

# NENA Virtual PSAP Management Information Document



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## 1 Executive Overview

As Next Generation 9-1-1 systems begin to be deployed, PSAP Authorities may have an opportunity to enhance their operations and to develop practices that will fully embrace the new Next Gen environment. The concept of a virtual worker as part of the PSAP team is one that was not fully possible before. Whether it is an acceptable and functional concept for 9-1-1 operations can only be determined after careful and comprehensive assessment of current functionality in light of available technology and how PSAP Authorities want to operate in the new Next Gen setting. The practical application of a virtual worker in the public safety communications environment will have to be considered, carefully planned, trialed, implemented and then re-assessed and modified as appropriate.

The PSAP Authorities best positioned to implement a comprehensive virtual work program will have an organizational maturity and culture of teamwork and collaboration that can support it. A clear and shared understanding of mission and priorities will make it easier to have some of the employee team spending their work days not in close physical proximity to other members of the team. Open, honest and proactive communication is a prerequisite. Everyone involved must understand what is being done and why, and the role they are expected to play in supporting the whole.<sup>1</sup>

All aspects of the PSAP operation will be impacted by such a change in the work force--recruiting, hiring, testing, training, supervision, team dynamics, technology, security, support systems, policy and operational practices. Therefore, the consideration of virtual workers will require visionary leadership, comprehensive assessment, and a will to create a culture within the organization that allows for success.

Virtual work within a 9-1-1 construct may not be desired by all PSAP Authorities, nor may it be possible in all environments. However, as opportunities for change in PSAP operations present themselves with Next Generation 9-1-1 systems or technology; it may be appropriate for the PSAP Manager and decision makers to evaluate whether such a structure is right for their operation.

### **Purpose and Scope of Document**

This document is intended as a guide for PSAP Authority staff and policy makers to evaluate and consider the opportunities and challenges presented with the Next Generation 9-1-1 systems as they relate to personnel and PSAP management. Specifically, what considerations might be necessary for employing virtual workers for the traditional PSAP environment?

Next Generation 9-1-1 provides expanded opportunities that exist with 'virtual' Public Safety Answering Points. A PSAP is no longer required to be in a specific single-site physical location, or at least not all of their workers need be in a single physical location. While there can be a number of benefits, ranging from day-to-day operations to disaster/major event scenarios, there may exist a need to provide management recommendations and guidelines to assist in evaluating and

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<sup>1</sup> Telework 360°: A Best Practices Digest and Guide to Getting Telework Right in the Public Sector, The Center for Digital Government, 2006, at: [http://media.govtech.net/Digital\\_Communities/assets/CDG06\\_Telework.pdf](http://media.govtech.net/Digital_Communities/assets/CDG06_Telework.pdf).

implementing this concept. While it is new to the 9-1-1 community, the virtual call center concept is already in place in the State of Maine 9-1-1 Program and Palm Beach Florida<sup>2</sup>

The goal of this document is to provoke thought, to consider opportunities, to address challenges and to develop initial recommendations and guidelines in areas ranging from supervision to full management oversight. The discussion of this issue has been built from reviewing what has been learned within private industry's virtual call center implementations, considered against a review of basic management recommendations and guidelines which already exist for the 9-1-1 PSAP environment. Other NENA documents should be consulted for information on contingency planning, contingency operations, security issues, network design which are beyond the scope of this document.

### **Reason to Implement**

Today's PSAPs environment primarily consists of two main core functions; call handling and radio communication.

The work group discussion identified a number of challenges to current PSAP operations which might benefit from addressing issues in new ways in the future PSAP environment. Things such as:

- PSAPs increasingly have difficulty finding enough qualified people.
- PSAPs are costly to set up and run.
- PSAP space, structure and resources are not easily scalable.
- PSAPs cannot always easily accommodate unpredictable demand.
- PSAPs do not reflect the employee's desires for a flexible work environment.
- PSAPs have difficulty retaining qualified people.

Finding successful and efficient ways to solve some of these challenges by use of virtual workers in the PSAP present significant opportunities for management. More study is needed, but research in the private sector has demonstrated that benefits of virtual workers are experienced in the area of improving access to business call centers attracting the new generation of worker, saving on physical space, potential cost savings, effective response to erratic call volume and overcoming the employee retention problems issues that plague PSAPs today.

One of the initial questions discussed by the work group was why consider a "virtual" work group for the PSAP environment? What might be the advantages, or challenges to such an implementation?

Modern information technology has made effective and efficient virtual work possible and today's employees expect virtual work as an option. But, are those sufficient reasons to implement it? If virtual work is going to become part of a successful public safety strategy, there needs to be significant planning and adjustment to operations policy in order to accommodate the changing work environment.

What benefits can be expected from moving to a virtual work program and what resources will be required? It is important for decision-makers to have a full understanding of the drivers, benefits, challenges and opportunities and the relationship between and among these factors, including

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<sup>2</sup> Task Force on Optimal PSAP [Architecture](#) (TFOPA) Report 2016

potential liability, regulatory and privacy issues. Otherwise, well-intentioned action may result in confusion and unachievable expectations for the organization and from constituents, as well as errors in planning, program promotion, and other implementation activities.

## **2 Virtual PSAP**

What is a virtual PSAP? The concept of a virtual PSAP ranges from having employees working off site to multiple brick and mortar PSAPs sharing remote or centralized resources. With today's environment and technological advances, the need for a virtual PSAP could range from employees handling tasks off site to managing and overseeing selected PSAP operations. When preparing continuity of operations plans, virtualization could enable the PSAP to continue to function off site.

### **2.1 Assessment of PSAP Task Virtualization**

PSAP authorities should evaluate the different operational tasks that are currently being performed or will be performed in the future within their emergency communication center to determine if they are mission critical and should be performed internally, or if the task could be virtualized. PSAP Authorities will need to weigh the risk, benefits, privacy and liability of having that task(s) virtualized. The needs assessment should identify the application, tools, security, technological and human resources including skills that would be required to perform the task and the supporting supervisory methods and skills necessary to manage virtual workers performance.

Remote workers will have access to sensitive or protected data outside of a controlled environment that is otherwise covered under statutes or policies, e.g. HIPAA and CJIS. Additional considerations and/or policies will need to be undertaken how to address the legal issues that may arise with remote workers. This may require periodic on-site inspections of remote work environments, as well as remote monitoring tools to track employee activity and data that they access.

Regionally PSAP authorities may evaluate consolidating or virtualizing mission critical tasks such as 9-1-1 call processing. Virtualizing mission critical tasks in a region, the need to have "local knowledge" of the region should be a consideration.

### **2.2 Architecture**

Virtual infrastructure will need to be common and shared. Hosted applications will need to be replicated at the virtual sites for consistency of operations and redundancy. In order to effectively provide a virtual environment for call processing, the PSAP authority will need to implement NG911 technologies and replicate operations. Virtual workers will need to be able to securely access the emergency services network(s). Any satellite or virtual work locations may need to access functions of the main site.

### **2.3 Virtual Environment**

PSAP authorities will need to operate in an IP environment. PSAP authorities need to be aware of the legislative or governmental mandates when designing a virtual PSAP. For example; restrictions in regards to data being hosted off site, proof of chain of custody.



Call answering can occur locally, regionally or off site from an individual's home. Call routing in this environment can be changed. Different call routing protocols could be set based on continuity of operations. The virtual environment provides countless opportunities and challenges.

Beyond the individual PSAP operating in their own virtual environment, NG 9-1-1 creates the opportunity to regionalize 9-1-1 call taking. PSAPs can work together developing a hosted 9-1-1 system to share the technology, SOP's and call handling. For example, PSAP A is a smaller PSAP that can find itself in an overflow condition. PSAP B, the larger PSAP, can absorb the overflow.

Challenges: recording and logging of calls, when routing changes. GIS, local knowledge in a regional setting. Shared funding and governance in a cooperative virtual environment.

## **2.4 Security**

Scope of the security in a virtual environment can grow. It starts at a local level; the impact of a security breach could now have consequences for multiple locations, including the overall health of the ESInet on a regional or global scale. This would not only include network security but physical security. Federal Communications Commission (FCC) Communications Security, Reliability and Interoperability Council (CSRIC) provides best practices for designing and implementing security and control <https://www.fcc.gov/nors/outage/bestpractice/BestPractice.cfm>

### **2.4.1 Physical Security**

Controls should be in place and applied in regards to access to the site and equipment room controlling the network. REF: NENA 04-503 Technical Information Document Network/System Access Security.

### **2.4.2 Network Security**

PSAP Authorities in a virtual environment should assess any risk, vulnerabilities and likelihood of occurrence leading to a threat.

The FCC's Task Force on Optimal Public Safety Answering Point Architecture (TFOPA) or Task Force) report, available at <https://www.fcc.gov/document/fcc-releases-tfopa-final-report>, identifies four use cases that will provide public safety entities with better situational awareness, create a focus on cybersecurity, and encourage immediate action on the part of 9-1-1 Authorities, PSAPs and public safety entities in both educating their personnel and protecting their networks and systems.

The objective of the Task Force was to address the issues of increasing exposure to cyber threats and vulnerabilities that did not exist in the legacy 9-1-1 environment, and develop recommendations for PSAP-specific cybersecurity best practices based on the National Institute of Standards and Technology (NIST) Cybersecurity Framework and other foundational resources that include the results of Federal cybersecurity focused reports and activities of CSRIC and the Department of Homeland Security (DHS); industry specific standards bodies such as NENA, Association of Public-Safety Communications Officials (APCO), and the Alliance of Telecommunications Industry Solutions (ATIS); and industry best practices.

### **2.4.3 Human Resources-Personnel Standards**

PSAP Authorities should develop human resource (HR) procedures to include preventative measures such as background checks. Procedures should acknowledge that job rotations might necessitate the need for modifying the access of the rotated personnel. The organization should have termination procedures that include returning of all keys, pass cards and sensitive material. The organization should have a code of conduct that outlines expectations of its personnel. Additional workplace policies may be required that are specific to the organization's function.<sup>3</sup>

PSAP Authorities accessing law enforcement databases will need to consult their state and local administrators to comply with regulations specific to their state.

## **2.5 Communications**

PSAP Authorities need to consider how internal and virtual environment communications will be conducted, acknowledged and tracked especially for the virtual environment for compliance. Measures should also be taken to ensure comprehension by all staff.

### **2.5.1 Internal Communications**

Tools used for internal communication should also be fostered for all staff, including those working remotely. For example: incident sharing, broadcast, etc. Virtual workers need to have a direct line of communication to supervisors for questions, inquiries or clarification.

### **2.5.2 External Communications**

PSAP Authorities should use standardized definitions to communicate with other PSAP Authorities or the public to report or share incidents or issue details.

### **Management of Virtual Functions**

PSAP Authorities should consider a method of managing these functions in a virtual environment;

- Quality Assurance: call answer time; call processing, customer service and dispatching procedures.
- Scheduling/Payroll
- Shift management (daily observation reports, work flow, unusual occurrences-staff notification)
- Performance Appraisals
- Training
- Quality Control-investigate performance from inquiries
- Disciplinary Action
- Adherence to policies
- Etc.

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<sup>3</sup> FCC Task Force on Optimal PSAP Architecture (TFOPA), section 4.3.2.3 Human Resources

### 3 Employee Selection

Although the technology that supports virtual workers gets most of the attention when we talk about virtual teams, it's really the changes in the nature of teams - not their use of technology - that creates new challenges for managers and PSAP employees. Most "virtual" teams operate in multiple modes including having face-to-face meetings when possible. Managing a virtual team means managing the whole spectrum of communication strategies and project management techniques as well as human and social processes in ways that support the work team.<sup>4</sup>

The basic elements or traits that we look for in hiring a 9-1-1 Telecommunicator will probably not change drastically in a virtual environment. In the Work Group discussion, there was general agreement that, first and foremost, we need to hire individuals who can work in the traditional "bricks and mortar" PSAP. The initial dispatcher/call taker training should still occur in the traditional classroom with hands-on training on the live dispatch floor. It is anticipated that before an individual would be accepted for work in a "virtual" PSAP, they would demonstrate proficiency in the traditional PSAP setting.

With that said, our search profile might be slightly expanded. Currently, some PSAP employers do not place a priority in the ability to work independently or the ability to self-pace the work day. Daily PSAP operations involve a great deal of teamwork and reliance on direct supervision to shift operational priorities during peak call times or during critical incidents. Any PSAP operations rely on individuals who possess a basic computer technology skill set.

To work in an individual or virtual environment, it would be beneficial to have experienced employees with the confidence to be able to work independently. These individuals should also be capable of pacing their workload and being able to adapt remote indicators of systems status and needs. Additionally, it will be helpful to have employees who possess a better than "basic" technology skill set. These virtual workers will need to know more than just logging on to a computer. They will be interfacing with streaming video, text to 9-1-1, third party applications, monitoring social media, while maintaining local computer hardware/software in operational condition, awareness of other peripherals will be necessary. Any of the tools available to the on-site physical PSAP will also need to be available to the virtual PSAP worker.

When selecting employees for a virtual workforce PSAP Authorities should consider at a minimum the following requirements:

- self-motivation;
- self-discipline and initiative;
- strong organizational and time management skills;
- the ability to work alone and independently with minimal supervision and feedback;
- success in their current position;
- compliance with the organization's procedures and policies;
- an understanding of the effect of their participation in the program on other employees;
- effective communication skills and the ability to be a team player;

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<sup>4</sup> [Managing Virtual Teams](#) Text of speech given by Lisa Kimball for Team Strategies Conference sponsored by Federated Press, Toronto, Canada, 1997. Lisa Kimball is the Executive Producer of Group Jazz ([www.groupjazz.com](http://www.groupjazz.com)).

- access to a safe, comfortable remote worksite where it's easy to concentrate;
- compliance with mandatory level of security;

Finally, consideration should be given to testing virtual PSAP candidates for work ethic and commitment.

## **4 Recruitment**

Finding successful employees is one of the biggest challenges for the traditional PSAP manager.

As stated in the "Employee Selection" section above, consensus is that primary or initial recruitment would be for the "bricks and mortar" PSAP. Individuals placed in the virtual PSAP would most likely be veteran or proven dispatchers.

To be chosen to work in the virtual PSAP environment would most likely be seen as an incentive or preferential shift assignment--something that employees may even be competing for.

The virtual PSAP environment may open the doors to a new pool of candidates. With the potential use of virtual workers, the hiring pool can be expanded to include all 50 states. Virtual workers can take their job with them when traveling or if they move. This type of employment is ideal for stay at home moms/dads, military spouses, retirees, disabled persons or people who live in very rural areas.

While local preferences in emergency communications have traditionally been to utilize persons from the local community and emphasis on local community understanding and awareness is acknowledged to be critically important for effective 9-1-1 operations, depending on the need and the application, utilizing persons outside of the local area can also be effective. The TERT program, for example, has been demonstrated to be highly effective to augment staff and provide specific assistance for skilled tasks in urgent situations.

Virtual work would open the candidate pool to retired dispatchers or dispatchers from other jurisdictions looking for shorter work shifts or special assignments that would normally not be targeted in the normal recruitment procedure. Also, the current and upcoming generations may be more receptive to offsite work opportunities that involve state of the art technologies.

The pool of potential candidates for employment may widen and provide new opportunities for the PSAP manager.

## **5 Hiring Practices**

PSAPs and their supporting Human Resource Departments will need to evaluate existing job descriptions for essential functions impacted by a virtual work environment. Multiple job descriptions may be needed to accommodate unique sites, i.e., home, off-site PSAP or satellite office and identify specific job requirements required for independent work. Some examples for consideration are:

- site approval for virtual assignment;
- define equipment requirements, security, and maintenance;
- expand computer literacy requirement;
- require work relation MOU (if working from home);

- accommodation for ADA if necessary.

Actual testing and interviews for qualified employees need to be specialized from the manner in which a PSAP Authority does today for on location positions. When a PSAP Authority is hiring specifically for a virtual position, the questions and scoring criterion for the applicant may need to be tailored for the specific position. Consequently, the skills and demeanor, work ethic and independence of the applicant may all be considered as highly acceptable qualities for the virtual position. As we have stated earlier in the document, if the ability to work in a virtual environment is going to be considered a promotional aspect or one that an employee “graduates” or proves themselves into, perhaps nothing in the hiring or screening process need change. Work rules will be changed as the situation warrants. When the worker provides sufficient acceptable qualities to the supervisor and manager of the PSAP Authority and the PSAP Authority has determined it is in their best interest to advance the concept of virtual work, then other factors may need to be considered such as a Memorandum Of Understanding (MOU).

An MOU, for working from home or an alternate work environment from the on-site PSAP Authority, might consist of agreement of site specifications for supporting computer access; security of work environment; random site visits for inspection purposes; responsibilities of the employer, responsibilities of the employee, etc.

## **6 Collective Bargaining**

PSAP Authorities with union employees may have special challenges and opportunities with the virtual PSAP concept that would have to be addressed before a virtual PSAP could be implemented.

As unions contemplate the effect virtual work may have on their union members, they will likely be concerned about the ability to represent their members and will be seeking a clear definition of the role of the union in implementing alternate work environments. In the past, union leaders may have struggled with employers who attempted unplanned, informal virtual work programs through an essentially arbitrary selection process. It is likely that Union leaders will want to know early on how the Union will be involved in planning, implementing and monitoring virtual work programs. They may even want to be involved in developing the criteria for who is selected or allowed to work virtually. Their involvement may help assure their members that the criteria has been developed in a fair and even way and that the selection of who is permitted to work virtually is conducted by an agreed upon process. The federal government requires agencies to develop alternate location work programs in partnership with unions and other stakeholders since such work affects conditions of employment. That same model may well be translated to the local level in order for virtual work relationships to be successful.

In Telework 360°: <sup>5</sup>A Best Practices Digest and Guide to Getting Telework Right in the Public Sector, the Center for Digital Government it was reported that Unions have historically been supportive of virtual working as an option for members when they have been involved from the beginning, and implementation plans have been well considered and well-constructed. When appropriately involved, unions can be very helpful in instituting a successful virtual work program.

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<sup>5</sup> Telework 360°: A Best Practices Digest and Guide to Getting Telework Right in the Public Sector, The Center for Digital Government, 2006.

For example, unions can sponsor information sessions on virtual work that are open to employees at every level of the PSAP organization. Employers in the public and private sectors who have successfully implemented a virtual work plan can be invited to discuss the benefits and challenges of the programs. If a virtual work program is to be successful, all staff must be comfortable with the process. The union can facilitate this together with management and supervisory counterparts<sup>6</sup>.

Objections by unions may need to be contemplated as part of the planning and evaluation analysis conducted by the PSAP manager. Some possible objections to consider include:

1. fairness and equity in the selection process for virtual work;
2. fairness and equity in supervision, work schedules, performance evaluation and other personnel related aspects of management; and
3. compensation issues including both pay and benefits.

Literally anything that exists today in a PSAPs policies and procedures, employment rules and regulations may require re-evaluation by both management and union representatives.

Virtual work can be a win-win proposal if done correctly. Both union leadership and management may need to work to alleviate citizen and political concerns regarding perceptions that virtual work hinders supervision and therefore facilitates ineffectiveness and imbalance of workload. All those issues can and need to be addressed in the supervision and monitoring processes and employment of appropriate technology that should be established by the PSAP Authority management.

PSAP managers may need to consider that virtual working is part of the technological wave of the 21st century and it can be beneficial to citizens and workers alike, but it must provide seamless coverage in support of the quality services that the public has come to expect from its dedicated public employees.<sup>7</sup>

## **7 Retention**

Employee retention could perhaps be one of the major benefits of a virtual PSAP environment. Some of the most common reasons of job dissatisfaction leading to employees leaving their job are uncomfortable work environment, work hours, pay, and stress levels. The virtual PSAP may be able to address some of these issues and thereby aid in staff retention.

Working at home or in a more localized satellite location may address the uncomfortable work environment complaint. The ability to “come to work” in casual clothing as opposed to a uniform may certainly increase the comfort level in some individuals. Not needing to be in physical proximity of a co-worker an employee has a conflict with might also alleviate some of the workplace complaints.

Work hours and pay concerns may also be accommodated. Shorter commute times, lower meal expenses, and lack of special clothing expenses could result in higher net pay for these employees even if the pay rate is identical to or lower than the traditional PSAP dispatcher.

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<sup>6</sup> Ibid

<sup>7</sup> Ibid

Finally, employees lost to retirement, and life changes (moving, needing to care for child/elder, wanting to work only part time), could be retained in a virtual PSAP environment. Being able to work a shorter schedule, only peak hours, or only during special assignments may keep these already trained individuals on your payroll to assist during times when it is difficult to staff with your full time employees.

## 8 Training

An understanding of the importance training plays in establishing a foundation for success—and a commitment to providing training will be essential to the success of any virtual program. An initial training program should be considered to provide telework information to both managers and employees. It will be important to demonstrate that both managers and employees are “in it together” and mutually responsible for success.<sup>8</sup>

It is recommended that initial training should be done on site the same as the local operators. This should include classroom training and on the floor training. Virtual continuing education can be flexible and scheduled. Using available technology for training is important for the success of training. Time and money must be allocated for training. It will be challenging to make sure everyone (local and remote) stays updated with technology hardware and software.

The difference between classroom training and virtual training is the time allotted for training. Employees can sit in a classroom for eight hours for training. It will be a challenge to expect employees to sit in front of a computer monitor for eight hours. It is recommended to conduct virtual training for a maximum 1-2 hour blocks. A virtual worker may take the initiative to learn in larger blocks if the virtual PSAP’s call volume allows for additional training. Onsite training should be scheduled at regular intervals to have the opportunity to get everyone together in one room for training/meeting. It will be important to document all training on a regular basis.

Different types of virtual training may include:

- Webcast – live training that allows interaction between the instructor and the students; can be used with audio or video conferencing.
- Online meeting software – live training used in conjunction with audio or video conferencing; example – use a PowerPoint and dial in on the phone for sound.
- Pre-recorded presentation – audio and slides viewed online; no interaction.
- DVD/CD – flexible training viewed by the employee when they have downtime
- Internet-based Learning Management System – flexible, self-paced training that can provide a variety of assignments, exercises, audio/visual aids, that allow the employee to learn at their own pace

Virtually any type of E-learning techniques and methods including teaching modules delivered to the virtual workers desktop via e-delivery or by way of virtual conference calls with live proctors or teachers, and E-learning modules can be successfully deployed and should be considered as a viable method of training in the virtual environment. Training software specifically designed for

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<sup>8</sup> Telework 360°: A Best Practices Digest and Guide to Getting Telework Right in the Public Sector, The Center for Digital Government, 2006.

application for virtual work groups is available today. PSAP Authority managers should evaluate the options and training packages in the marketplace to determine their applicability to PSAP employee training.

Additionally, the demands of virtual work may be significantly different and require additional technical knowledge. The training manager should consider placing special emphasis on IT operation and maintenance, information security and vulnerability, and maintaining effective communication with managers and co-workers, while covering any new liability risks.<sup>9</sup>

## 9 Teamwork

The PSAP Authority is encouraged to consider if the organization is best positioned to implement a comprehensive virtual work program, and if it has sufficient organizational maturity and a culture of teamwork and collaboration that can support it.

Research on this subject tells us that some of the key ideas to keep in mind to make sure a virtual team works effectively include:

- teamwork is fundamentally social
- knowledge is integrated in the life of teams and needs to be made explicit
- it's important to create ways for team members to experience membership
- knowledge depends on engagement in practice, people gain [and retain] knowledge from observation and participation
- engagement is inseparable from empowerment
- "failure" to perform is often the result of exclusion from the process<sup>10</sup>

It is not easy keeping up the motivation levels of team members from different cultures and work environments who lack face-to-face interaction. The camaraderie and spirit that makes such a difference to team work is also missing. However, the advents of new technologies and networking capabilities have introduced a new virtual team work environment.

Initial training for new employees must be held at the physical PSAP, to gain an understanding of how public safety operates and get to know co-workers. This will aid in teamwork down the road. There may also be group training sessions, where both new and tenured dispatchers can gain trust in each other to aid in team building. Virtual briefings at the beginning of each shift can be helpful, keeping in mind they would need to be more detailed. A secure virtual break room, or chat room, for specific employee groups so they can bond while discussing issues, may also be beneficial. Secure chat rooms can be monitored and logged by the PSAP authority. Secure chat rooms should be used for business purposes only.

Organizations should consider the importance of investing in technologies that will help remote workers feel connected to the agency and their peers. More of an effort may need to be made to help

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<sup>9</sup> Telework 360°: A Best Practices Digest and Guide to Getting Telework Right in the Public Sector, The Center for Digital Government, 2006.

<sup>10</sup> Managing Virtual Teams Text of speech given by Lisa Kimball for Team Strategies Conference sponsored by Federated Press, Toronto, Canada, 1997. Lisa Kimball is the Executive Producer of Group Jazz ([www.groupjazz.com](http://www.groupjazz.com)).



make the virtual worker feel a part of the team because they are not physically located with other members of the team.

## 10 Staffing

The virtual PSAP environment will most likely encounter some of the same staffing challenges as the traditional “bricks and mortar” PSAP. One of the biggest challenges will be control of and communication with the virtual PSAP employee.

In a traditional PSAP environment, the physical presence of an employee can facilitate communications within the agency and aid in the daily control of operations. In the virtual environment, the visual cues that managers and supervisors rely on will not be readily available. The following table identifies some specific areas where the virtual operation differs from the physical presence of an employee located within a physical facility.

	Physical	Virtual
Attendance	We can visually see an employee arriving late, leaving early or taking excessive breaks.	Attendance can be tracked virtually by monitoring software, instant messaging that tracks real time online status and type of device, ambient awareness
Roll Call	The same information can be disseminated to all employees coming on to a shift in one physical location	Use of electronic bulletin boards, emails, conference calls, private chat rooms, private instant messaging, video conferencing
Scheduling	Schedules and shift openings are normally posted in the physical PSAP where all employees can view and sign up for overtime and post requests for vacation coverage of shift swaps.	PSAP authorities should consider using applications and technology to virtualize their staff scheduling. These applications can be used to schedule both traditional and virtual workers. In addition applications could be used to contact employees to cover last minute shortages and/or during emergency situations to work virtually or onsite.  Web based scheduling software, other web based applications to provide real time updates to facilitate shift sign ups or vacation bids.
Control of Work	In the physical PSAP setting,	PSAP authorities should establish

Environment	managers can control the work environment to some degree. The employee is physically present and the equipment is set up in work stations.	guidelines for the work environment. Considering noise reduction, restricting access to unauthorized people. PSAP authority may choose to supply equipment, and define requirements for BYOD.
Work Force	Currently there is a high demand for staffing. Retention is challenging. Management can offer perks to on site employees to help with retention and recruitment. Your recruitment pool maybe limited to the geographic area. Impacts of commuting, cost of living etc. can affect the hiring pool.	<p>The availability of virtual work opportunities may bring more people into the work force and increase retention to counter short staffing in the traditional PSAP.</p> <p>A virtual environment could remove geographic barriers, opening up the applicant pool. Using virtual workers could reduce travel to the work site; in some regions this may improve employee retention.</p> <p>The future manager will need options to meet scheduling challenges and the virtual workforce may provide those options.</p>

There may very well be simple solutions to the points mentioned above. Utilizing new and existing technologies may assist the manager with many of the virtual staffing issues. Some examples may be:

- **Hardware** – Web cams at the virtual workers location could monitor their presence at a work station and the physical location of where the work is being performed. During long or odd shift hours, being able to see a virtual worker can help the manager monitor for fatigue or distractions.
- **Software** – Software solutions that allow for instant text messaging and/or Voice over Internet Provider (VoIP) “intercoms” can facilitate “roll call” meetings or dissemination of vital information that may be needed for each shift on a daily basis. Additionally, there are many online providers of Shift Scheduling Services which allow anyone to remotely see assigned shift, open shifts, and shift swap requests. Placing both traditional and virtual workers on such a system may facilitate scheduling.

- Remote Monitoring- Workstation status monitoring software can be used to track workstation status such as call taking availability, call processing time, and to assist management in the assessment of overall performance.
  - Remote Access- Organizations with higher security needs or with particularly high risks against their remote access communications should use thick remote access clients whenever possible to reduce the risk of compromise.<sup>11</sup> Remote access client is considered thick if it is configured so that the organization has nearly complete control over the remote access environment.<sup>12</sup>

Finally, it is worth mentioning again that there are some staffing challenges that will be common to both the virtual and traditional PSAP environments. Work force is one such issue. The ability to work virtually may make more people interested in a 9-1-1/Dispatch career. It may also cause some of the traditional PSAP workers to want to work away from the bricks and mortar location.

Another challenge is staff mobilization. It is not uncommon for a traditional PSAP worker who does not want voluntary or mandated overtime to ignore the telephone call to his/her home when the caller ID indicates the call is coming from the PSAP Authority. This issue will not change when calling to try and mobilize the virtual worker for an unexpected shift. Careful consideration should be given and perhaps an “on call” schedule can be implemented with virtual workers to address this concern.

PSAP managers should be aware that a virtual workforce doesn’t necessarily solve all of the staffing problems that exist today. However, the next generation worker may be seeking more flexibility in the existing work environment. The manager may need to police the use of such communication modes more in the on-site environment and must realize that they will not have the same level of supervision in the virtual environment.

## 11 Supervisory Management

Managing remote Call Takers and Dispatchers may require some additional or even different skill sets from those needed to be successful in today’s PSAP environment. Even though the ability to successfully communicate with staff is critical for any manager, there are additional challenges for those who must manage staff that they may not know on a personal basis. Some specific management roles may include the ability to:

- develop real-time quality control processes that include surveying the users of the system, remote monitoring, instant messaging or other means for communicating.
- develop selection processes that will predict the success of a remote applicant.
- develop and implement an effective training and awareness program that emphasizes the critical services provided.

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<sup>11</sup>NIST SP 800-46 R 2-Guide to Enterprise Telework, Remote Access, and Bring Your Own Device (BYOD) Security (Section 3)

<sup>12</sup> Ibid

- schedule remote personnel both for a normal shift and those needed during an emergency.
- oversee the operation from the macro level and to delegate and empower key staff members to carry out the quality control program.
- oversee compliance with cyber security procedures
- develop program for wellness such as use of wearable devices to manage stress

There is no doubt that the next generation system will provide the flexibility to allow multiple staffing models both on site and remote. It is incumbent that Public Safety organizations at the highest level consider the staffing problems that currently exist and evaluate the potential of a culture shift toward utilizing remote emergency communication personnel.

Managers of virtual teams (individuals or group of individuals at remote sites) will have to learn how to support their teams by:

- recognizing them and their importance;
- encouraging members to explore questions about how they are working together as a team;
- supporting the creation of some kind of shared space (the feeling that there is an infrastructure where people are working together);
- facilitating the coordination of the technology, work processes, and the formal organization;
- recognizing reflection as action and as legitimate work function (getting the infrastructure of the organization to support the learning process); and
- supporting activities which make the informal network visible

## **12 Administrator/Policy Maker/Director Skills**

PSAP Authority Administrators should provide recommendations and seek support and guidance from governing 9-1-1 Authorities. These individuals are expected to ensure their facilities, staff, and resources meet the requirements and expectations necessary for implementing and managing NG9-1-1. PSAP Administrators should also avail themselves to the volume of information on NG9-1-1, architecture and operations developed by the standard development organizations such as NENA and APCO

Many of the position requirements for the director level of the virtual PSAP will remain the same as those required to lead a bricks and mortar model. The director will be responsible for performing complex contract development and administration work along with being responsible for the coordination and implementation of service agreements across the communication network. Those contract management responsibilities may expand to include independent contractors serving as Telecommunicators and/or Dispatchers. They will also be required to provide vision, solid leadership, coaching, direction and resources to build a team capable of providing efficient and effective service to the public and first responders the organization serves.

Some of the specific position requirements for top level management of a Virtual PSAP that may present unique challenges from the traditional PSAP may include the following:

- The knowledge and ability to ensure that the virtual organization is in compliance with Federal, State and Local regulations, statutes and ordinances. Some of these may vary from the traditional PSAP due to security, privacy and confidential issues.
- The knowledge and ability to understand the underlying network and technology available and ensure that systems are in place that will monitor both the technology and the personnel on the system along with providing real-time alerts and metrics.
- The ability to lead, guide and direct the strategic planning, operation and integration administratively throughout the system by identifying effective strategies regarding issues that affect the success of the virtual organization.
- The ability to utilize industry subject matter experts and adapt to dynamic changes in the business model.
- The ability to facilitate face to face communication in a virtual environment to help create a sense of connection with co-workers and the overall mission of the organization.

In addition to these specific position requirements for consideration, there are several essential competencies that an effective top level manager may need to possess to better perform in the new environment. As with PSAP Managers of today, the Next Generation PSAP manager will need to maintain high standards of personal integrity in order to transmit those same expectations to all employees of the organization. The expectations for the staff who will be working virtually will require a high degree of credibility and consistency on the part of all staff including supervision and upper level management which will set the tone and establish the culture for the organization.

The manager of a Next Generation PSAP with both on site workers and virtual workers will need to be a manager who is comfortable with new challenges and learning opportunities. The successful NG PSAP manager will likely gain insight from experiences and will be personally committed to self-improvement and the continual improvement of the operation they manage.

As with any top level management position, effective communication is critical. A successful NG manager will facilitate the free flow of information and communication throughout the organization and encourages open expression of ideas and opinions. The manager's position will require the ability to communicate frequently and in person and inspire others to contribute ideas on their own.

Other essential competencies that may be beneficial for both standard brick and mortar and virtual PSAP managers include the following:

- Results Oriented and Drives Execution
- Passion for Service
- Builds Organizational Relationships
- Leads/Manages Change and Innovation
- Develops and Inspires People
- Vision/Strategy/Judgment
- Influences Others and Manages Differences
- Resource Management
- Leverages Technology
- Embraces Diversity

### **13 Performance**

PSAP Authorities with virtual workers need to monitor the performance of their virtual workers just as diligently as they do on-site workers. The traditional model, where supervisors are on site and can see call takers or dispatchers face to face and can “coach” appropriately to keep call takers and dispatchers motivated, may not necessarily be the most cost efficient or effective method either. A single supervisor can only oversee the number of employees the facility can physically hold. In addition, their “visibility” into an on-site workers performance may be limited to trolling the PSAP floor or observing calls or in a command center to help with questions.

Expectations should be the same for local employees as well as virtual workers. Some areas that will need to be addressed include voice mail, email, instant messaging, cell phone/pager, audio conferencing and video conferencing. Quality of service must remain constant with both local employees and virtual workers.

Managers need to be proactive in conflict management by keeping an open line of communication with each employee. Regular one-on-one discussions onsite or using a video conference are important in keeping up with how the employee is doing and recognizing conflict such as changes in the actions and reactions of the remote employee.

When conflict occurs the manager should speak with each employee individually first by phone or face-to-face. This type of interaction should never take place by email. When the time comes to conduct a conflict resolution between employees the manager acts as the facilitator and mediator. The parties involved should not be left to deal with conflict on their own.

Virtual positions should be earned based on established skill sets, expectations and performance. It is recommended the performance of employees selected to work remotely be reviewed on an established timeline to determine if the employee continues to be suited for a remote position or brought back to the onsite environment.

All employees must be acknowledged for their accomplishments. Managers must be creative in the ways they reward remote employees.

### **14 Employee Appraisal & Review**

In a traditional PSAP Authority, managers or supervisors typically use organization approved systems of performance evaluations to provide feedback on performance, determine pay rates, and encourage employees to perform their best. PSAP Authorities should develop automated, data driven performance systems that enable supervisors to objectively measure and reward performance in real time whereby all employees will be evaluated based on established performance standards..

Ideally, incentive systems should put workers in the driver’s seat by proactively providing them with real-time information about their performance compared to the organization standards. Employees should be able to see their scores on individual metrics so they can see exactly where they have to improve. Systems should also provide links to e-learning materials so that employees can proactively take action to improve areas of weakness. These scores should be updated frequently so that employees can see how improvements in their performance quickly translate into improvements in their scores.

Performance evaluations and appraisals should measure a telecommunicator's performance against key performance indicators. These indicators should be the same whether the employee is physically located in the PSAP, or is at a remote location operating in a Virtual PSAP capacity.

Each PSAP Authority will need to assess the management tools available to its supervisors to adequately evaluate a telecommunicator's performance. These tools may include:

- reviewing recorded audio of an incident
- real-time monitoring to include audio and entry of incident into CAD systems
- Protocol quality assurance/quality improvement programs
- Analytics that provide statistical performance data, i.e. average handling time, post-processing time, etc.

Virtual PSAP managers may need to be creative and employ new methods and/or applications that assist in remote monitoring a virtual worker to ensure that policies and procedures as well as quality of service is at an equal level that is provided to 9-1-1 calls to the on-site PSAP.

During the agency's appraisal and/or evaluation period, virtual telecommunicators should be appraised utilizing the appraisal process that on-site employees receive. At a minimum, the virtual worker should be allotted personal time with his/her supervisor to discuss progress and recommendations for improvement. Additionally, the virtual worker should be given the opportunity to provide feedback to the supervisor to help identify any special needs or training that may be necessary to accommodate the virtual worker in performing his/her job tasks.

## 15 Technology

The integration of a virtual PSAP component as a functional element in the 9-1-1 emergency response environment will not occur as easily as flipping a switch. This integration will occur incrementally, based on best practices from other disciplines and industries, to guide the development of guidelines and applications, and to ensure consistency of technological applications. The identification of the underlying technological requirements is a critical step in advancing the concept of a virtual PSAP and making it a reality. Technology is a broad concept, but its non-tactile properties necessitate well-defined technological requirements, for each functional element, to describe the architecture of a virtual PSAP. This architecture is comprised of the systemic infrastructure and related processes and applications that will provide the tangible structure for the concept of a virtual PSAP. Fundamentally, this means an open-architecture, application-based system, utilizing an IP network or backbone, which is often described by the 9-1-1 community as an ESInet.

At a minimum, the technological requirements of a virtual PSAP will mandate easy access to information, providing a secure and fluid transfer between virtual and physical PSAP personnel. Although technology is an enabling tool, it also has inherent limitations. Establishing a virtual PSAP in a geographically diverse landscape may present connectivity challenges related to broadband availability and bandwidth limitations. Furthermore, as the 9-1-1 community develops a greater understanding and a clearer picture of the concept of a virtual PSAP, the technological requirements will evolve. Technology changes and evolves rapidly, so it must be thoroughly tested and trialed to ensure quality and redundancy before any new virtual PSAP technology is widely

deployed. This technology must also complement Next Generation 9-1-1, as well as co-exist in a legacy 9-1-1 environment. And finally, virtual PSAP technology should guarantee interoperability and allow for resource sharing that provides procurement economies of scale and regional equity from a cost benefit standpoint.

## 16 Conclusion

There are numerous reasons to contemplate aspects of virtual work in a PSAP environment. For some PSAP Authorities such a concept will be an easy transition, for others the implementation of a virtual workforce at some level will be a difficult accomplishment. However, PSAP Authority managers and decision makers are encouraged to evaluate the business reasons to consider virtual workers in light of their current operations and future goals for the organization. An assessment of the key aspects of a virtual work force to include people, process and technology will be essential if such a program is to be successful. For the PSAP Authority such an evaluation or assessment might include an appraisal of:

**Management readiness** — The PSAP Authority should conduct an evaluation or assessment of the benefits, requirements and challenges of establishing a virtual component to their operations and then ensure that the PSAP Authority supervisors and managers understand these benefits, requirements and challenges of managing employees in a virtual environment. Are managers and supervisors ready to use innovative tools and techniques to measure productivity and outcomes instead of traditional line-of-sight management? Do they understand the effort necessary to encourage collaboration and team work? Is there a willingness in the culture of the organization to undertake the changes that a successful virtual work program will require?

**Virtual worker readiness** — The PSAP Authority will need to determine if the potential employee has the characteristics a successful virtual worker in a PSAP environment needs to have to be successful. Will the virtual worker make the effort to stay connected to the work place? Does the position have well-defined tasks and measurable work products? Can their work be interrupted if glitches occur, especially during initial implementation? How will the agency prepare for and overcome these “glitches” or operational issues?

**Operational readiness** — The PSAP Authority will need to assess all work processes to ensure they fit well into a virtual work program tailored for the 9-1-1 PSAP environment and work requirements. Metrics will need to be established for the virtual position that allows the appropriate measurement of productivity and quality. Is the 9-1-1 training program for the virtual workers and their supervisors appropriately adjusted for virtual workers? The PSAP Authority may also want to consider the value of test or pilot programs, assessing and adjusting after a predetermined period of time.

**Technological readiness** — The PSAP Authority will need to concern itself that the systems utilized will provide virtual workers the level of access necessary to perform their work. Have bandwidth and availability of network services, performance, resiliency and reliability of systems to be accessed, security and protection of information and systems, equipment needs at the remote site and IT support issues been addressed?

Proper assessment of readiness, leadership courage, well thought out implementation strategies, and a willingness to overcome challenges may help to revolutionize the nature and characteristic of the



public safety communications environment. A virtual work force may not be appropriate for every type of PSAP Authority that exists today, but PSAP survivability into the future may be dependent on its consideration.

## **17 Impacts, Considerations, Abbreviations, Terms, and Definitions**

### **17.1 Operations Impacts Summary**

This document should help PSAP Authorities to consider the opportunities and challenges of virtualization ranging from identifying and utilizing internal and external resources to telecommunicators operating in a remote site environment(s). In this document, we explore areas to consider for operating and managing personnel in a virtual environment. The opportunity to utilize technology creates a new challenge for personnel management; recruitment, hiring, training, retention, supervision, evaluation, communication and teamwork.

### **17.2 Technical Impacts Summary**

The technical impact for virtualization will vary greatly dependent upon the size and complexity of the PSAP Authority, as well as the architecture of the virtual environment. The demands of virtual work may be significantly different and require additional technical knowledge from both users and IT staff. The 9-1-1 Authority should consider placing special emphasis on IT operation and maintenance, information security, risk assessment and vulnerability, and maintaining effective communication with managers, employees and co-workers, while covering any new liability risks or potential privacy issues.

The CIO or IT director and technical staff have especially important roles to play in establishing a successful remote work program. The effectiveness of remote work will largely depend on the capability of the infrastructure and tools in place to support it. In addition to programmatic planning, IT staff needs to be actively involved in informing the decisions that are made regarding equipment (off site and mobile), software, applications, network services, and other aspects of IT support for remote workers. PSAP Authorities and remote workers will need to have access to 24/7 technical support.

### **17.3 Security Impacts Summary**

The security impacts and potential new risks will be significant to the PSAP Authority. Examples of the potential security impacts and risks might include threats, breaches and risks associated with the availability, privacy and security of the infrastructure, facilities and staff affected by a virtual and remote work environment. Security impacts should also take into considerations any technical, functional and operational elements. Future NENA security and cybersecurity standards should be assessed and applied to virtual and remote work environments.

### **17.4 Recommendation for Additional Development Work**

This document is intended to be used as a guide to evaluate and analyze how, or if, a virtual workforce can be of benefit to the PSAP. It is intended to assist the PSAP with planning. Concepts are offered for consideration and suggestions provided to guide the PSAP in its assessment of the

value of virtual work options. Current and future Standards regarding equipment, infrastructure and capability should be used to assist with this Virtual PSAP Management Document.

Standards may have to be developed once technology is in marketplace. The need for specific technical standards to complement the virtual PSAP environment will be evaluated as implementation of NG 9-1-1 continues. Recommendations for Best Practices will also be carefully considered.

Additionally, a roadmap will need to be developed for PSAPs to partner and/or collaborate virtually in the NG 9-1-1 environment that covers funding, governance, technology and staffing.

### **ASSUMPTIONS:**

- This document is focused on the management aspects of considering and preparing for virtual workers in the PSAP environment.
- It is assumed that a bricks and mortar building which houses the PSAPs exist in a shared new environment but that staffing is supplemented or augmented with workers who are “virtual.”
- In this document, we will not address all the technological issues, although technology will play a key role in planning for a virtual work force and should be considered a tool.
- This document primarily discusses a virtual Public Safety Answering Point ecosystem and the call taking function as having the greatest initial potential for a virtual work force.
  - Call taker functionality may be perceived to be easier to transition to a virtual environment than dispatcher functionality due to the increased complexity of technology (radio-phone-CAD functions) involved.
- Virtual workplaces and/or workers are an opportunity not just for contingency operations but for day-to-day operations as well.
- Transition will occur over time and may be incremental.
- PSAP entities that are challenged by resource issues may be more compelled to establish or embrace the virtual environment/ worker concept.
- If you are doing things in a VPN environment you can do it in a virtual environment. The NG 9-1-1 network has to be built first before a virtual workforce can be fully utilized.
- Cost will likely be one of the driving factors.
- Personnel resources will likely be an additional driving factor.
- Increased use of Technology may result in more flexibility in the work place.
- Applications, system integrity, privacy and secure data exchange are critical
- Once security and cybersecurity standards for NG 9-1-1 have been finalized and approved, managers will be more inclined to consider implementing a virtual environment.
- At the minimum, all PSAP applications and tools will need to be available to the virtual worker as they are to the on-site worker.
- Processes, policies and procedures will need to be clearly defined.
- Employee supervision practices will likely require modification.

Some of the things that need to happen in order for organizations to make effective use of virtual teams include:

- processes for management and development of a virtual workforce have to be designed, defined, piloted, tested, and refined
- managers and supervisors have to be trained in new team management strategies
- employees have to be trained in new ways of working
- organizational structures have to be modified to reflect new work group dynamics
- the culture of the organization has to be reshaped to support new structures and processes
- compensation practices have to be updated to reflect new structures and organizational structure
- new management, measurement and control systems have to be designed 13

### **17.5 Anticipated Timeline**

The timeline would be dependent on the PSAP Authority's assessment and adoption of a virtual work environment. Implementation timeline would be dependent on the scope of the environment, tools availability and readiness.

### **17.6 Cost Factors**

PSAPs that desire to consider virtual workers either for contingency operations or for day to day operations are encouraged to evaluate the advantages and disadvantages of implementing virtual workers within their organization. Establishing the ability to utilize virtual workers as part of the PSAP team, allowing work from a remote site or home may decrease commute times, offer more flexible schedules, and potentially decrease employee and employer expenses (i.e. meal expense, uniform costs, etc.). Analysis of space allocation per employee in the physical PSAP may offer insight into potential cost savings as fewer employees may need to be accommodated in the brick and mortar facility of the PSAP.

Use of mainstream technology and off the shelf equipment may help to bring the cost of equipment down because the PSAP has reduced its utilization and dependence on customer premise equipment base to a shared cloud based environment.

As part of the evaluation process, cost analysis should include consideration of the potential added costs for establishing a virtual work force such as connectivity to the PSAP from the remote (and possibly multiple remote) location, equipment costs, or the need to augment pay for an "on-call" status.

Organizations are going to have to help remote workers feel connected to the agency and their peers and it may require an investment in technologies that will assist with this requirement.

Advantages and disadvantages will vary from PSAP to PSAP and may even vary from urban to rural environments. Thorough analysis, planning and audit will be essential to the success of any virtual implementation.

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<sup>13</sup> [Managing Virtual Teams](#) Text of speech given by Lisa Kimball for Team Strategies Conference sponsored by Federated Press, Toronto, Canada, 1997. Lisa Kimball is the Executive Producer of Group Jazz ([www.groupjazz.com](http://www.groupjazz.com)).

### 17.7 Cost Recovery Considerations

PSAP Authorities should research what cost recovery options are available to them from local, state and federal funding to support virtual and consolidated PSAP environments.

### 17.8 Additional Impacts (non-cost related)

The information or requirements contained in this NENA document are expected to have 9-1-1 technical, functional and operational impacts, based on the analysis of the authoring group. At the date of publication of this document, development had not started. The primary impacts are expected to include but not limited to:

- The design, implementation and maintenance of a virtual ecosystem
- Trained IT support
- Management and engagement with virtual workers
- Recruiting, hiring and training personnel suited to work in a virtual environment
- Human Resource impacts to having virtual workers
- Operational and Personnel policy development to operate in a virtual environment
- Dynamics of interacting between the virtual workers and the traditional workers
- Privacy and security policy management
- Work flow and scheduling considerations

### 17.9 Abbreviations, Terms, and Definitions

See NENA Master Glossary of 9-1-1 Terminology, NENA-ADM-000 [1], for a complete listing of terms used in NENA documents. All abbreviations used in this document are listed below, along with any new or updated terms and definitions.

## 18 Recommended Reading and References

- [1] NENA Master Glossary of 9 1 1 Terminology, [NENA-ADM-000](#)
- [2] [NIST SP 800-46 R 2](#)-Guide to Enterprise Telework, Remote Access, and Bring Your Own Device (BYOD) Security (Section 3)
- [3] [Task Force on Optimal PSAP Architecture \(TFOPA\) Report 2016](#)
- [4] [NIST 800-114 Rev. 1](#) User's Guide to Telework and Bring Your Own Device (BYOD) Security
- [5] [How to Create a Strong Company Culture in a Virtual Workplace](#); Skilledup for Companies by Josh Kraus
- [6] [NIST 800-53 Rev 4](#) Security and Privacy Controls for Federal Information Systems and Organizations
- [7] FCC CSRIC Best Practices <https://www.fcc.gov/nors/outage/bestpractice/BestPractice.cfm>
- [8] [NENA 04-503](#) Technical Information Document Network/System Access Security
- [9] [NENA-INF-015.1-2016](#) NENA NG 9-1-1 Security Information Document

- [10] [NENA/APCO REQ-001.1.1-2016](#) NENA/APCO NG9-1-1 PSAP Requirement Document
- [11] [NENA-INF-003.1-2013](#) Potential Points of Demarcation in NG9-1-1 Networks Information Document
- [12] Kimball, Lisa, “**Managing Virtual Teams**” Text of speech for Team Strategies Conference sponsored by Federated Press, Toronto, Canada, 1997. Lisa Kimball is the Executive Producer of Group Jazz ([www.groupjazz.com](http://www.groupjazz.com)).
- [13] [Telework 360°](#): A Best Practices Digest and Guide to Getting Telework Right in the Public Sector, The Center for Digital Government, 2006.

### **Previous Recommended Reading and References**

- [14] General Services Administration Interagency Telework Site <http://www.telework.gov>
- [15] A comprehensive nonprofit site focused on broad based telework issues <http://www.telcoa.org>
- [16] A site dedicated to economic and community development through telecommuting education <http://www.telecommuter.org>
- [17] A public and private sector not-for-profit organization dedicated to advancing the growth and success of work-independent locations <http://www.workingfromanywhere.org>

### **Official Telework Agreements in Public Service Sites**

- [18] General Services Administration Interagency Telework Site <http://www.telework.gov>
- [19] State of Washington Executive Order and Telework Policy Guidelines <http://www.ga.wa.gov/CTR/Guide08.PDF>
- [20] Arizona Department of Administration Telework Page <http://www.teleworkarizona.com/>

### **For Those Interested In Green Technology**

- [21] Green Technology [www.green-technology.org](http://www.green-technology.org)
- [22] US Government’s Energy Star Program [www.EnergyStar.gov](http://www.EnergyStar.gov)
- [23] Climate Savers Smart Computing Initiative [www.climatesaverscomputing.org](http://www.climatesaverscomputing.org)
- [24] The Green GridSM [www.thegreengrid.org](http://www.thegreengrid.org)

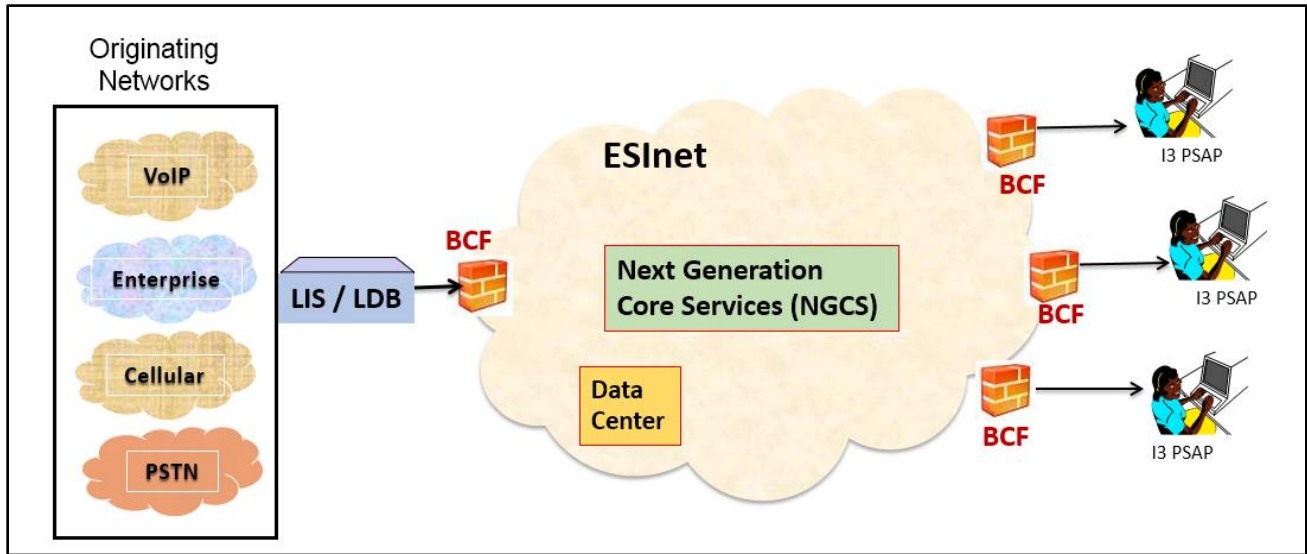
## **Exhibit A-B**

**Model A**—depicts a multiple PSAP shared or consolidated infrastructure configuration.

**Model B**—depicts a single PSAP jurisdiction which has a combination of a physical facility and some functions are conducted in a remote or “virtual” work place.

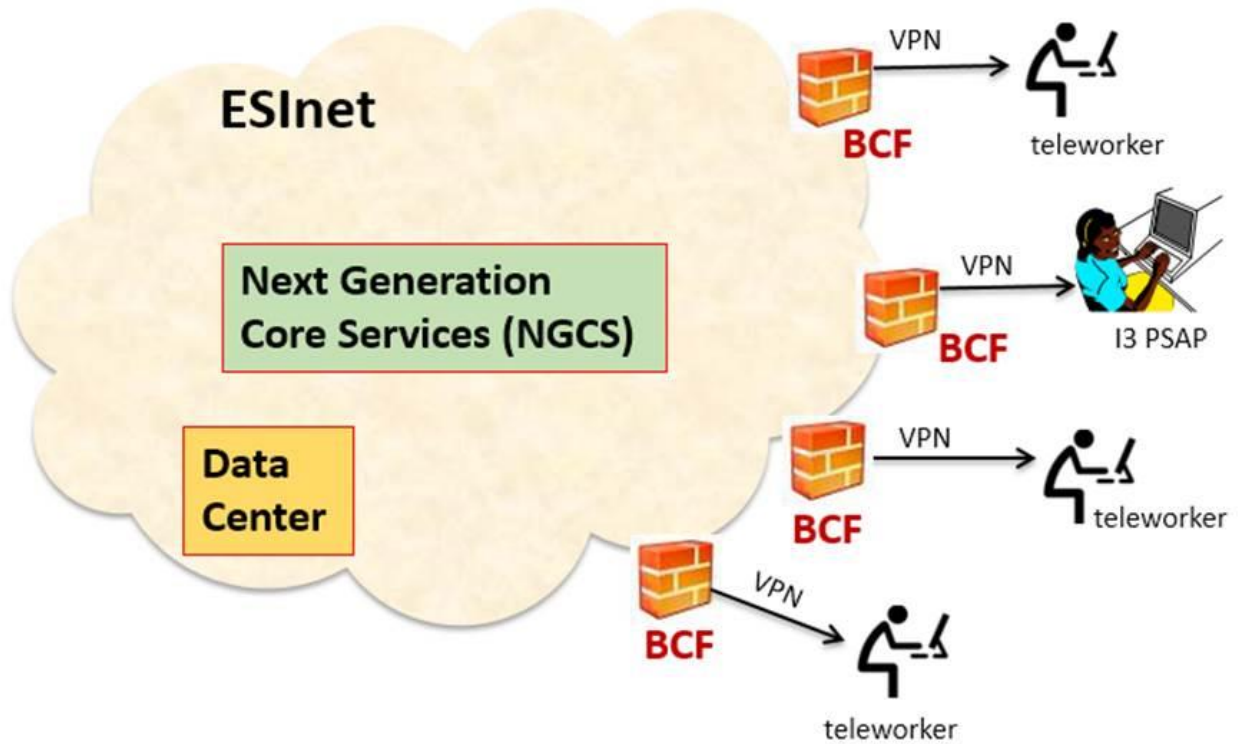
**SHARED/CONSOLIDATED INFRASTRUCTURE  
PSAP  
MODEL A**

In this model, a number of PSAPs share or have consolidated infrastructure. PSAPs remain independent but share common equipment in a separate facility such as a data center. PSAPs are connected via IP connectivity to allow the sharing of infrastructure.



### ***HYBRID VIRTUAL PSAP MODEL B***

In this model the PSAP has a combination of the traditional “bricks and mortar” physical facility where some of the PSAP workers perform work and some are performing functions in a remote or “virtual” work place. This virtual work place may be their home or an alternate work environment established by the PSAP. Workers are connected via IP connectivity.





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