawai'i's geography necessitates one primary PSAP on each main island, except for two on O'ahu. This model reflects the reality that most emergency response activity remains localized due to the natural separation of islands. However, in the event of large-scale incidents—such as hurricanes, tsunamis, or other significant disruption—support may need to come from another island or even from the mainland. NG9-1-1 is especially critical in such scenarios, as it enables real-time coordination across PSAPs, facilitates load sharing, and provides operational continuity even if a local PSAP becomes incapacitated.

By leveraging NG9-1-1's capabilities, Hawai'i can build a more resilient emergency communications ecosystem—one that honors the state's geographic realities while embracing the future of interoperable public safety operations.

An operational environment that actively supports the implementation of NG9-1-1 is a critical success factor. To ensure a smooth transition and long-term sustainability, policies, procedures, and training programs must be developed to support both the transitional phase and the end-state NG9-1-1 environment.

Equally important is the need for adequate staffing to support NG9-1-1. Many state and local managers and administrators are already stretched thin, often managing multiple roles and responsibilities. Without dedicated personnel or additional resources, the essential tasks required to implement and maintain NG9-1-1 functionality may be assigned to an already overburdened staff, increasing the risk that these responsibilities are delayed or neglected altogether.

As part of the evaluation, the MAPS tool examines eight key Operations-related areas to assess a jurisdiction's readiness for NG9-1-1 implementation:

- Policies and Procedures
- Training
- Support
- Additional Data
- COOP Plans
- Succession Planning
- Incident Management
- Facility

Based on the MAPS assessment, a review of the documentation provided, and interviews with staff and stakeholders, Hawai'i received a composite Operations score of 5.00, placing it within the beginning of the transitional state on the NG9-1-1 readiness continuum.

Table 9: Operations Readiness Scores

Lever	Overall Score	Policies and Procedures	Training	Support	Additional Data	COOP Plans	Succession Planning	Incident Management	Facility
Operations	5.00	2.0	8.0	2.0	2.0	6.0	8.0	6.0	6.0

Policies and Procedures

Score: 2.0

Clear, well-crafted policies and procedures are essential tools for helping PSAP personnel navigate new workflows, minimize the risk of human error, and make informed decisions with confidence. As technology evolves, written operational guidance becomes even more critical—it not only supports the effective use of emerging tools and features like text, images, video, and sensor data, but also promotes consistency, simplifies decision-making, and strengthens accountability.

While PSAPs across Hawai'i may have operational differences, establishing shared guidelines and adaptable templates ensures a common foundation, particularly in the context of NG9-1-1. Policies tailored to advanced capabilities—such as handling RTT, integrating OTT applications, and processing multimedia data—will be essential to ensure safe, efficient, and standardized service across all islands.

To support this effort, MCP recommends the formation of a Policy Committee under the 9-1-1 Board, tasked with collaborating closely with the PSAP community. This committee would be responsible for developing model operational policies and procedures that reflect both NG9-1-1 capabilities and Hawai'i's unique emergency response landscape. It could also serve as a central hub for gathering and disseminating best-in-class examples from around the country, giving PSAPs a strong starting point while allowing for local adaptation. This approach empowers PSAPs with tools that are both standardized and flexible—ensuring readiness, consistency, and excellence in public safety operations.

Training

Score: 8.0

Training is the cornerstone of excellence in 9-1-1 operations. It equips telecommunicators with more than just technical skills—it empowers them to make split-second decisions with confidence, promotes the safety of first responders, and ultimately improves outcomes for the communities they serve.

Hawai'i is making a strong commitment to this foundation of readiness by advancing toward statewide certification of its 9-1-1 professionals. Most PSAPs are pursuing APCO Public Safety Telecommunicator certification, while the Regional Dispatch Center follows NENA's Telecommunicator Core Competencies curriculum. Both are 40-hour programs that blend classroom learning with on-the-job training (OJT) training, designed to build basic skills, knowledge, and abilities required to thrive in high-stakes environments.

These certification programs do more than meet national standards—they create consistency, reinforce best practices and support the continuity of high-quality service across the state. By aligning with APCO and NENA, Hawai'i ensures its telecommunicators are trained to a high level of proficiency, prepared for the challenges and demands of a rapidly evolving emergency response landscape.

Moving forward, MCP recommends the formation of a training workgroup to monitor and evaluate training programs offered by NENA and APCO, ensuring they continue to meet the evolving needs of Hawai'i PSAPs. As the NG9-1-1 implementation progresses, this workgroup could also recommend curriculum updates to align with emerging technologies, procedures, and operational requirements.

In light of ongoing staffing shortages and the high-stress nature of 9-1-1 operations, PSAP management should also seek opportunities to integrate occupational wellness programs into their training initiatives. Providing curriculum focused on resilience-building, mental health support, and stress management can help telecommunicators feel more supported and better equipped to manage challenges in their critical roles.

Support

Score: 2.0

PSAP representatives indicated they currently lack IT staff support with NG9-1-1 expertise and do not anticipate being able to provide the requisite level of support without additional personnel and training. The PSAPs expect the 9-1-1 Board's Technical Committee to play a crucial role in holding the NG9-1-1 service provider accountable and assisting in unresolved technical issues.

The Board employs an executive director—whose primary role is to support the Board and facilitate the work of its three committees—Communications, Funding, and Technical. The Board's primary responsibilities include administering the 9-1-1 fee collection and distribution, overseeing Board operations, and providing technical advisory support.

NG9-1-1 is significantly more complex than legacy 9-1-1 systems or interim solutions that rely on legacy 9-1-1 components. The flexibility of NG9-1-1 allows public safety agencies to leverage advanced capabilities, but doing so requires input from public safety users and more technical engagement to understand and support the system. This includes managing and monitoring a highly technical solution that is often beyond the current expertise of PSAP or local agency IT staff.

As the Board evaluates the migration to a fully compliant i3 NG9-1-1 solution, it should also consider the need for statewide technical and contract management support. This support will be essential to effectively manage the NG9-1-1 vendor and ensure accountability throughout implementation and ongoing operations.

MCP recommends hiring at least one or more technical staff or engaging third-party technical support— independent of the NG9-1-1 solution provider—to support system management and oversight. Experience from other jurisdictions suggests that visibility into the NG9-1-1 system, through dashboards and ticket monitoring, is essential to identify trends and proactively address emerging issues. The use of SLAs has proven to be a successful method for technical staff to hold the vendor accountable for fast, efficient resolution to 9-1-1 issues.

As the ESInet and NGCS solution is implemented, the IT staff should be given adequate training so they can support the PSAPs locally as needed.

Additional Data

Score: 2.0

OTT applications are transforming emergency response by leveraging modern technology and enhancing communication and coordination. OTT technology aims to provide more precise, immediate and diverse communication channels to improve response effectiveness. However, there are challenges with OTT applications, including:

- Infrastructure upgrades and associated costs
- Interoperability — Different technologies working together seamlessly can take time and increase vendor costs
- Training and adaptation — Users must know how to effectively use the systems
- Funding and resources — Costs to purchase, set up, and maintain as well as resources to support the applications
- Public awareness and accessibility — Time to train the public how and when to use the applications
- Data security and privacy — OTT applications necessitate robust security measures to protect against breaches and unauthorized access

Hawai'i PSAPs use OTT applications such as RapidSOS and RapidDeploy, and where policies are in place to direct use of those applications, they are specific to the respective agency.

With more caller data being captured, state record retention laws should be reviewed to ensure compliance. MCP recommends the 9-1-1 Board form a workgroup to assess current OTT applications, evaluate their value, and develop best practice guidance for their use. Oversight of a 911 system is becoming even more important as the nation moves beyond analog technology toward a NG911 environment where the demand for and

exchange of real-time information and data (e.g., pictures, video, etc.) with internal and external partners become more complex. This increase in available data requires coordination in real-time conveying of information to field responders and must also account for long-term data storage.

COOP Plan

Score: 6.0

During interviews conducted by MCP, two PSAPs reported having formal COOP plans that are regularly trained and exercised, including participation from other public safety partners. These plans reflect a structured approach to ensuring operational continuity during emergencies or disruptions.

In contrast, one PSAP reported having an informal COOP plan that is readily accessible to staff at their consoles and used frequently. However, this plan is not regularly exercised in coordination with other public safety agencies or partners or other agencies, which may limit its effectiveness during broader regional incidents.

Effective COOP plans require the following:

- An annual comprehensive review of established plans is necessary to determine the need for any updates and ensure it is relevant and effective in addressing changes and risks.
- Plans should be reviewed following any significant organizational changes and changes in technology and personnel.
- Post-disaster reviews conducted following major events or disruptions to PSAP operations are essential for capturing lessons learned. These reviews help identify weaknesses or gaps in the current plan and support informed updates to improve effectiveness during future activations.
- Regular training, exercise, and plan testing are essential to ensure the effectiveness of a COOP plan. These activities help identify areas for improvement, validate the plan's viability, and reinforce staff knowledge and readiness to execute the plan.

Given the size, geography, and demographics of Hawai'i, MCP recommends the development and adoption of a state-level COOP plan that aligns with Federal Emergency Management (FEMA) guidelines to serve as a standardized framework for all PSAPs across the state. This plan should align with the principles and best practices already established by PSAPs that have robust COOP plans in place. The plan should incorporate specific measures to address the need for island PSAPs to support one another, given the risk implied with their distance from the mainland. The *NENA Communications Center/PSAP Disaster and Contingency Plans Model Recommendation*⁹ document provides guidance on creating and maintaining a PSAP COOP. An additional resource is the PSAP-focused COOP plan developed by the Nebraska Public Service Commission; it details how to identify the need to activate the plan, operational concepts, incident management, plan training, administration, and maintenance.¹⁰

With the increasing frequency and sophistication of cybersecurity attacks targeting 9-1-1 systems, it is essential that COOP plans go beyond traditional considerations such as natural disasters and operational disruptions to also include comprehensive cybersecurity incident response and recovery measures. Integrating cybersecurity into COOP planning ensures that PSAPs remain resilient, can maintain critical services during cyber events, and can quickly recover from such incidents to protect public safety.

⁹ https://cdn.ymaws.com/www.nena.org/resource/resmgr/standards/nena-inf-017.3-2018_disaster.pdf

¹⁰ https://psc.nebraska.gov/sites/default/files/doc/NE%20PSAP%20COOP%20Plan%20Guide_017AUG2021_Final.pdf

PSAP Staffing and Succession Planning

Score: 8.0

During interviews conducted by MCP, each PSAP expressed a shared concern regarding staffing shortages—which range from moderate to severe—an issue consistent with national trends. Successfully building and sustaining appropriate staffing levels requires intentional focus on recruitment, hiring, and retention of qualified personnel. Many of the PSAPs lack dedicated staff for these critical functions and must rely on other agency personnel to meet the needs.

Having staff available to train new employees can be challenging. Trainers are often assigned to dispatch duties that demand their full attention, making it difficult to dedicate time to onboarding. One PSAP shared that some new hires struggle to complete training due to communication barriers with callers who speak the traditional Hawaiian language—a unique complication that further impacts Hawai'i's staffing landscape.

MCP has observed that staffing conditions tend to improve in states where 9-1-1 personnel are formally classified as first responders. Reclassifying telecommunicators as first responders could help professionalize the role and attract more qualified candidates. Additionally, implementing a structured mentoring program can support new employees and improve retention. Conducting stay interviews can also yield valuable insights into why employees choose to remain in their roles, allowing PSAPs to leverage this feedback to reinforce positive trends and implement measures that support continued employee satisfaction and engagement.

Consideration of the impact of visual imagery to the telecommunicator is also necessary as additional tasks will add to the time required to process calls for service with multi-media, as well as the mental health impacts of viewing potentially disturbing images and/or video.

Several of Hawai'i's PSAPs have implemented succession planning strategies. Some are preparing staff for advancement by providing hands-on experience in supervisory roles, often using them as backup when vacancies arise. Others use a shadowing approach, allowing employees to observe and perform a new role for a set period. This helps employees and management assess whether the role is a good fit for their skills and interests. Another PSAP limits planning to call-taker and dispatcher positions, excluding supervisory roles, while another has identified strong candidates for promotion within their organization, but is unable to act due to ongoing staff constraints.

NENA's *Succession Planning Information Document* (NENA-INF-010.2-218) is an excellent tool designed to assist PSAPs with succession planning.

Incident Management

Score: 6.0

MCP recommends that the 9-1-1 Board clearly define and document the roles and responsibility of the Board staff as they relate to the NG9-1-1 migration. This should include explicit delineation of responsibilities for vendor management, issue escalation, and oversight of SLAs to ensure that vendors are held accountable for performance and compliance.

To promote consistency and transparency, the Board should consider adopting a formal policy that outlines these responsibilities in detail and provides clear guidance on when and how to engage Board staff and the Technical Committee. Establishing this structure will help ensure effective governance, timely issue resolution, and strong operational coordination throughout the transition to NG9-1-1.

Facility

Score: 6.0

The planned NG9-1-1 solution and CHE are managed solutions, hosted remotely at vendor facilities.

Each PSAP indicated that they have key card access for their facilities, understanding the importance of security.

4 Recommendations

This section contains the recommendations for resolving challenges faced by Hawai'i in its advancement toward NG9-1-1 readiness. In many cases, the transition to the NG9-1-1 end-state is an iterative process and may take years to materialize. Technical and operational needs are intertwined and must be addressed in parallel to ensure the full transition to NG9-1-1 is i3-compliant. In some cases, technology or compliance will be outside the 9-1-1 Board's sphere of influence.

The table below recaps the scores for the assessed factors. Green represents NG9-1-1 Ready, orange represents Transitional, and red represents Foundational.

Lever	MAPS Areas											
Overall Score												
Governance	Documentation	Strategic Planning	Communication	Coordination	Technology	Budgeting	Funding	Staffing	Procurement	Standards and Best Practices		
4.10	2.0	2.0	6.0	8.0	8.0	6.0	3.0	2.0	2.0	2.0		
NGCS	Technology Procurement	Functional Elements	Routing Solutions	MSAG and GIS – Address Validation	MSAG and GIS – MCS	SLAs	Reporting and MIS	Portal/Dashboard	Interoperability	ADR	Policy Routing	
3.64	2.0	4.0	4.0	4.0	2.0	2.0	2.0	4.0	4.0	6.0	6.0	
ESInet	Carrier Ingress – RFS	Carrier Ingress – LSR/Tandem	Interconnectivity	Survivability	Monitoring	Change Management	Reporting and MIS	Bandwidth	Netclock	QoS	Documentation	
6.36	8.0	2.0	2.0	4.0	10	10	4.0	6.0	6.0	10	8.0	

Lever	MAPS Areas														
Overall Score															
CHE	i3-capable Call Handling	Connectivity	Funding Management	Text-to-9-1-1	Text-from-9-1-1	RTT	Logging and Recording	Mapping	MIS	Multimedia	Grounding	TVSS	Supplemental Information	Additional Data – ADR	Additional Data – EIDO
6.64	6.0	4.0	6.0	8.0	8.0	6.0	4.0	10	6.0	2.0	10	10	10	2.0	4.0
Security	Cybersecurity Plan	Cybersecurity Policy and	Proactive Monitoring	Risk Assessment	Network Security	Physical Security	Staff Security								
6.29	8.0	2.0	4.0	4.0	10	8.0	8.0								
GIS	Production Environment	Policies and Processes	Regional Coordination	Training	Support	Addressing	Data Readiness								
6.26	8.5	5.5	4.5	6.0	5.3	4.5	9.5								

Lever	MAPS Areas								
Overall Score									
Operations	Policies and Procedures	Training	Support	Additional Data	COOP Plans	Succession Planning	Incident Management	Facility	
5.00	2.0	8.0	2.0	2.0	6.0	8.0	6.0	6.0	

4.1 Governance

The recommendations below are designed to help Hawai'i as it moves toward NG9-1-1 readiness.

Table 10: Governance Recommendations

Category	Recommendations
Documentation	• Utilize a 9-1-1 Board committee to bring together stakeholders to help develop model policies and standardized processes for consistent 9-1-1 operations across the state • Consider updating legislation to remove legacy terminology and cost recovery language
Strategic Planning	• Create a NG9-1-1 technology and operations strategic plan, including a vision and mission, with a focus on measurable goals and tasks
Communication	• Develop a communications plan for NG9-1-1 implementation
Coordination	• In coordination with the PSAPS and NG9-1-1 vendor, construct a state-level COOP plan • [Each island] Develop a COOP plan that aligns with the statewide plan to leverage NG9-1-1 technology capabilities
Technology	• Utilize a vendor with a well-formulated backup plan • Include SLAs in the vendor contract for accountability
Budgeting	• Identify the estimated costs of the NG9-1-1 transition • Assist PSAPs in planning for the transition
Funding	• Consider updating legislation to ensure the surcharge is collected from all providers
Staffing	• Hire a technical resource to manage and provide oversight to the NG9-1-1 system vendor(s)
Standards and Best Practices	• Establish a joint workgroup or committee to share documented policies, procedures, and best practices to assist with interoperable communications across jurisdictions

4.2 Next Generation Core Services

The recommendations below are designed to help Hawai'i as it moves toward NG9-1-1 readiness.

Table 11: NGCS Recommendations

Category	Recommendations
Functional Elements	Ensure that sufficient functionality is in place in the state to support 9-1-1 call, callback number, and location information delivery for fixed, nomadic, and wireless callers in cases where connectivity to the NGCS elements on the mainland is lost
Routing Solutions	Ensure all routing solutions in the hybrid ESInet/NGCS solution are i3-compliant and interoperable with legacy, transitional, and i3 solutions provided by other interconnected entities
MSAG and GIS – Address Validation	Ensure the implemented NGCS solution includes support for civic location validation during the transition and at end-state NG9-1-1
MSAG and GIS - MCS	Ensure the implemented NGCS solution includes capabilities to support conversion between legacy MSAG-formatted location and i3-formatted location during transition to NG9-1-1
SLAs	Develop service-level requirements that will improve the state's ability to hold the NG9-1-1 solution provider accountable for consistent system performance and service delivery across the state
Reporting and MIS	Ensure that the hybrid NG9-1-1 solution supports industry NG9-1-1 standards for reporting, monitoring, and MIS, allowing visibility into system health and metric tracking at both the state and local levels
Portal/Dashboard	- Ensure that the deployed NGCS system supports an online portal with an executive dashboard that allows PSAPs to access call data, network and systems status, and discrepancy reports - Ensure the portal supports an enhanced ticketing mechanism that allows PSAPs to receive real-time updates related to the status of those tickets
Interoperability	- Ensure the deployed NGCS solution supports interoperability with legacy, transitional, and i3-compliant solutions for alternate routing and the transfer of emergency calls - Ensure interoperability with other agencies outside of the State such as the Coast Guard or other military installations to facilitate data exchange and improve coordination during emergencies
Additional Data	Ensure the deployed NG9-1-1 solution supports the delivery of additional data integrated with the 9-1-1 call and supports access to third-party ADRs

Category	Recommendations
Policy Routing	Ensure that the deployed ESInet/NGCS solution includes a policy routing capability that supports real-time routing changes and facilitates call management over a wider range of alternate routing scenarios (i.e., conditions defined in i3 standards that go beyond those currently supported by the ESInet/NGCS solution)

4.3 Emergency Services IP Network

The recommendations below are designed to help Hawai'i achieve a greater level of network resiliency and interoperability as it moves toward NG9-1-1 readiness.

Table 12: ESInet Recommendations

Category	Recommendations
Carrier Ingress – RFS	- Ensure that carrier ingress to Hawai'i's ESInet uses basic SIP and standard NG9-1-1 SIP formats to support 9-1-1 call delivery to the PSAPs, in accordance with the timelines established by the FCC's Report and Order in the Matter of Facilitating Implementation of Next Generation 911 Services (NG911) - Deploy SBCs on each island to improve connectivity between the islands and provide resiliency for wireless, wireline, and VoIP 9-1-1 calling - Ensure appropriate contracts/tariffs are in place to facilitate connectivity to IP POIs
Carrier Ingress – LSR/Tandem	- Ensure the transition of carrier ingress traffic from TDM-based signaling to selective routers to SIP-based delivery to ESInets adheres to the requirements and timelines established by the FCC's Report and Order in the Matter of Facilitating Implementation of Next Generation 911 Services (NG911) - Set specific targets for the decommissioning of selective routers and the elimination of the associated costs
Interconnectivity	- Ensure the procured ESInet solution supports interoperability and interconnectivity with other i3 ESInets as well as with LSRs via LSRGs - Require the ESInet provider to comply with industry standards and best practices regarding NNIs used to interconnect with other ESInets
Survivability	Pursue a robust survivability strategy to ensure the ongoing delivery of 9-1-1 calls and associated data when connectivity issues, service outages, or interruptions occur

Category	Recommendations
Monitoring	Ensure that the procured ESInet supports a continuous monitoring capability that provides transparency and visibility into how the network is performing and the security status of the system
Change Management	Support a more integrated change management system to ensure changes are made more uniformly across the NG9-1-1 infrastructure and that PSAPs can track the status of system changes being made to the ESInet and NGCS
Reporting and MIS	- Ensure that the procured ESInet/NGCS solution supports the ability to obtain canned and ad hoc reports related to network performance data - Share this data with the 9-1-1 Board
Bandwidth	Ensure that the procured ESInet solution supports the flexible allocation of bandwidth across ESInet links and accommodates future increases in data capacity and quality
Netclock	Ensure support for access to a standard network clock to improve the consistency of the timing used by various systems within the NG9-1-1 solution
Documentation	Maintain documentation describing the overall NG9-1-1 architecture, such as detailed network design drawings that reflect the physical and virtual IP paths to each PSAP

4.4 Call-handling Equipment

The recommendations below are designed to help Hawai'i procure i3-capable CHE in preparation for the transition to NG9-1-1.

Table 13: CHE Recommendations

Category	Recommendations
i3-capable Call Handling	Monitor the ongoing evolution of support for i3-capable CHE
Connectivity	Ensure that the procured NG9-1-1 solution supports the use of standard i3 interfaces for 9-1-1 call delivery to PSAPs and for transfers between PSAPs
Funding Management	Assess whether the current tariffs and pricing structure are sufficient to fund the evolution to, and ongoing support for, NG9-1-1, including end-to-end IP connectivity

Category	Recommendations
Text-to-9-1-1	Develop a plan and/or a set of guidelines and recommendations defining Hawai'i's vision for a cohesive statewide deployment of text-to-9-1-1 that aligns with industry best practices and standards regarding the receipt and processing of texts to 9-1-1
Text-from-9-1-1	Develop guidelines and recommendations defining a statewide vision for providing PSAPs with a more integrated means of initiating text messages, including support for RTT
RTT	Ensure that the procured NG9-1-1 system supports RTT on an end-to-end basis, once originating networks and PSAP CHE are RTT-capable
Logging and Recording	Align with i3 logging and recording standards in the upgraded CHE to allow PSAPs visibility into all significant call and incident processing steps associated with a 9-1-1 call
Mapping	Recommend that the PSAPs support the use of the standard i3 MDS as an integrated mapping solution
MIS	Obtain access to ECaTS i3 call delivery reporting and analysis, once ECaTS becomes available with the upgrade of PSAP CHE, to support operational and strategic decision-making based on performance, trends, and traffic capacities
Multimedia	- Require the conveyance of multimedia over the procured ESInet/NGCS - Require an integrated solution for video and imagery for the CHE
Grounding	Reinforce requirement for any CHE installed at PSAP facilities to comply with all applicable national, state, and local codes related to grounding
TVSS	Reinforce requirement that ingress and egress metallic connections installed at PSAP facilities be equipped with primary and secondary TVSS devices in alignment with industry standards and best practices for telecommunications equipment
Additional Data – ADR	- Recommend that PSAP CHE provide integrated support for additional data that is delivered by the procured statewide ESInet/NGCS solution - Develop policies, procedures, guidelines, and recommendations to manage the receipt, visibility, usage, storage, and security of additional data - Ensure such policies, procedures, guidelines, and recommendations are general enough to cover a broad spectrum of data types
Additional Data – EIDO	Require support for EIDOs as part of the procured NG9-1-1 solution to support the conveyance of critical incident data between PSAPs with transferred 9-1-1

Category	Recommendations
	calls and between applications (e.g., between call handling and CAD) within a PSAP Recommend that upgraded PSAP CHE support the exchange of EIDOs

4.5 Security

While the MAPS security assessment provides a foundational overview, it only scratches the surface of what is needed to fully prepare an organization for cyberthreats. Special consideration should be given to conducting comprehensive network security and risk assessments at the local PSAP level.

A recurring theme in the PSAP environment is a lack of sufficient cybersecurity awareness and controls to proactively identify and mitigate threats. In contrast, ESInet and NGCS providers are generally expected to maintain a proactive cybersecurity posture, including continuous monitoring.

Given the frequent reliance on vendors to manage security, it is critical that priority be placed on verifying vendor compliance with NG9-1-1 security requirements.

The recommendations below are designed to help Hawai'i achieve a greater level of cybersecurity preparedness and become more cybersecurity aware as it moves toward NG9-1-1 readiness.

Table 14: Security Recommendations

Category	Recommendations
Cybersecurity Plan	- Exercise the statewide cybersecurity plan - Provide an annual assessment program, as well as cybersecurity training
Cybersecurity Plan and Procedure	[Counties] Document cybersecurity policies defining procedures and actions to take in the event of a cybersecurity incident, including how and when to bring in outside assistance
Proactive Monitoring	- Ensure the NG9-1-1 solution incorporates end-to-end monitoring of the ESInet and NGCS - Support regular third-party monitoring of systems, networks, and facilities - Regularly review security policies and procedures to maintain a strong security posture for all systems that play a role in providing 9-1-1 service
Risk Assessment	Require annual risk assessments and audits of the ESInet connectivity to OSPs and to individual PSAPs to identify any cyber vulnerabilities associated with the end-to-end NG9-1-1 architecture

Category	Recommendations
Physical Security	- Ensure all entities involved in providing NG9-1-1 services have NG9-1-1 standards-compliant security processes in place for all network personnel and equipment - Ensure protections align with policies and procedures applicable to all systems interfacing with the statewide NG9-1-1 solution
Network Security	
Staff Security	

4.6 Geographic Information Systems

The recommendations below are designed to help Hawai'i as it prepares for the transition to NG9-1-1.

Table 15: GIS Recommendations

Category	Recommendations
Production Environment	- Mitigate the lack of dedicated GIS support in most PSAPs to provide data remediation, analytics, and mapping support through grants and staff augmentation - Develop guidelines and recommendations to guide the State's vision for GIS support at the local level
Policies and Processes	- Develop and/or revise COOP plan to include local, state, and contractor GIS capabilities supporting 9-1-1 operations - Record SOPs and workflows - Review metadata policies and update as appropriate
Regional Coordination	- Coordinate with federal and military partners to refine PSAP and provisioning boundaries - Promote and support HIGICC 9-1-1 GIS workgroup
Training	Perform outreach and education beyond the 9-1-1 ecosystem to expand data development and maintenance resource pool
Support	- Centralize GIS contractor support at the State - Centralize local addressing authority coordination at the State
Addressing	- Initiate an outreach and education campaign to promote the importance of addressing standards and coordinated addressing for all PSAPs - Provide a brief, one-page explanation of the importance of addressing to 9-1-1 and why the 9-1-1 Board is conducting the outreach

Category	Recommendations
	- Establish minimum standards for address assignment - Methods for assigning address ranges - Proper spacing for address numbers - Odd/even parity standards - Draft a template for creating an addressing ordinance - Recommendations for methodology - Common language for address creation standards - Signage standards and draft address display language - Draft templates for intergovernmental agreements to manage the information flow from addressing authorities without GIS capabilities up to the GIS contracted support - Draft standards and expectations for address propagation from the addressing authority to the NG9-1-1 solution - Prepare executive briefing materials to garner leadership and elected official buy-in
Data Readiness	Implement an Open GIS Data policy allowing the sharing of 9-1-1 GIS data with other government agencies

4.7 Operations

The recommendations below are designed to help Hawai'i in preparation for the transition to NG9-1-1.

Table 16: Operations Recommendations

Category	Recommendations
Policies and Procedures	- Assure PSAPs continue to develop policies as NG9-1-1 solutions are deployed - Form a Policy Committee under the 9-1-1 Board tasked with creating policy and procedure templates for use by the PSAPs
Training	- Form a training workgroup to identify minimum training standards and review the APCO curriculum to ensure it meets the needs of the PSAPs - Suggest updates to the training curriculum as NG9-1-1 technology is deployed - Explore the need for occupational wellness in the PSAP curriculum focused on the impact of new information received by the PSAP
Support	Consider hiring technical staff at the Board level to manage NG9-1-1 system vendor(s) and provide oversight of system health

Category	Recommendations
	• Include dashboard or ticket monitoring capability to identify trends and proactively address emerging issues • Include SLAs to hold vendor(s) accountable for the fast and efficient resolution to 9-1-1 issues • Train local IT staff on NG9-1-1 and CHE solutions to ensure they can adequately support the PSAP
Additional Data	• Review state record retention legislation to address additional data that is collected • Form a workgroup to understand the OTT applications used today, review the value they offer, and develop best practice guidance for the use of various applications
COOP Plans	• Encourage all PSAPs to finalize a comprehensive COOP plan that aligns with FEMA recommendations and includes an annual review process • Ensure cybersecurity is a component of the final COOP plan • Develop appropriate policies and procedures that align with the COOP plan • Conduct regular COOP exercise activities to ensure staff are comfortable with the process
Succession Planning	• Develop a succession plan and update regularly • Conduct training for staff members to function in a role that is one above their position for emergency backup, succession training, and to increase organizational depth • Cross-train staff (to the degree feasible) to augment current staff shortages until additional staff is acquired
Incident Management	• Identify the role and responsibility of 9-1-1 Board staff as it pertains to the NG9-1-1 migration • Develop a policy of when to engage 9-1-1 Board staff

5 Conclusion

Hawai'i has begun laying a solid foundation for the transition to NG9-1-1. Through the use of the MAPS tool, gaps have been identified across seven critical readiness categories: governance, NGCS, ESInet, CHE, security, operations, and GIS.

Hawai'i is currently entering the transitional stage of the NG9-1-1 readiness continuum and has shown notable progress in CHE, security and GIS, while governance remains an area requiring focused attention. This level of

readiness is typical in the early phases of NG9-1-1 planning and reflects a forward-focused posture committed to improvement.

To continue advancing the transition, the following are key areas for strategic focus:

- Consider updating legislation and providing technical support at the 9-1-1 Board level
- Develop a strategic plan with clearly defined metrics and develop a comprehensive communication plan
- Establish SLAs for the call handling and NG9-1-1 solution
- Develop a plan for implementing text-to-9-1-1, RTT, and multimedia capabilities
- Establish documented county cybersecurity policies that include when to engage outside resources
- Develop guidelines and recommendations to guide the State's vision for GIS support at the local level
- Form a Policy Committee under the Board to establish templates that can be used across the state

The results of this assessment will guide Hawai'i in developing an NG9-1-1 strategic plan and help prioritize actions to transition from the current state to full NG9-1-1 readiness. Throughout this process, Hawai'i will face critical decisions about how to achieve its goals. A well-crafted NG9-1-1 strategic plan—grounded in stakeholder input and focused on identified areas for improvement—will be essential for a successful transition.

Appendix A: State 9-1-1 Fee Comparison

State	9-1-1 Surcharge
Alaska	Wireline – up to \$2.00 Wireless – up to \$2.00 Prepaid – N/A VoIP – N/A Does not collect on Prepaid Wireless or VOIP at this time.
Delaware	Wireline – \$0.60 Wireless – \$0.60 Prepaid – \$0.60 VoIP – \$0.60 MLTS – unknown
Maine	Wireline – \$0.35 Wireless – \$0.35 Prepaid – \$0.35 POS VoIP – \$0.35 MLTS – surcharge capped at 25 lines
Massachusetts	Wireline – \$1.50 Wireless – \$1.50 Prepaid – \$1.50 VoIP – \$1.50 MLTS – \$0.17 per Centrex line; \$7.50 per PRI Line
Montana	Wireline – \$1.00 Wireless – \$1.00 Prepaid – \$1.00 VoIP – N/A MLTS – unknown
New Hampshire	Wireline – \$0.75 Wireless – \$0.75 Prepaid – \$0.75 POS VoIP – \$0.75 MLTS – \$0.75 Up to 25 Lines
Rhode Island	Wireline – \$.50 Wireless – \$.50 Prepaid – 2.5% POS VoIP – Included in wireless charge MLTS – \$1.00

State	9-1-1 Surcharge
Vermont	Wireline – 2.4% customer telecommunications charges Wireless – 2.4% customer telecommunications charges Prepaid – 2.4% customer telecommunications charges VoIP – 2.4% customer telecommunications charges MLTS – unknown