NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

NEXT GENERATION 9-1-1: POLICY IMPLICATIONS OF INCIDENT RELATED IMAGERY ON THE PUBLIC SAFETY ANSWERING POINT

by

D. Jeremy DeMar

March 2017

Thesis Co-Advisors: David Brannan
Glen L. Woodbury

THIS PAGE INTENTIONALLY LEFT BLANK

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.			
1. AGENCY USE ONLY *(Leave blank)*	**2. REPORT DATE** March 2017	**3. REPORT TYPE AND DATES COVERED** Master's thesis	
4. TITLE AND SUBTITLE NEXT GENERATION 9-1-1: POLICY IMPLICATIONS OF INCIDENT RELATED IMAGERY ON THE PUBLIC SAFETY ANSWERING POINT			**5. FUNDING NUMBERS**
6. AUTHOR(S) D. Jeremy DeMar			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000			**8. PERFORMING ORGANIZATION REPORT NUMBER**
9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A			**10. SPONSORING / MONITORING AGENCY REPORT NUMBER**
11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government. IRB number ____N/A____.			
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release. Distribution is unlimited.			**12b. DISTRIBUTION CODE**

13. ABSTRACT (maximum 200 words)

Fully implemented, Next Generation 9-1-1 (NG9-1-1) will dramatically change the way in which 9-1-1 calls are processed in the United States. While the NG9-1-1 initiative is expected to introduce a variety of new features and functionality to the public safety answering point, this thesis examines the operational impact of a single capability of the program. That capability, hereafter referred to as Incident Related Imagery (IRI), will allow 9-1-1 callers to send still images, pre-recorded video, and streaming media directly to a 9-1-1 telecommunicator via a variety of mediums. The study analyzes existing 9-1-1 operational practices; provides a baseline understanding of the Next Generation 9-1-1 initiative, and makes the case for preparation and early adoption of the technology. Further, it explores how the viewing of graphic or objectionable material by 9-1-1 personnel likely exposes these professionals to greater levels of stress and vicarious trauma, and analyzes the importance of stress mitigation and treatment methods prior to and following IRI exposure. Finally, this thesis investigates existing communications center hiring and training practices, and evaluates their effectiveness in a post-NG9-1-1 setting.

14. SUBJECT TERMS Next Generation 9-1-1, NG9-1-1, 9-1-1, incident related imagery, IRI, hiring, stress, training			**15. NUMBER OF PAGES** 121
			16. PRICE CODE
17. SECURITY CLASSIFICATION OF REPORT Unclassified	**18. SECURITY CLASSIFICATION OF THIS PAGE** Unclassified	**19. SECURITY CLASSIFICATION OF ABSTRACT** Unclassified	**20. LIMITATION OF ABSTRACT** UU

NSN 7540-01-280-5500 Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. 239-18

THIS PAGE INTENTIONALLY LEFT BLANK

Approved for public release. Distribution is unlimited.

NEXT GENERATION 9-1-1: POLICY IMPLICATIONS OF INCIDENT RELATED IMAGERY ON THE PUBLIC SAFETY ANSWERING POINT

D. Jeremy DeMar
Supervisor, Emergency Communications Department, Rochester, New York
B.S., SUNY Empire State College, 2014

Submitted in partial fulfillment of the
requirements for the degree of

**MASTER OF ARTS IN SECURITY STUDIES
(HOMELAND SECURITY AND DEFENSE)**

from the

**NAVAL POSTGRADUATE SCHOOL
March 2017**

Approved by: David Brannan
Thesis Co-Advisor

Glen L. Woodbury
Thesis Co-Advisor

Erik Dahl
Associate Chair for Instruction
Department of National Security Affairs

THIS PAGE INTENTIONALLY LEFT BLANK

ABSTRACT

Fully implemented, Next Generation 9-1-1 (NG9-1-1) will dramatically change the way in which 9-1-1 calls are processed in the United States. While the NG9-1-1 initiative is expected to introduce a variety of new features and functionality to the public safety answering point, this thesis examines the operational impact of a single capability of the program. That capability, hereafter referred to as incident related imagery (IRI), will allow 9-1-1 callers to send still images, pre-recorded video, and streaming media directly to a 9-1-1 telecommunicator via a variety of mediums. The study analyzes existing 9-1-1 operational practices; provides a baseline understanding of the Next Generation 9-1-1 initiative, and makes the case for preparation and early adoption of the technology. Further, it explores how the viewing of graphic or objectionable material by 9-1-1 personnel likely exposes these professionals to greater levels of stress and vicarious trauma, and analyzes the importance of stress mitigation and treatment methods prior to and following IRI exposure. Finally, this thesis investigates existing communications center hiring and training practices, and evaluates their effectiveness in a post-NG9-1-1 setting.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

LIST OF ACRONYMS AND ABBREVIATIONS

APCO	Association of Public Safety Communications Officials
ASD	acute stress disorder
CAD	computer aided dispatch
CDE	continuing dispatch education
CISM	critical incident stress management
CPR	cardiopulmonary resuscitation
CSMP	comprehensive stress management program
DNG	digital negative
E911	Enhanced 9-1-1
EMD	eye movement desensitization and reprocessing
EMS	emergency medical service
ESInet	Emergency Service IP Network
ETNS	emergency telephone notification systems
FCC	Federal Communications Commission
FirstNet	First Responder Network Authority
FRSN	First Responder Support Network
GUI	graphical user interface
GWI	GlobalWebIndex
iCERT	Industry Council for Emergency Response Technologies
IoT	Internet of things
IP	internet protocol
IPAWS	Integrated Public Alert & Warning System
IRI	incident related imagery
ITS	intelligent transportation systems
ITSJPO	Intelligent Transportation Systems Joint Program Office
JPEG	joint photographic experts group
NCMEC	National Center for Missing and Exploited Children
NENA	National Emergency Number Association

NFPA	National Fire Protection Association
NG9-1-1	Next Generation 9-1-1
PSAP	public safety answering point
PTSD	post-traumatic stress disorder
QoS	quality of service
SMS	short message service
STSD	secondary traumatic stress disorder
TDD	telecommunications device for the deaf
TIA	Telecommunications Industry Association
USDOT	United States Department of Transportation
WEA	wireless emergency alerting
WHO	World Health Organization

EXECUTIVE SUMMARY

> With NG911 systems, callers will be able to send text messages and transmit photos, videos, and other forms of data to 9-1-1 centers, and call takers will be able to better coordinate responses. For example, a caller could send streaming video from a crime scene, or personal medical data about a deadly allergy—all of which would improve the 9-1-1 center's ability to assist.[1]

As technology has evolved, the 9-1-1 profession has evolved with it. One aspect of the profession that has not changed however as wireless technology has improved is the ability of a 9-1-1 telecommunicator to view still images, video, and streaming media captured and sent by a 9-1-1 caller during an emergency incident. Next Generation 9-1-1 (NG9-1-1), a nationwide initiative "that allows digital information (e.g., voice, photos, video, text messages) to flow seamlessly from the public, through the 911 network, and on to emergency responders" will provide this capability, and as a result, completely change the way in which emergency information is processed and disseminated to first responders.[2]

While the NG9-1-1 concept has been around since 2000, the initiative received a much-needed boost in 2016, when the NG911 NOW Coalition announced a plan to implement NG9-1-1 nationwide by 2020.[3] This action created a sense of urgency for program development on the part of 9-1-1 stakeholders, industry professionals, and vendor partners. Despite the efforts of the aforementioned entities, the research suggests that emergency communications center administrators and trainers have done little to prepare their personnel for the arrival of these technologies.

---

[1] Brian Fontes, "America's 9-1-1 Infrastructure Is Showing Cracks, too," *The Hill*, accessed February 23, 2017, http://thehill.com/blogs/congress-blog/technology/320743-americas-9-1-1-infrastructure-is-showing-cracks-too.

[2] "Next Generation 911 (NG911)," accessed March 13, 2017, https://www.911.gov/911-issues/standards.html.

[3] Next Generation 911 Now, *NG9-1-1 Gap Analyses and Next Steps* (Arlington, VA: Next Generation 911 Now, 2016), https://static1.squarespace.com/static/56bb58608a65e27aeda89c9c/t/575eadd4746fb9dbf86f7d76/1465822676753/NG911NOW+National+Gap+Analysis+and+Strategy+Document+Draft+6-13-16+Final%5B1%5D.pdf.

Stress is a given for those working in public safety communications. Having to listen to an incident of domestic violence as it happens, a child being abused, or a person taking their last breath all carries with it a considerable amount of work related stress. Once NG9-1-1 arrives in the communications center, emergency incidents will not be limited to audio alone. Still images, pre-recorded video, and streaming media, hereafter referred to as Incident Related Imagery (IRI), sent by the 9-1-1 caller to the 9-1-1 telecommunicator during an emergency incident will invariably compound the amount of stress to which these professionals are exposed. To combat these stressors, the study supports the use of resilience training, as well as stress and trauma awareness instruction for all 9-1-1 professionals exposed to IRI.

The research also suggests that resiliency begins with the hiring process. Employment announcements for the positions of telecommunicator and dispatcher should include some mention of exposure to graphic or objectionable material, even before IRI becomes available in the public safety answering point. Those applying for or considering a career in emergency communications may use this information to clarify the expectations of the position, conduct some additional research on the role, or decide based on what they have read that the position is not for them. Educational requirements for the position of telecommunicator and dispatcher might also need to be re-evaluated, as the limited professional and technical background of applicants possessing only a high school diploma may prove to be inadequate in a post-NG9-1-1 setting. The research also identified technology acceptance as an important attribute for existing and newly appointed public safety personnel.

Training will also play a major role in the 9-1-1 center of tomorrow. Data interpretation will be a critical skillset for telecommunicators as the viewing of emergency calls meets or exceeds the need for listening alone. Modifications to existing 9-1-1 classroom curriculum may be necessary to ensure new and existing personnel are proficient in skills identified as vital in a NG9-1-1 setting. Trainers should be familiar with all NG9-1-1 technologies and applications selected for use in the communications center and the expectations of center leadership relative to the training process should be explicit. Being cognizant of each age group, the different ways in which each generation

learns, and encouraging open dialogue during the learning process will help to foster a productive and participatory environment for learning.

THIS PAGE INTENTIONALLY LEFT BLANK

ACKNOWLEDGMENTS

An academic endeavor of this caliber would not have been possible without the unwavering support of my family, friends, and peers. While many offered words of encouragement during the last 18 months, I felt it appropriate to recognize the following individuals who truly went above and beyond in helping me reach the finish line.

To my lovely wife, Heather, who since the day we met has supported every personal and professional goal I have had, provided encouragement when needed, constructive criticism when warranted, an essential dose of comic relief from time to time, and most of all, provided a loving and caring home for our family, I say thank you and I love you.

To my children, Austin, Zachary, and Morgan, for being there to help your Mother when I was not available, for your understanding of my many absences at important family events (Zack, I know I owe you one for missing your 18th birthday), and for being my personal cheering section throughout this process, thank you. I love you all so much.

To my parents, who instilled in me the importance of hard work, tenacity, and perseverance, thank you. You have both inspired me in so many ways. I love you both.

To my sister Jennifer, and my brother Adam, who were both present for the shenanigans of my youth, but act today as if I was always guided by ambition and excellence, thank you. I love you both.

To my extended family members and friends, both near and far, who since the day I announced my intention to pursue an advanced degree were there with me physically, virtually, or by phone to provide needed support and encouragement, thank you.

To Emergency Communications Department Director John Merklinger, who has always supported my academic endeavors and industry-related involvement, and who endorsed my participation in this graduate program, thank you.

To Jim Herbst and Brian Bennington, for your words of encouragement, support, and your endorsement of my participation in this graduate program, thank you.

To Monroe County Sheriff and CHDS alum Patrick O'Flynn, for sitting down with me to discuss the ins and outs of the CHDS graduate program, providing many worthwhile tips on the completion of the five entry essays, and for making yourself available throughout the process, thank you.

To the 4s, you know who you are. Thanks brothers!

To my co-workers, who agreed to cover my time away for graduate school, and supported my efforts without reservation, thank you.

To the many telecommunicators and dispatchers of the Emergency Communications Department who I hope will someday benefit from my work and research, thank you for your words of encouragement during this process, and thank you for being the best of the best at what you do. The residents of Monroe County and the City of Rochester are fortunate to have each and every one of you in this profession. You truly are the FIRST of the first responders!

To the many members of APCO, NENA, neighboring 9-1-1 centers, and the vendor partners who provided valuable insight and information about Next Generation 9-1-1, thank you.

To David Brannan and Glen Woodbury, my thesis co-advisors, your guidance, recommendations, knowledge, and insight made the thesis process far less painful than I had anticipated. For all of these things, your quick turnaround of my changes, thoughtful responses, and continuous encouragement throughout this process, I sincerely thank you.

Lauren Wollman, you are awesome! Thanks!

To Christopher Bellavita, who "talked me off the ledge" at least once (it may have been more) early on in this process, thank you for making me a far more discriminating and articulate writer, and for providing needed reassurance about my academic abilities. Chris, you should also know the word "utilize" does not appear anywhere in this thesis.

(By the way, I am still sorry about the pen…oops!)

Finally, to my colleagues in the great Cohort 1511, working with each of you over the course of the last 18 months has been nothing short of inspirational. I will miss the camaraderie, professionalism, and spirited banter of your company. Prime Rib night in the Trident (and every other night in the Trident), football at Peter B's, Texas Hold 'Em mid-IR, countless cups of Starbucks coffee, and of course, Manny's Cuban brew. Each of you made this academic undertaking far easier for me to manage in your own unique way. This has been a wonderful experience. Thank you for being there for me. I am always here for you.

#eyesontheprize

THIS PAGE INTENTIONALLY LEFT BLANK

I. INTRODUCTION

A. RESEARCH QUESTION

How will the introduction of images, video, and streaming media as part of the nationwide rollout of Next Generation 9-1-1 (NG9-1-1) impact public safety telecommunicators, as well as those responsible for the hiring, training, and supervision of America's public safety answering point personnel?

B. PROBLEM STATEMENT

> While the technology to implement NG9-1-1 systems is available now, the transition to NG9-1-1 involves much more than just new computers. Implementing NG9-1-1 will include activities of many people, who will coordinate efforts to plan and deploy a continually evolving system of hardware, software, standards, policies, protocols, and training.[1]

The strategies public safety answering point (PSAP) managers and directors will use to prepare, train, and support their communications personnel properly, as it pertains to the national rollout of NG9-1-1 have yet to be developed. Where communications center personnel are accustomed to listening to tense, graphic, and in some cases, fatal situations unfolding over the phone and radio, few if any of these professionals have had to view what's going on with a caller or first responder during an incident, simply because the technology to bring this information into the communications center is not readily available. Since one of the primary functions of NG9-1-1 will be the delivery of incident related imagery (IRI) from an incident scene to the emergency communications center, and since so few of this nation's 9-1-1 centers are currently receiving information in this fashion (outside of a test environment), the physical and emotional reactions of communications professionals to these forms of media are essentially unknown.

Fully implemented, NG9-1-1 will dramatically change the way in which 9-1-1 calls are processed in the United States. This thesis analyzes the impact of IRI on the PSAP, provides an understanding of the policy implications of this technology on the

[1] "Standards for Next Generation 911," accessed December 27, 2016, https://www.911.gov/911-issues/standards.html.

PSAP, and educates and makes recommendations to communications center management, administration, and training center staff about the importance of preparing, hiring, and training 9-1-1 personnel for the arrival of these technologies. The thesis provides research-based analysis upon which leaders charged with overseeing the operation of this nation's 9-1-1 centers can more effectively base policy as the national NG9-1-1 program is implemented.

With so many of this nation's 9-1-1 centers still using legacy technology for call processing, early adoption of advanced NG9-1-1 technology is unlikely.[2] This legacy technology, coupled with the current inability of call centers to receive and process images of any type during a 9-1-1 call, creates an area of uncertainty when it comes to determining the potential impact of these images on the communications center. It is likely most call center employees will have no problem dealing with the still images and video received and processed during "routine" 9-1-1 calls for service. For example, images sent in from the scene of a non-injury motor vehicle accident, depicting fuel leaking from a vehicle, a blocked intersection, or debris in the roadway, would not expose the 9-1-1 call taker to graphic imagery. Someone wanting a police report for a property damage incident at their home might send in a picture of a tree fallen on a house or a broken window. A person reporting a warehouse fire might transmit a live video stream from the scene of a fire. Such incidents, where little to no possibility of death or injury to a person results, are considered low stress or "routine" calls for service, and therefore, not something that would cause a 9-1-1 call taker to be horrified, sickened, or otherwise affected by its occurrence. Calls of a more critical nature however (suicidal and homicidal persons, physical domestic situations, active shooters, etc.) have the potential for generating significantly more graphic content, resulting in an extreme emotional toll on the call takers and dispatchers dealing with the event in question.[3]

---

[2] Suresh Gursahaney, "Next Generation 911 Is the Future for Our Antiquated 911 Infrastructure," *Micro Automation*, accessed December 27, 2016, http://www.microautomation.com/new-blog/next-generation-9-1-1-is-the-future-for-our-antiquated-9-1-1-infrastructure.

[3] Laura Walter, "First Responders and Emotional Distress," *EHS Today*, accessed December 27, 2016, http://ehstoday.com/fire_emergencyresponse/news/first-responders-emotional-distress-5444.

Hiring managers and agency administrators in this nation's 9-1-1 centers must plan for the arrival of these technologies. Plans should likely include a comprehensive review of existing hardware and software infrastructure in use at the center, to be sure servers and workstations can support the receipt and processing of high quality digital images and video. Those charged with training should develop and roll out specialized programs to prepare 9-1-1 personnel properly for the receipt and processing of graphic images associated with the 9-1-1 call intake process.[4] The viewing of civil and criminal actions witnessed and carried out by 9-1-1 callers will likely result in an increased number of requests for 9-1-1 personnel to appear in court proceedings, as key witnesses to a variety of high-profile events. The emotional toll associated with the viewing of these images also needs to be considered, as does the increased availability of counseling services for all 9-1-1 personnel exposed to IRI.[5]

C. LITERATURE REVIEW

Identified in name only 12 years ago, NG9-1-1 is not universally defined in the literature.[6] Preliminary research for this thesis topic yielded a number of ideas, theories, and visions about how NG9-1-1 will be implemented, maintained, and supported once the nationwide rollout of this program begins.[7] In contrast, few have hypothesized about the impact NG9-1-1 technology will have on the PSAP and its personnel.

Three organizations have produced the majority of the content available regarding the NG9-1-1 initiative: The Association of Public Safety Communications Officials (APCO), the National Emergency Number Association (NENA), and intelligent

---

[4] Dave Blake and Lesli Prado, "Stress & Stress Inoculation Training," *9-1-1 Magazine*, accessed December 27, 2016, http://www.9-1-1magazine.com/Blake-Prado-Dispatcher-Training-Col?TopicID=538.

[5] Roxanne Cohen Silver, "Repeated Exposure to Media Images of Traumatic Events May Be Harmful to Mental and Physical Health," September 4, 2012, *Association for Psychological Science*, http://www.psychologicalscience.org/news/releases/repeated-exposure-to-media-images-of-traumatic-events-may-be-harmful-to-mental-and-physical-health.html.

[6] National Emergency Number Association, *NG9-1-1 History* (Alexandria, VA: National Emergency Number Association, n.d.), accessed December 27, 2016, http://c.ymcdn.com/sites/www.nena.org/resource/resmgr/ng9-1-1_project/ng9-1-1_history.pdf.

[7] Intrado, *NextGen9-1-1 Insights into Text-to-9-1-1 Implementation*, vol. 2 (Omaha, NE: Intrado, 2013), https://www.intrado.com/sites/default/files/documents/NextGen9-1-1_Insights%20Into%20Text-to-9-1-1%20Implementation.pdf.

transportation systems (ITS) via the United States Department of Transportation (USDOT). Industry professionals and subject matter experts affiliated with these three entities have published a variety of white papers and reports that specifically address the immediate needs of the NG9-1-1 initiative, as well as the recommended short- and long-term goals for deploying NG9-1-1 on a national level. Since most of what is known or theorized about the anticipated rollout of NG9-1-1 is based on speculation, and since the aforementioned entities are considered by the emergency communications profession to be the foremost authorities on "all things 9-1-1," the researcher anticipates a great deal of his research and findings (from an NG9-1-1 foundational perspective) will be derived from this consortium.

While the research and documentation produced by these three organizations provides a thorough technical foundation and suggested template for NG9-1-1 deployment, what these institutions cannot provide is research generated data pertaining to the emotional and psychological impact of graphic and horrific images viewed by public safety communications personnel, as part of the national NG9-1-1 rollout. Why a lack of research generated data? The answer is that the technical infrastructure needed to deploy these technologies to this nation's 9-1-1 centers does not currently exist, thus no qualitative way is available to measure the impact of IRI on 9-1-1 center personnel. That said, to gauge the potential impact of the arrival of IRI on the communications center, the researcher must look to other closely related public safety fields whose personnel are exposed to this type of imagery (either in person or as part of their regular work responsibilities) to establish a baseline response to the viewing of graphically traumatic material.

A wide variety of books have been written about post-traumatic stress disorder or "PTSD." Many of these texts speak to the challenges faced by this country's service men and women as they return from military life abroad to civilian life at home. Following the attacks of September 11, much was written regarding the short- and long-term impact of incident-related trauma on first responders. Of equal concern to those serving these two groups are proposed treatment methods for dealing with the effects of PTSD and incident-related trauma. For this reason, programs like critical incident stress

management (CISM) and resilience training come into the picture. Literature from these two categories contributes a great deal to the findings and recommendations of this thesis.

Like their law enforcement, fire, and emergency medical service counterparts, America's 9-1-1 professionals regularly participate in a variety of in service training programs, not only to remain proficient in their daily work related activities, but also to stay informed of proposed and approved changes to call taking and dispatching protocols. Those beginning a career in emergency communications will undergo many hours of classroom instruction and on the job training, prior to being certified to work independently. As the transition from an audio only 9-1-1 call taking environment to a combination audio/visual environment begins (as part of the nationwide NG9-1-1 rollout), and 9-1-1 professionals begin to be exposed to graphically intense images from an incident scene, significant modifications to established training procedures will likely become necessary. The question raised is how to train those who are not accustomed to viewing horrific images to begin doing so suddenly as part of their regular work responsibilities. How will veteran 9-1-1 professionals react to graphic visual stimuli fed to them from an incident scene, when historically they have always been limited to the audio side of the incident alone? Will newly appointed call takers and dispatchers be more adept at dealing with this new form of emergency call processing? Looking at the training practices of agencies and organizations whose personnel are exposed to graphically intense images as part of their regular work responsibilities may help answer these questions.

To address all the aforementioned questions and concerns accordingly, the researcher divided this literature review into four separate categories:

- literature from professional organizations
- emotional and psychological impact analysis
- trauma recognition and treatment
- training for traumatic situations

1. Literature from Professional Organizations

Although not limited to the following three organizations, the majority of the literature discussed in this category comes from APCO, NENA, and ITS via the USDOT. Each of these organizations plays a critical role in the nationwide rollout of NG9-1-1, and each is considered an authority on policies and procedures relating to NG9-1-1 implementation.

So what is NG9-1-1? In a 2008 white paper by NENA, NG9-1-1 was defined in the following way:

> Next Generation 9-1-1 (NG9-1-1) networks replace the existing narrowband, circuit switched 9-1-1 networks which carry only voice and very limited data. Currently there are difficulties in supporting such things as text messages for emergencies, images and video (including support for American Sign Language users), and easy access to additional data such as telematics data, building plans and medical information over a common data network. In addition, the need for inter-communications across states, between states, and across international boundaries requires that we create a more flexible 9-1-1 system design with much greater data handling capabilities. A highly standardized system is essential and critical to seamlessly support communications and data transfer across county, state, and international borders, and across the multitude of emergency response professions and agencies, from traditional PSAPs to Poison Control Centers, trauma centers, Coast Guard, and disaster management centers.[8]

It is critical early on in this work for the reader to understand what NG9-1-1 is, and to have a fundamental understanding of the need for NG9-1-1 implementation on a nationwide level. Literature in this category provides a comprehensive explanation of the NG9-1-1 program, makes recommendations to PSAP administrators of how to prepare properly for the arrival of NG9-1-1 technologies, and provide guidance on the importance of partnerships and vendor collaboration during the implementation process.

ESInets or "Emergency Service IP Networks" are a vital part of the nationwide NG9-1-1 rollout. APCO defines ESInet as "a network of networks designed to achieve specific Quality of Service (QoS), security and reliability levels while facilitating

[8] National Emergency Number Association, *What is NG9-1-1* (Alexandria, VA: National Emergency Number Association, 2008), http://c.ymcdn.com/sites/www.nena.org/resource/resmgr/ng9-1-1_project/whatisng911.pdf.

enhanced call routing and delivery," and recognizes ESInets as "fundamental to the formation of NG systems."[9] APCO's alliance with the First Responder Network Authority (FirstNet) further reinforces the need for ESInet design and buildout at the state level, as not having this technical infrastructure in place could hinder data interoperability, standardization, and the exchange and relay of vital public safety information.[10] Both APCO and FirstNet see NG9-1-1 as one half of the nation's future public safety request and response approach, with the public safety answering point acting as the nerve center of the effort. The days of PSAPs simply handling call taking and dispatching are numbered.[11]

Recruitment, training, and retention methods in tomorrow's PSAP will look considerably different than they do today, based primarily on the changes expected with the arrival of NG9-1-1. Programs like APCO's "Project RETAINS," Erlang, and NENA's collaborative staffing guideline report (L. R. Kimball) provide PSAP managers and administrators with a baseline set of criteria for adequately staffing today's emergency call centers, based on a variety of factors like call volume, population density, number of wireless subscribers, and number of public safety providers.[12] The problem with these applications however is that they "may not sufficiently address the additional data elements that are necessary to effectively consider future technological processes that affect staffing calculations."[13]

---

[9] Jay English, *NG911 Implementation* (Daytona Beach, FL and Alexandria, VA: Association of Public Safety Communications Officials, 2013), http://techforum.apcointl.org/wp-content/uploads/English_NG911_Implementation_ETF214.pdf.

[10] Jay English, "NG9-1-1 & FirstNet," Association of Public Safety Communications Officials, accessed December 27, 2016, http://techforum.apcointl.org/wp-content/uploads/2H-English-NG911-FirstNet.pdf; "About FirstNet," *First Responder Network Authority*, accessed December 27, 2016, http://firstnet.gov/about.

[11] Ibid.

[12] "Project RETAINS," accessed December 27, 2016, https://www.apcointl.org/resources/staffing-and-retention/retains.html; "Call Centre Erlang Staffing Calculator—Including Shrinkage," accessed December 27, 2016, https://www.callcentrehelper.com/online-call-centre-staffing-calculator-77780.htm; "PSAP Staffing Guidelines Report," accessed December 27, 2016, https://www.nena.org/?PSAP_Staffing Guide.

[13] Steve Leese, "Next Generation 9-1-1 Staffing," PSC Online, June 13, 2016, http://psc.apcointl.org/2016/06/13/next-generation-9-1-1-staffing/.

> Current models that aid in determining adequate staffing are available; however, updates are needed in the area of input data for accurate calculations in a Next Generation 9-1-1 environment. For example, some current staffing formulas require the input of incident types such as domestic violence and emergency medical dispatch to help compute staffing recommendations. It will be necessary to re-examine these and make additions so we can adequately capture the challenges that Next Generation 9-1-1 incidents will bring and the time it takes to process them.[14]

Leese (APCO) also had an interesting take on the future of America's 9-1-1 centers following NG9-1-1 implementation.

> The PSAP's fundamental purpose will probably not change, but the means by which we provide the service to the public and first responders will likely be revised. PSAPs will be required to deal with vast amounts of data such as pictures, videos, sensor data and information from other devices. Some of the concerns this additional data will generate include, but are not limited to; training, organizing, delivery, back-up, storage and transport.[15]

The arrival of NG9-1-1 will require tomorrow's call takers and dispatchers to be far more analytical and methodical in their daily duties. Leese's article suggests cognitive processing skills will be imperative when it comes to working in the 9-1-1 center of the future. Where today's emergency communications personnel are accustomed to answering the phone, documenting what they hear on a computer screen, and relaying pertinent incident-related information to the necessary first response agency assigned to the jurisdiction, tomorrow's telecommunicator will need to excel in "problem solving, decision-making, and creativity; skills which lead to flexible behavior and the ability to learn."[16]

What is the anticipated timeline for NG9-1-1 deployment and how will America's 9-1-1 centers make the transition to an IP-based 9-1-1 environment? According to NENA, "the prerequisite of deploying IP networks is [already] being done in some areas of North America. The transition to NG9-1-1 will be a journey that will be realized at

---

[14] Leese, "Next Generation 9-1-1 Staffing."

[15] Steve Leese, "The PSAP of Tomorrow," PSC Online, May 3, 2016, http://psc.apcointl.org/2016/05/03/the-psap-of-tomorrow/.

[16] Ibid.

different rates within various parts of North America, based upon state/province, local implementation and stakeholder environments."[17] Collaborative groups promoting NG9-1-1implementation, like the Next Generation 911 Now Coalition (ng911now.org), have set an aggressive goal for nationwide implementation of NG9-1-1 services by the end of 2020. A recent white paper published by the coalition provides a gap analysis and resolution strategy to address progress shortfalls in the NG9-1-1 initiative in the areas of governance, funding, technology, operations, and education.[18]

The successful rollout of NG9-1-1 will not occur without the support of the federal government. One government entity, the USDOT, has taken point on the nationwide initiative, through its Intelligent Transportation Systems Joint Program Office (ITSJPO). The ITSJPO, in cooperation with other public and private sector partners, has released a variety of resource reports and fact sheets that they hope will expedite the NG9-1-1 implementation process, and educate and motivate necessary stakeholders across the country whose participation is vital to the startup of the program. Those stakeholders include (but are not limited to): 9-1-1 authorities and PSAP administrators, state government (legislative and regulatory bodies), federal government agencies and regulatory bodies, non-governmental organizations, service and equipment providers and third party call centers, responder agencies, and the general public.[19]

While the importance of early NG9-1-1 adoption and implementation has been underscored by a variety of public and private sector entities, moving forward with this initiative on a nationwide scale will not be without its challenges. Thus, it will be crucial to understand where potential barriers to progress exist, as well as to develop countermeasures to mitigate or eliminate those obstacles.

> There are overarching issues that States, 9-1-1 Authorities and PSAPs will need to resolve regardless of the specific migration path or implementation

[17] National Emergency Number Association, *NENA NG9-1-1 Transition Plan Considerations Information Document* (Alexandria, VA: National Emergency Number Association, 2013), http://c.ymcdn.com/sites/www.nena.org/resource/resmgr/Standards/NENA-INF-008.2.1-2013_NG9-1-.pdf.

[18] Next Generation 911 Now, *Nation NG9-1-1 Gap Analyses and Next Steps*.

[19] Intelligent Transportation Systems, *Next Generation 9-1-1 (NG9-1-1) System Initiative* (Washington, DC: United States Department of Transportation, 2009), http://ntl.bts.gov/lib/35000/35600/35654/NG911_Transition_PlanFinal.pdf.

> approach they choose. The migration barriers and issues are categorized into five areas—funding, operations, standards and technology, governance and policy, and education and awareness.[20]

Literature from all the previously mentioned organizations will help establish a solid technical foundation for NG9-1-1 deployment at the local, state, and regional level.

2. Emotional and Psychological Impact Analysis

In the preface of his book, *Bulletproof Spirit*, La Mesa Police Department Captain Dan Willis discusses the extremely delicate nature of traumatic situations on the first responder:

> Prolonged exposure to violence, trauma, death, and suffering can scar a first responder's spirit and take a terrible toll; substance abuse, depression, post-traumatic stress disorder, emotional suffering, suicide, and lost careers plague these honored professions. The effects of the invisible wounds of the job ripple outward, and the wear and tear affect not just the first responders themselves, but also their friends, family, colleagues, and the community they are devoted to protecting.[21]

When hearing the term "first responder," who do people generally think of? "The term has come to be used popularly or colloquially to refer to law enforcement, fire, and emergency medical personnel, especially after the events of September 11, 2001."[22] However, how often are 9-1-1 call takers and dispatchers included in the first responder category? Unfortunately, not all that often. In fact, as recently as June 2016, efforts were underway at the private sector and congressional level to reclassify the nation's 9-1-1 call takers and dispatchers as a "protective occupation," instead of an "office and administrative support occupation" under the United States Department of Labor's standard occupational classification, which is where the position title currently resides.[23]

---

[20] "A National Plan for Migrating to IP-Enabled 9-1-1 Systems," accessed December 27, 2016, http://c.ymcdn.com/sites/www.nena.org/resource/collection/22dbdb9d-fbd7-445e-a760-1c39a222ed34/National_NG911_Migration_Plan.pdf?hhSearchTerms=%22Next+and+Generation+and+9-1-1%22.

[21] Dan Willis, *Bulletproof Spirit—The First Responder's Essential Resource for Protecting and Healing Mind and Heart* (Novato, CA: New World Library, 2014), xiii.

[22] "The Legal Definitions of First Responder," accessed December 27, 2016, https://www.nap.edu/read/22451/chapter/1.

[23] "Police, Fire, and Ambulance Dispatchers," accessed December 27, 2016, https://www.bls.gov/soc/2010/soc435031.htm.

It is important to classify and consider 9-1-1 professionals as first responders for a variety of reasons. First, because these individuals deal with life and death situations over the phone and on the radio on a daily basis, like other first responders, 9-1-1 professionals are subject to instances of vicarious trauma and other stress-related symptoms.[24] Secondly, not classifying them in this manner may prevent those who specialize in recognizing and treating these types of stress and trauma in first responders from helping 9-1-1 professionals who could benefit greatly from their assistance. 9-1-1 professionals are already in an "at-risk" category for symptomatology of traumatic stress as a result of performing their normal daily duties. That said, it is safe to assume the introduction of graphic or horrific IRI following the nationwide rollout of NG9-1-1 will only serve to aggravate an already volatile situation.[25]

Without first researching and evaluating stress signs and symptoms detection methods in use by non-9-1-1 public safety entities across the country, it will be extremely difficult to assess or approximate the emotional response of this nation's 9-1-1 professionals to the viewing of traumatic media. For this very reason, learning more about the personal experiences of first responders who see (and in some cases witness first hand) traumatic situations will help build a case for stress and trauma awareness in the 9-1-1 professional.

> I still get nauseated remembering the seven hundred photos on a child molester's computer depicting infants and small children being forcibly sodomized and forced to perform other sex acts. As much as I would like to forget them, those images will be seared into my mind forever.[26]

Captain Willis's account paints a vivid and disturbing picture of the work experience of a single public safety professional. Such plausible situations occur across all disciplines of public safety on a regular basis.

---

[24] Melissa Mann, "Dispatcher Trauma: The Unique Stress of the Job (and How to Overcome It)," *PoliceOne*, April 12, 2016, https://www.policeone.com/health-fitness/articles/171323006-Dispatcher-trauma-The-unique-stress-of-the-job-and-how-to-overcome-it/.

[25] Kimberly D. Turner, "Effects of Stress on 9-1-1 Call-Takers and Police Dispatchers: A Study at the San Jose Police Department" (master's thesis, San Jose State University, 2015), http://scholarworks.sjsu.edu/cgi/viewcontent.cgi?article=8109&context=etd_theses.

[26] Willis, *Bulletproof Spirit—The First Responder's Essential Resource for Protecting and Healing Mind and Heart*, xiii.

3. Trauma Recognition and Treatment

> PTSD tends to develop after a critical incident in which an emergency first responder has been exposed to trauma that concerned actual or threatened death or great harm. It can also develop over time, after a person has endured repeated, significantly stressful and intensely dangerous situations.[27]

Today's 9-1-1 professional deals with a variety of traumatic situations, both on the phone and over the radio. Talking a panic stricken family member through the steps of cardiopulmonary resuscitation (CPR), consoling someone whose loved one just passed away, or keeping a suicidal individual on the line until assistance arrives is all in a day's work for the 9-1-1 call taker. Dealing emotionally with the many traumatic situations a call taker or dispatcher will experience over the course of a given shift is for most individuals a very personal experience. Those unable to work through the feelings they are experiencing via conventional coping mechanisms might choose to speak with a peer, take a short break away from their console, or if the situation warrants, engage the services of a professional.

Many private and public sector employers make health and well-being services available to their employees as part of a general employment benefits package. An excellent example is an employee assistance program or "EAP." As a member of this program, an employee experiencing severe emotional or psychological stress following a traumatic experience is put in touch with a trained mental health professional. In fact, ESI Employee Assistance Group, an EAP provider, lists "mental and behavioral health issues" and "stress" as two matters commonly dealt with in their offices.[28]

For the 9-1-1 community, the great unknown is how the introduction of IRI will impact those who since the beginning of their career have only been able to listen to traumatic situations unfolding. To gauge the impact, it makes sense to look at other public safety disciplines, specifically the manner in which their personnel prepare for and

---

[27] Willis, *Bulletproof Spirit—The First Responder's Essential Resource for Protecting and Healing Mind and Heart*, xiii.

[28] "Solutions for Common Issues—EAP Employee Assistance Program," accessed December 27, 2016, http://www.theeap.com/solutions-for-common-issues/.

deal with the viewing of traumatic scenes and images. Initial treatment methods are also something to consider.

> The military has done a good job of recognizing the effects of this [PTSD] trauma. Sadly, the Fire Service, EMS and Law Enforcement are lagging behind, with acceptance of this being held as a sign of weakness. The reality is that there are many First Responders who will witness much more trauma in their career than many soldiers. This needs to be acknowledged in our profession. Pretending that this trauma and tragedy doesn't have an effect on the men and women that serve their communities is unacceptable. This old school mentality is leading to huge amounts of depression, alcohol and drug abuse and even suicide. It is time that PTSD and the associated mental health issues are brought to the forefront.[29]

While widely diagnosed among military personnel, the appearance of PTSD in public safety professional is not seen (or recognized) nearly as often.[30] For this very reason, co-worker awareness is crucial, and early recognition of PTSD symptoms vital, when it comes to the potential prevention of stress related illness.

> An emergency can present first responders with a critical incident—that is, a sudden, unexpected, unusual event that includes the loss or threat of loss of life. First responders who perceive a threat or trauma can react in significant psychological and physiological ways. It's important for the treating therapist to understand the meaning clients attribute to a critical incident, which affects how it is processed.[31]

Two treatment methods have been used to assist first responders (including 9-1-1 professionals) in dealing with the emotional aftermath of a traumatic situation; CISM and first response resiliency training.

> Critical Incident Stress Management, or CISM, is an intervention protocol developed specifically for dealing with traumatic events. It is a formal, highly structured and professionally recognized process for helping those

---

[29] James Geering, "I Wish My Head Could Forget the Things My Eyes Have Seen—PTSD in First Responders," *Behind the Shield*, November 27, 2016, http://www.jamesgeering.com/blog/2016/11/27/i-wish-my-head-could-forget-the-things-my-eyes-have-seen.

[30] National Center for PTSD, "How Common is PTSD," *United States Department of Veterans Affairs*, last updated October 3, 2016, http://www.ptsd.va.gov/public/PTSD-overview/basics/how-common-is-ptsd.asp.

[31] Susan O'Grady, "Post-Traumatic Stress Disorder and Post-Traumatic Stress Injury," *O'Grady Psychology Associates*, March 29, 2014, https://ogradywellbeing.com/post-traumatic-stress-disorder-post-traumatic-stress-injury/.

> involved in a critical incident to share their experiences, vent emotions, learn about stress reactions and symptoms and given referral for further help if required. It is not psychotherapy. It is a confidential, voluntary, and educative process, sometimes called 'psychological first aid'.[32]
>
> Resiliency is the ability of an individual to bounce back from life's adversity, cope with stresses and deal with these stresses in healthy ways. Because self-efficacy—most simply defined as the belief in one's capabilities to achieve a goal or an outcome—is related to stress reactions and quality of coping in threatening situations, maintaining a sense of personal self-efficacy, owing to resiliency, becomes foundational to producing, through one's actions, the desired level of performance.[33]

Other organizations, like the First Responder Support Network (FRSN), "provide first responders and their families' tools to reduce personal and family stress, encourage appropriate career decisions and reduce the effects of traumatic incident stress on an individual's life."[34]

Following the implementation of NG9-1-1, and the subsequent delivery of graphic incident related imagery to the public safety answering point, early recognition of trauma-related stress symptoms in 9-1-1 professionals will be critical. Moreover, methods for treating those who have experienced traumatic situations in the line of duty must be arranged and approved, to ensure needed assistance is readily available.

4. Training for Traumatic Situations

Training for 9-1-1 call takers and dispatchers in America is a relatively straightforward process. Generally speaking, emergency call centers will use an internally developed curriculum or one of several professionally prepared curricula to train newly hired call takers and dispatchers. Those selected for either critical public safety role usually spend some time in a classroom setting, learning about the fundamentals of emergency call taking and dispatching, followed by a month (or several months) of on the job training, fielding 9-1-1 calls or dispatching law enforcement, fire, and emergency

---

[32] Sherry Cardinal, "What is CISM," *CISM International*, accessed December 27, 2016, http://www.criticalincidentstress.com/what_is_cism_.

[33] Jonathan Gunderson et al., "Responder Resilience," *JEMS*, March 2014, http://cdpsdocs.state.co.us/safeschools/Resources/First%20Responder%20Resiliency%20Article.pdf.

[34] "About the First Responder Support Network," accessed December 27, 2016, http://www.frsn.org/.

medical service resources in a real world setting. Once the communications training officer (CTO) feels candidates' progress is sufficient, and general proficiency in the position has been demonstrated by the candidates, they are certified to work independently.

Training curriculum, whether prepared "in house" or professionally, usually include some aspect of stress preparation awareness for the 9-1-1 candidate. This awareness may include something as simple as what to expect while call taking, how to deal with an irate or out of control caller, or how to deal with an emergency on the radio involving a first responder. This training, coupled with the fact that many 9-1-1 centers across the United States are short staffed, means that communication center recruits may have only an incidental understanding of the root causes of work-related stress (and how to deal with it effectively) before being released to the operations floor for on-the-job instruction.[35]

Fortunately, professionally prepared programming, in the form of specialized topic specific training, is available to educate newly appointed and veteran 9-1-1 personnel about the importance of stress recognition and intervention. One such program, created by APCO titled "Surviving Stress," tackles a variety of stress-related topics specific to the 9-1-1 profession:

> Stress is one of the most common words used in society today and something that each one of us will experience at some point in our life. Stress affects people of all ages, professions and life situations. However, emergency communications as a profession is inherently stressful with the various demands placed upon them by nature of the profession. Understanding these causes of stress in the profession will allow the public safety telecommunicator to recognize and mitigate some of the stressful situations that they may encounter. This course addresses how to detect stress within yourself and co-workers and provides measures to reduce its impact.[36]

---

[35] Barry Furey, "9-1-1 Center Staffing & Standards: Stop Pointing Fingers and Give Us a Hand," *9-1-1 Magazine*, accessed December 27, 2016, http://www.9-1-1magazine.com/Furey-Sep-2016-Stop-Pointing-Fingers.

[36] "Surviving Stress," accessed December 27, 2016, https://www.apcointl.org/training-and-certification/continuing-dispatch-education/cde-courses/surviving-stress.html.

Topic specific policy has also been developed to address stress-related concerns in the emergency communications center. In 2013, NENA released a standard titled "9-1-1 Acute/Traumatic and Chronic Stress Management." The basis of the document provides for "essential awareness of the serious risks posed by work-related stress on the mental and physical health of 9-1-1 emergency Telecommunicators/Dispatchers in their role as our *first* first responders."[37] Most encouraging about this document is its mention of NG9-1-1, specifically how the adoption of the initiative will potentially increase work-related stressors in the communications center. In fact, NENA recommends additional development work on the standard based on the research question of this thesis:

> Is standards development work needed for this topic?" Yes, since the stressors facing 911 professionals operating the PSAP are predicted to increase with the adoption of Next Generation 911 technologies (e.g., texting, real-time video exposure to the public in crisis and the field responders serving them). Additional development by a future working group is anticipated to pursue careful investigation of predictable stress impacts of each specific NG911 technology leading to development of standards that will provide optimal protection of frontline 9-1-1 Telecommunicators/Dispatchers exposed to these NG911 stressors.[38]

Although mentioned in the previously referenced NENA standard, examining stressors associated with the viewing of incident related imagery as part of the anticipated rollout of NG9-1-1, and incorporating the findings of those studies into basic call taker and dispatcher training curriculum (at both the in house and professional level) needs to happen more sooner than later.

5. Conclusion and Summary

Of the literature reviewed for this thesis, the following is known or inferred.

Little data exists on how the introduction of incident-related imagery (still images, pre-recorded video, or streaming media) will impact the PSAP and its personnel following the implementation of NG9-1-1.

---

[37] "NENA Standard on 9-1-1 Acute/Traumatic and Chronic Stress Management," August 5, 2013, https://nebula.wsimg.com/711721acb5a76c6e020996ba09a3dfd4?AccessKeyId=3210927A8AD89F7745AA&disposition=0&alloworigin=1.

[38] Ibid.

The lack of technical infrastructure in place at the local, state, regional, and national level to support NG9-1-1 technology is hindering the abilities of PSAP administrators and trainers to prepare new and veteran 9-1-1 personnel properly for the delivery of IRI to the communications center.

The effects of PTSD, acute stress disorder (ASD), and other psycho-emotional conditions are not limited solely to military personnel and first responders in the field. Emergency communications personnel are also subject to these conditions, and early recognition of a problem, as well as rapid intervention by peers and mental health professionals, is critical to the immediate and long-term mental well-being of the individual.

The technical and educational background of a prospective 9-1-1 professional may be far more important to a hiring manager or PSAP administrator once NG9-1-1 is fully implemented. Moreover, properly preparing 9-1-1 personnel for the arrival of NG9-1-1 technology will likely reduce the turnover of newly appointed staff, and improve the retention rate of veteran personnel.

The overall impact of IRI on the PSAP and its personnel is essentially unknown.

D. RESEARCH METHODOLOGY

1. Object or Sample

This research is focusing primarily on the staffing implications associated with the introduction of still image, pre-recorded video, and streaming media on the public safety answering point. The researcher anticipates his research will focus on needed theory and policy implications at an organizational level.

2. Selection

Little is known about the impact of NG9-1-1 on the communications center; specifically, the impact of still image, pre-recorded video, and streaming media on communications center personnel. As the emergency communications profession has always been one of listening, the introduction of IRI as part of the nationwide NG9-1-1 rollout will alter the work role of the 9-1-1 call taker and dispatcher considerably. To

alleviate some of the speculation associated with the arrival of NG9-1-1 technology in the PSAP, focusing his research efforts on effective methodologies for 9-1-1 staff preparation in a NG9-1-1 environment seemed viable.

3. Limits

The researcher has narrowed this research topic as the literature review continuously honed the research questions and scope. NG9-1-1 is a broad topic, affecting many areas of the technical landscape of today's 9-1-1 center. The scope of this project is solely trained on the impact of still images, video, and streaming media on communications center personnel. The research boundary is image based.

4. Data Sources

Much of what is known about the impact of IRI on emergency communications center personnel is speculative. A number of predictions or recommendations for how NG9-1-1 will or should be rolled out have been posited, but none is based on actual technological deployments. The researcher anticipates white papers and research studies from NENA and APCO will likely provide a foundational source for this thesis. Third party voice, data, and software developers and vendors may also be a source of information. The work these organizations are doing to advance the technical capabilities of the 9-1-1 industry, both in solution development and deployment, will likely play a considerable role in the national deployment of NG9-1-1 technology. The emotional and psychological toll to 9-1-1 center personnel exposed to these technologies will be of considerable concern to industry professionals reading this thesis. The researcher also anticipates conducting extensive research on PTSD, critical incident stress management (CISM, and support options available through public and private sector EAPs.

5. Type and Mode of Analysis

Qualitative analysis is the basis for this research, with a historical and case study based approach. The research considers how the introduction of other technologically advanced capabilities impact communications center staff and what the impacts at the administrative and operational level of the PSAP are as a result of those technologies.

The research uses a case study approach to look at the impact of still and video-based graphic imagery on other public safety or private sector entities. It considers how to prepare personnel to deal with grotesque and graphically intense scenes in the field. The research also considers what support mechanisms are in place, or should likely be in place, to help personnel deal with such situations.

6. Output

To produce conclusive research that PSAP managers and communications center directors nationwide can use to determine best practices for accepting incident-related imagery in the communication center, the researcher believes his research will yield a model for preparing communication center personnel for the arrival of this particular element of NG9-1-1 technology. This model will describe methods for bringing NG9-1-1 technology into the communications center, provide analysis of the anticipated issues associated with the arrival of NG9-1-1 technology, give suggestions for recognizing and dealing with incidents of critical incident stress among center personnel, and provide ideas for how to train center personnel effectively for dealing with the viewing of graphic and intense images, video, and streaming media.

THIS PAGE INTENTIONALLY LEFT BLANK

II. BACKGROUND

A. BRIEF HISTORY OF THE 9-1-1 SYSTEM

It has been almost 50 years since the first 9-1-1 call was placed in Haleyville, Alabama by Senator Rankin Fite.[39] At that time (1968), the idea of a nationwide emergency telephone number was still relatively new, based on a recommendation made by the National Association of Fire Chiefs in 1957.[40] While a considerable number of changes and advancements in telecommunications technology have occurred over the course of the last 50 years, the method used by Americans to contact law enforcement, fire, and emergency medical service professionals during an emergency has remained relatively consistent.[41]

As of December 2015, the United States has 5,899 primary and secondary PSAPs and 3,135 counties, which include parishes, independent cities, boroughs, and census areas.[42] The Federal Communications Commission (FCC) describes primary and secondary public safety answering points in the following way:

> A primary PSAP is defined as a PSAP to which 9-1-1 calls are routed directly from the 9-1-1 Control Office, such as, a selective router or 9-1-1 tandem. A secondary PSAP is defined as a PSAP to which 9-1-1 calls are transferred from a primary PSAP.[43]
>
> and
>
> An estimated 240 million calls are made to 9-1-1 in the United States each year. In many areas, 70% or more are from wireless devices.[44]
>
> and

[39] "9-1-1 Origin & History," accessed February 6, 2017, https://www.nena.org/?page=911overviewfacts.

[40] Ibid.

[41] "Telephone Timeline," 2016, http://www.greatachievements.org/?id=3625.

[42] "9-1-1 Statistics," 2014, https://www.nena.org/?page=911Statistics.

[43] "911 Master PSAP Registry," 2016, https://www.fcc.gov/general/9-1-1-master-psap-registry.

[44] "9-1-1 Statistics."

Approximately 96% of the geographic US is covered by some type of 9-1-1" service.[45]

B. CALL INTAKE PROCESS

Callers' experience with the nation's 9-1-1 system differ slightly depending on their location, what type of device they are calling from, and whether they are calling into a primary or secondary PSAP. Smaller or lower volume 9-1-1 centers may consolidate 9-1-1 call taking and dispatching responsibilities into a single role, while larger volume 9-1-1 centers may hire and assign personnel to serve solely in a call taking or dispatching capacity. Those calling a small volume primary PSAP run by a law enforcement agency might be transferred to a secondary PSAP (talking to several people in the process) if their call is of a fire or emergency medical service nature. In a large volume primary PSAP, the inbound 9-1-1 call might be fielded by a public safety professional (generally referred to as a "call taker" or "telecommunicator"), whose sole responsibility is to answer 9-1-1 calls, collect all critical call information (address, town, cross streets, phone number, name), document the nature of the problem, and route the information to the appropriate public safety dispatcher (generally referred to as a "dispatcher"). The receiving dispatcher would then review the material sent over by the call taker, determine the appropriate response, and dispatch the law enforcement agency, fire department, or emergency medical service provider responsible for the area in question.

The questions a 9-1-1 caller is asked also varies from jurisdiction to jurisdiction. While some 9-1-1 center personnel might use an established protocol[46] or pre-written script to gather incident related information from a caller, personnel from a neighboring center might be trained to conduct call-related questioning in a less formal but still comprehensive fashion, adhering to call taking policies and procedures created at the agency level.

Whether the 9-1-1 call taker is reading from a script or conducting random call related questioning, virtually all 9-1-1 calls commence with the asking of a single

[45] "9-1-1 Origin and History."

[46] "ProQA Call Taking Software," 2016, http://www.prioritydispatch.net/proqa/.

important question, what is the address of your emergency? Without accurate location information, providing any level of emergency assistance to a 9-1-1 caller is virtually impossible. Yes, modern communications technology provides varying levels of assistance to a 9-1-1 call taker when it comes to ascertaining the location of a 9-1-1 caller; however, with the increased use of wireless communications technology and the nationwide trend to eliminate legacy landline equipment (41% of households in the United States have only wireless phones), the ability of a 9-1-1 call taker to determine a 9-1-1 caller's location immediately and accurately (if the information is not conveyed by the caller) is dramatically reduced. [47] For this reason, 9-1-1 center personnel routinely ask the caller to verify the address they are calling from, even if the location information on the 9-1-1 call taker's screen is believed to be accurate. The township or municipality associated with a given address, as well as nearby cross streets, are often asked for during the location verification process. Similar sounding street names and streets of the same name appearing within a given jurisdiction make this practice an essential part of the 9-1-1 call intake process.

Once the correct incident location has been established, the callers are asked to provide the phone number they are calling from, as well as their first and last name. Only after all critical call information has been gathered and the incident narrative has been created does the 9-1-1 call taker disconnect with the caller. The only exception is for "in progress" events (i.e., violent family troubles, burglaries in progress, or medical emergencies, for example), where disconnecting prematurely may present a life safety hazard to the caller. In such situations, the 9-1-1 call taker remains on the line to keep the caller calm, provide supplemental information about the situation to responding units, or in the case of a medical emergency, provide medical intervention instructions to the caller. Only after first responders have made contact with the caller will the 9-1-1 call taker disconnect.

Whether the 9-1-1 call taker remains on the line with the caller or not, the objective remains the same; the timely and accurate entry of the computer aided dispatch

[47] Geoff Williams, "Is It Finally Time to Get Rid of your Landline?" *USNews*, 2015, http://money.us news.com/money/personal-finance/articles/2015/10/08/is-it-finally-time-to-get-rid-of-your-landline.

(CAD) event, and subsequent notification of appropriate first responders. In some cases, multiple public safety disciplines may respond to the same incident.

C. INCIDENT DISPATCH PROCESS

Whether the dispatcher is responsible for fielding inbound 9-1-1 calls or not, the process by which public safety resources are dispatched in a communications center is relatively consistent across the nation. A dispatcher, generally situated in front of six to eight computer screens, uses a CAD application to organize, prioritize, dispatch, and track the status of hundreds of emergency calls over the course of a given shift. Depending on the size of the communications center, the dispatcher might be responsible for one facet of public safety (i.e., law enforcement), or multiple disciplines (law enforcement, fire, or emergency medical services).

While the following list (provided by 911DispatcherEDU.org) is by no means exhaustive, it does provide an accurate snapshot of the average daily responsibilities of a dispatcher:

- Operate a multi-line telephone console system, alerting system, and telecommunications device for the deaf (TDD) system for the deaf and hearing-impaired.
- Translate information to the appropriate codes.
- Determine and assign the level of priority of the call and enter the data into a computer-aided dispatch system for radio dispatch purposes.
- Perform emergency medical dispatch and crisis intervention services.
- Ask vital questions and provide pre-arrival instructions for emergency medical calls.
- Monitor and operate a radio console and computer equipment.
- Receive and respond to a variety of emergency and non-emergency services and complaints.
- Ask questions to interpret, analyze, and anticipate the caller's situation to resolve problems, provide information, dispatch emergency services, or refer callers to other agencies.
- Dispatch and coordinate the responses of public safety agencies.

- Identify the appropriate number and type of equipment or apparatus to dispatch.
- Enter and modify information into local, state and national computer databases.
- Monitor and respond to a variety of technical systems and alarms.[48]

Of particular importance is the dispatchers' responsibilities to the first responders within their assigned dispatch area. Information pertaining to the incident must be relayed to responding units in a timely fashion, and read verbatim. Supplemental information (i.e., information provided after the initial 9-1-1 call has been completed) must be relayed as well, to ensure those responding have the most up-to-date information on the situation at hand. Once the first unit arrives on scene, a virtual clock begins to tick. With each passing minute, a dispatcher's responsibility to the assigned unit will change.

From a law enforcement perspective, once an officer arrives at an incident scene, the dispatcher has to be cognizant of several things. How far away is the on-scene unit's backup? Can the situation possibly escalate? If additional officers are needed, which ones are to be sent? At what intervals should the dispatcher be checking on the officer? Although the officers on scene are ultimately responsible for their own safety and the safety of those around them, the dispatcher provides a vital link to immediate additional support, if and when a need arises.[49]

The fire and emergency medical service (EMS) dispatcher has a slightly different, but equally important role. Like their law enforcement counterparts, responding fire and Ems units rely on the timely delivery of incident-related information. As units begin arriving at an incident scene, the dispatcher needs to listen carefully to and acknowledge the initial report or "size up" of the first in piece of apparatus, relay the information to fire command staff still in route to the scene, document the specific location and designated function of apparatus on the fire ground, and prepare for incident escalation. More importantly, because radio transmissions from within a building are not always

[48] "Job Duties of 911 Dispatchers," 2016, http://www.911dispatcheredu.org/job-description/.

[49] "Police, Fire, and Ambulance Dispatchers—Work Environment," December 17, 2015, https://www.bls.gov/ooh/office-and-administrative-support/police-fire-and-ambulance-dispatchers.htm#tab-3.

heard by those outside the building, dispatchers have to listen carefully for personnel-related emergencies or "maydays," and be prepared to relay those emergencies to incident command.[50]

Paramedics and emergency medical technicians periodically encounter dangerous situations when responding to medical emergencies, especially when those situations occur in the midst of a domestic dispute and an argument or altercation occurs between one of the requesting parties and the EMS professional. In such cases, the dispatcher is the quickest and most effective means of securing law enforcement assistance.[51]

While dispatchers are responsible for a variety of tasks associated with the handling of an emergency incident, ultimately, their primary function is one of accountability. Knowing what emergency units are out, where they are responding, what their function is at an incident scene, and what units remain available for the next emergency gives dispatchers an extremely high level of situational awareness. Command officers from all facets of public safety rely on the competence, quick thinking, and organizational abilities of a dispatcher to ensure the operational aspect of an emergency incident runs as smoothly as possible.[52]

D. CURRENT TECHNICAL CAPABILITIES

Fully implemented, NG911 will provide a number of technology-based benefits[53] to 9-1-1 telecommunicators and dispatchers, the first responders they serve, and ultimately, to the public at large. Unfortunately the nationwide deployment of NG911 is not expected to be complete until sometime in 2020.[54] In the interim, America's antiquated9-1-1 system must struggle to keep up with the constantly evolving pace of the nation's wireless communications market, and more importantly, the demands of the

---

[50] P. J. Norwood, "Handling the Mayday: The Fire Dispatcher's Crucial Role," *Fire Engineering*, June 1, 2012, http://www.fireengineering.com/articles/print/volume-165/issue-6/departments/real-world-rit/handling-the-mayday-the-fire-dispatchers-crucial-role.html.

[51] Ibid.

[52] "Dispatchers Role in Situational Awareness," accessed March 1, 2017, http://www.samatters.com/dispatchers-role-in-situational-awareness/.

[53] "Benefits of Next Generation 911—A Video," 2016, http://www.911.gov/ng911movie.html.

[54] "Next Generation 911 NOW," 2016, http://www.ng911now.org/#about.

connected public.[55] Although emergency communications technical capabilities continue to improve, industry experts suggest a considerable amount of work remains:

> Four hundred times each minute, people across the country will dial 911 on sophisticated handheld devices and lose precious seconds trying to describe where they are and what they're seeing over the phone, rather than sharing precise coordinates or a live video stream.
>
> What these several hundred million callers don't realize is that they're dialing an antiquated emergency telephone network, a system that—even in its most advanced state today—struggles to deliver geographical location with a text message.[56]

Fortunately, features of NG911 technology are beginning to emerge incrementally across the United States, well in advance of the planned 2020 nationwide rollout. One such feature is "Text to 9-1-1."

Adopted by a FCC order in 2014, Text to 9-1-1 gives emergency callers the option of interacting with 9-1-1 Center professionals via conventional cellular texting technology or short message service (SMS).[57] A white paper published by APCO provides a more detailed explanation of the technology:

> Carrier native SMS is that feature provided by the carrier, and not a third party texting or messaging application (app) that may be installed on the mobile device. The SMS interim text-to-9-1-1 service provides support for wireless subscribers to send 9-1-1 SMS text messages to PSAPs and for subscribers to receive text replies from PSAPs. Wireless customers with SMS service are able to send emergency SMS messages to a PSAP by using the single code "911" as the destination address of the SMS message.[58]

---

[55] Mark J. Fletcher, "The Truth about 911: How Outdated Technology Is Putting your Life at Risk," *Avaya*, July 22, 2015, https://www.avaya.com/blogs/archives/2015/07/the-truth-about-911-how-outdated-technology-is-putting-your-life-at-risk.html; Alison Knezevich and Pamela Wood, "How Cellphones Are Changing 9-1-1," *The Baltimore Sun*, February 6, 2016, http://www.baltimoresun.com/news/maryland/crime/bs-md-911-cell-phones-20160206-story.html.

[56] Fletcher, "The Truth about 911: How Outdated Technology Is Putting your Life at Risk."

[57] "What You Need to Know about Text to 911," last updated/reviewed October 25, 2016, https://www.fcc.gov/consumers/guides/what-you-need-know-about-text-911.

[58] "Interim SMS Text-to-9-1-1 Information and Planning Guide," May 2014, https://www.apcointl.org/resources/next-generation-communications-systems/text-to-9-1-1.html.

While the FCC's order requires "all wireless carriers and providers of interconnected text messaging applications to deliver emergency texts to" PSAP's requesting them, it is important to note that as of June 2015, only five percent of the nation's 6,500 emergency call centers are currently setup to receive and process Text to 9-1-1 calls.[59] Ultimately, the decision to upgrade dispatch center equipment to handle Text to 9-1-1 calls falls on the shoulders of individual agency administrators; a decision not currently mandated by the federal government.[60]

Even if a PSAP or communications center files a formal request for service with a major wireless carrier for participation in the Text to 9-1-1 program, once implemented, the capabilities of the system remain somewhat limited.[61] For example, where Phase II Enhanced 9-1-1 (E911) services provide the 9-1-1 dispatcher or telecommunicator with callers' wireless phone number, as well as their estimated location information, geolocation data is rarely if ever available for SMS transmissions (text messages).[62] In other words, the Text to 9-1-1 caller must provide the dispatcher or telecommunicator with incident specific location information to ensure a timely dispatch and arrival of emergency services. If the SMS session is interrupted or lost completely, the dispatcher or telecommunicator has no baseline location information with which to initiate a response. This fact alone is why many states have adopted the catch phrase, "Call if you can, Text if you can't."[63]

Few in the emergency communications profession would argue the value of E911 services to the call center. Where its Phase I counterpart provided only the phone number of the wireless device (used to contact 9-1-1) to communications center personnel, Phase

---

[59] "What You Need to Know about Text to 911"; Herb Weisbaum, "Dispatch Centers Slow to Adopt 'Lifesaving' Text to 911 Technology," *NBCNEWS*, June 10, 2015, http://www.nbcnews.com/business/consumer/dispatch-centers-slow-adopt-lifesaving-text-911-technology-n372321.

[60] Ibid.

[61] Intrado, *NextGen9-1-1 Insights into Text-to-9-1-1 Implementation*.

[62] "Cell Phones and 9-1-1," 2013–2014, https://www.nena.org/?page=911Cellphones; "Text-to-911: Quick Facts & FAQs," last updated/reviewed November 1, 2016, https://www.fcc.gov/consumers/guides/text-911-quick-facts-faqs.

[63] Jim Ridolphi, "Call if You Can, Text if You Can't," *Richmond Times Dispatch*, 2015, http://www.richmond.com/news/local/hanover/mechanicsville-local/article_024a00a2-9dc3-11e5-98ef-8bef11ed16be.html.

II provides the same phone number information, but adds location information for the wireless caller, using estimated latitude and longitude information generated by the cellular tower to which the device is connected.[64] Thus, 9-1-1 telecommunicators and dispatchers have the ability to locate a 9-1-1 caller better, regardless of the callers' ability to articulate their location properly.

The technology of course is not foolproof. A tragic example of the failure of this technology to provide accurate wireless location information to 9-1-1 professionals occurred just outside Atlanta, Georgia on December 29, 2014. Shanell Anderson, who was out delivering newspapers early that morning, accidentally drove her SUV into a large pond. In the moments that followed, Anderson successfully dialed 9-1-1, but since the pond she had driven into was in one county, and the cellular tower she was connected to was in a neighboring county, the 9-1-1 dispatcher who took the call was not able to determine Anderson's exact location. As a result, it took responders almost 30 minutes to get to Anderson's location and locate her vehicle, which was submerged in about eight feet of water. After being removed from the vehicle, Anderson was revived, but ultimately died a week and a half later from organ failure.[65]

A *Today* story referencing the same event provided the following information regarding the delivery and accuracy of wireless location information to the 9-1-1 center:

> Today's cellphone system does not automatically send location data when you dial 911. After the call comes in, the dispatcher's computer transmits a digital request to the cellphone network seeking the phone's location. The data exchange can take seconds or even minutes. Sometimes, it doesn't return a location at all. The most high-tech 911 centers automate the process, digitally requesting the location every few seconds. If the system can't locate the device, cellphone carriers' systems will use nearby towers to estimate. These methods sometimes do net location information later, although public records show some call centers see major gains as calls go on and others see only marginal improvement. Often, 911 calls

[64] "Cell Phones and 9-1-1."

[65] Jeff Rossen and Charlie McLravy, "Some 911 Systems Can't Find You in an Emergency due to Dated Technology," *TODAY*, 2015, http://www.today.com/news/some-911-systems-cant-find-you-emergency-due-dated-technology-t4756.

end before that digital back-and-forth yields a specific location for emergency responders.[66]

Significant challenges remain in the wireless location realm for America's 9-1-1 centers to include a lack of indoor wireless location accuracy (i.e., you are in a high-rise building calling 9-1-1, but it is currently not possible to determine what floor you re on), requiring wireless phones to provide a smaller and more refined location radius to 9-1-1 centers (location technology in cell phones is generally accurate to within 100 meters), and an overall failure of wireless phones to deliver accurate location information successfully to a 9-1-1 center 100% of the time.[67]

Emergency telephone notification systems or "ETNS" (commonly referred to as "reverse 9-1-1") are used regularly by emergency communications centers throughout the United States. First used in the middle 1990s, ETNS is defined as "a system that uses the telephone—in conjunction with other elements—including computer hardware and software to notify persons of an" emergency.[68] These systems, combined with federally supported public notification systems like the Integrated Public Alert & Warning System (IPAWS).[69] Wireless emergency alerting (WEA), and the EAS, give local, state, and federal officials the ability to notify the public rapidly and accurately of a current or impending emergency via multiple communications mediums.[70]

While IPAWS, WEA, and EAS are generally available for use by emergency communications centers nationwide for large-scale event notification, ETNS or "reverse 9-1-1" is used far more frequently for targeted public notification of an emergency incident, at the request of local public safety officials. Conventional ETNS interfaces

---

66 John Kelly and Brendan Keefe, "911's Deadly Flaw: Lack of Location Data," *USA Today*, February 22, 2015, http://www.usatoday.com/story/news/2015/02/22/cellphone-911-lack-location-data/23570499/.

67 Randy Dotinga, "911 Explained: Why Uber Can Find You but maybe Not 911," *Voice of San Diego*, June 16, 2016, http://www.voiceofsandiego.org/topics/news/the-411-on-911-why-help-might-not-be-on-the-way/.

68 National Emergency Number Association, *Minimum Standards for Emergency Telephone Notification Systems* (Arlington, VA: National Emergency Number Association, 2004), https://transition.fcc.gov/pshs/docs-psap/etns060404.pdf.

69 "Integrated Public Alert and Warning System," last updated December 6, 2016, http://www.fema.gov/integrated-public-alert-warning-system.

70 Ibid.

allow authorized users to construct an incident specific message, in text message format, voice recorded format, or both, and deliver the message to a specific audience in a given locale, which could be as small as a single home, or as large as an entire zip code. Many of these interfaces include delivery confirmation (to ensure a specific audience was notified about a given situation), and in some cases, a reply feature, which allows those receiving the ETNS notification to reply back to the authorized sender with a specific message regarding the message received. This feature is beneficial when call outs of specialized public safety groups (SWAT, bomb squad, or hostage negotiation, etc.) are requested by command staff at a given incident.[71]

Although the technology used by America's telecommunicators and dispatchers has changed considerably since 1968, the overall mission of these public safety professionals remains relatively unchanged. As public expectations for more advanced and higher tech methods of emergency reporting grow, so too will the need for local, state, and federal officials to embrace and implement NG9-1-1 technologies to support these needs.

[71] "State & Local Government," accessed March 1, 2017, https://ecnetwork.com/state-local-government/.

THIS PAGE INTENTIONALLY LEFT BLANK

III. INTRODUCTION OF INCIDENT RELATED IMAGERY

A. THE NEXT GENERATION 9-1-1 INITIATIVE

Created in 2004 by NENA, the NG9-1-1 initiative began as part of an idea to redesign the nation's 9-1-1 system in 2000.[72] The Appendix provides a detailed timeline of critical dates in NENA's NG9-1-1 development process. NENA provides the following descriptive summary of the NG9-1-1 initiative:

> A system comprised of Emergency Services IP networks (ESInets), IP-based Software Services and Applications, Databases and Data Management processes that are interconnected to Public Safety Answering Point premise equipment. The system provides location-based routing to the appropriate emergency entity. The system uses additionally available data elements and business policies to augment PSAP routing. The system delivers geodetic and/or civic location information and the call back number.
>
> The system supports the transfer of calls to other NG9-1-1 capable PSAPs or other authorized entities based on and including accumulated data. NG9-1-1 provides standardized interfaces for call and message services, processes all types of emergency calls including non-voice (multi-media) messages, acquires and integrates additional data useful to call routing and handling for appropriate emergency entities. NG9-1-1 supports all E9-1-1 features and functions and meets current and emerging needs for emergency communication from caller to Public Safety entities.[73]

Although they are a major stakeholder in NG9-1-1 planning, NENA is only one of many participants involved in the nationwide implementation of the program. In December 2004, the USDOT officially entered the NG9-1-1 arena, assuming the lead role for the effort at the federal level, under the program name "National 911 Program."[74] Other key players include but are not limited to APCO, the Telecommunications Industry Association (TIA), and the Industry Council for Emergency Response Technologies

---

[72] National Emergency Number Association, *NENA NG9-1-1 Project History* (Alexandria, VA: National Emergency Number Association, n.d.), http://c.ymcdn.com/sites/www.nena.org/resource/resmgr/ng9-1-1_project/ng9-1-1_history.pdf.

[73] "NG9-1-1 Project," accessed January 1, 2017, http://www.nena.org/?page=NG911_Project&hhSearchTerms=%22NG911.+and+Project%22&#rescol_372926.

[74] "December—U.S. DOT NG911 Initiative Starts," 2016, http://www.911.gov/historyof911.html.

(iCERT). The initiative is also supported by a variety of public and private sector entities, including telecommunications equipment and service providers, state and local 9-1-1 agencies, public safety and emergency management agencies, and national organizations with active interests in 9-1-1.[75]

B. IMAGES AND VIDEO SENT VIA NEXT GENERATION 9-1-1

The 9-1-1 profession has always been one of listening. Newly appointed call takers and dispatchers learn early in their careers about this important skill, be it a person calling with an emergency, a first responder in the field calling for assistance, or a supervisor providing a job-related instruction. The most proficient 9-1-1 professionals quickly become astute at determining what is going on "behind the scenes" during a hectic emergency call, even when the caller is not forthright about the situation.[76]

Although the technology required to process an emergency call quickly and efficiently has improved considerably with time, one element of the 9-1-1 call-taking process that has not changed as technology has evolved is the inability to receive and view images digitally captured by the caller. The arrival of IRI with NG9-1-1 dramatically changes the ways in which 9-1-1 callers will interact with the public safety community. Where 9-1-1 callers have been limited to conveying the details of an emergency situation by voice alone, sending images, video, and streaming media from the scene of the incident to 9-1-1 will provide a completely new layer of situational awareness to first responders. How the average 9-1-1 professional will react when viewing a graphic or horrific image received during an emergency call is unknown. As of the writing of this thesis, the nationwide availability of NG9-1-1 is still almost three years away.[77] With efforts underway to accelerate the implementation of NG9-1-1, it will become increasingly important for those serving in a supervisory, training, or

---

[75] "Next Generation 9-1-1: The Stakeholders," accessed January 1, 2017, https://www.apcointl.org/resources/next-generation-communications-systems.html.

[76] Mike Emery, "9-1-1 Dispatchers Vital to Public Safety Efforts," Pal-Item, April 19, 2015, http://www.pal-item.com/story/news/local/2015/04/19/dispatchers-mainbar/26041587/.

[77] "Voice, Video, Text, and Data by 2020," accessed January 1, 2017, http://www.ng911now.org/#about.

administrative capacity in this nation's 9-1-1 centers to prepare for the arrival of these technologies.[78]

C. WIRELESS TECHNOLOGY AND THE INTERNET OF THINGS

In a 2016 *Wall Street Journal* article, Slack CEO Stewart Butterfield discussed the "Future of Communication," specifically how people will talk and interact with one another in the years ahead. His comments while not directly suggestive of a world of people tethered to wireless devices and devoid of casual conversation, did imply that new and more creative forms of communication are constantly being considered, "I think the future of communication is just continual exploration of all the possible modalities of communication, of recording things that happen in our world, of compositing things, of creating new things, composing."[79]

Statistically, sales of smartphones and similar hand-held communication devices show no signs of slowing down.[80] Dramatic increases in the use of chat applications and social networking will likely fuel additional growth in the industry, as new users purchase wireless technology and log in for the first time.[81] Deloitte, a multinational professional services company, estimates the sale of 1.6 billion smartphones by the end of 2016, with roughly 75 percent of those sales being upgrades to existing equipment, including better cameras, processors, connectivity, and storage.[82] This proliferation is beginning to

---

[78] Don Brittingham, "Press Release: New Report Details Important Steps to Accelerate NG911 Implementation," NG911 NOW, June 13, 2016, http://www.ng911now.org/blog/2016/6/13/press-release-new-report-details-important-steps-to-accelerate-ng911-implementation.

[79] Jason Dean, "Slack CEO Stewart Butterfield on the Future of Communication," *The Wall Street Journal*, October 25, 2016, http://www.wsj.com/articles/slack-ceo-stewart-butterfield-on-the-future-of-communication-1477405213.

[80] "Number of Smartphones Sold to End Users Worldwide from 2007 to 2016 (in Million Units)," accessed March 1, 2017, https://www.statista.com/statistics/263437/global-smartphone-sales-to-end-users-since-2007/.

[81] Andrew Perrin, "Social Media Usage: 2005–2015," Pew Research Center, October 8, 2015, http://www.pewinternet.org/2015/10/08/social-networking-usage-2005-2015/.

[82] Paul Lee and Duncan Stewart, "Photo Sharing: Trillions and Rising," *Deloitte*, accessed January 1, 2017, http://www2.deloitte.com/global/en/pages/technology-media-and-telecommunications/articles/tmt-pred16-telecomm-photo-sharing-trillions-and-rising.html#.

impact the way people communicate, not only with each other, but with businesses as well.[83]

Optimistic purchase estimates alone do not make the case for NG9-1-1 implementation at the national level. How these devices are used, beyond a conventional person to person conversation, is of far greater importance. Deloitte predicts that by the end of 2016, 2.5 trillion photos will be shared or stored online, a 15 percent increase over the prior year, with over 90 percent of those photos being taken on a smartphone.[84] A 2015 Pew Research Center study states that of the nearly two-thirds of Americans who own a smartphone, 67 percent use their phone to share pictures or videos, with 35 percent doing so frequently.[85] A special "experience sampling" survey (conducted by Pew) revealed that over a one-week period, "97 percent of smartphone owners used text messaging at least once, making it the most widely used basic feature or app, and the feature used most frequently."[86] Young smartphone owners (18–29 years of age) were by far the largest percentage of users of smartphone-related technology.[87]

User generated content in the form of pre-recorded and streaming video has also emerged as an area of concern for 9-1-1 planners. A recent GlobalWebIndex (GWI) poll found that while the use of live-streaming applications remains relatively low in comparison to similar application-based offerings for smartphones, the potential for growth in this arena remains quite high.[88] Live streaming applications like Meerkat and Periscope have seen some growth in recent quarters; however, the expectation for the increased use of these applications comes primarily from the top activities rating of social

---

[83] Laurie Beaver, "Here's How Millennials Are Impacting the Future of Communication," *Business Insider*, January 6, 2017, http://www.businessinsider.com/heres-how-millennials-are-impacting-the-future-of-communication-2017-1.

[84] Lee and Stewart, "Photo Sharing: Trillions and Rising."

[85] Aaron Smith, "U.S. Smartphone Use in 2015," Pew Research Center, accessed January 1, 2017, http://www.pewinternet.org/2015/04/01/us-smartphone-use-in-2015/.

[86] Ibid.

[87] Ibid.

[88] Jason Mander, "Trends 2016: Rise of Live Streaming," globalwebindex, January 7, 2016, https://www.globalwebindex.net/blog/trends-2016-rise-of-live-streaming.

media sites like Facebook and Twitter.[89] This growth, combined with Cisco's estimation that 75 percent of the world's mobile data traffic will be video by the year 2020—the same year NG9-1-1 is scheduled to be fully implemented in the United States—makes a strong argument for the continued growth of this digital medium.[90] Cisco's white paper also provides another staggering estimation; by the year 2020, "there will be 11.6 billion mobile connected devices, including machine to machine (M2M) modules—exceeding the world's projected population at that time (7.8 billion)."[91] This forecast fully supports "the "Internet of things" (IoT) notion that a system of interrelated computing devices, mechanical and digital machines, objects, animals or people, provided with unique identifiers, will have the ability to transfer data over a network without human-to-human or human-to-computer interaction."[92]

What these polls and forecasts do provide is a plausible prediction for the future of mobile communications. As a nation, it can absolutely be expected that a greater number of citizens will be carrying a variety of newer, more powerful, more feature rich mobile devices. Enhanced image capture and transmit capabilities, available with the advent of stronger cameras, faster processors, and increased provider bandwidth, will likely result in an increased number of digital images and videos being recorded. As these technologies become more readily available, affordable, and widely used, the expectation that America's 9-1-1 centers will be able to receive, process, and re-transmit still images and video sent by a 9-1-1 caller will increase as well.

D. NG9-1-1 INCIDENT RELATED IMAGERY HITS THE DESKTOP!

> Managing change means managing people's fear. Change is natural and good, but people's reaction to change is unpredictable and irrational. It can be managed if done right.

---

[89] Mander, "Trends 2016: Rise of Live Streaming."

[90] Cisco, "Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2015–2020 White Paper," updated February 9, 2017, http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/mobile-white-paper-c11-520862.html.

[91] Ibid.

[92] Margaret Rouse, "Internet of Things (IoT)," TechTarget, accessed January 1, 2017, http://internetofthingsagenda.techtarget.com/definition/Internet-of-Things-IoT.

~ F. John Reh[93]

Change is difficult to manage in any organization.[94] Unfortunately, in a world driven by technology, change is inevitable. Subtle changes to everyday work practices might be met with some resistance; however, major policy modifications may result in organization-wide chaos and animosity. The changes associated with the move from a legacy 9-1-1 environment to a NG9-1-1 environment will be numerous. To ensure a smooth transition, emergency communications center administrators and leadership will need to develop a technology implementation strategy that considers the work-related needs of the many 9-1-1 professionals who will be using the system on a daily basis. Second only to the needs of emergency call center staff are the needs of the public safety personnel who will be using elements of NG9-1-1 technology in the field. A white paper by Intrado suggests the following:

> While the benefits of these new capabilities are immeasurable, they will definitely impact operations, possibly in ways that cannot yet be predicted. Despite the fact that operations will change, PSAP directors and call takers will remain in control of every emergency call as well as the decisions surrounding how and when the new information will be made available to their personnel. Careful planning and the development of a NextGen 9-1-1 operations training program will help manage the changes that result from next-generation data.[95]

The changes associated with NG9-1-1 migration will not be isolated to technology alone. Internal policies and procedures must be amended. Personnel will have to be briefed and counseled prior to, during, and following the implementation process. Moreover, 9-1-1 personnel dealing directly with IRI as a part of their daily duties will have to be monitored once the NG9-1-1 IRI application goes live to ensure they are adjusting well to their new responsibilities. Suicides, homicides, assaults, and other life-threatening situations previously limited to "audio only" will now be delivered in real

---

[93] F. John Reh, "Managing Change: Managing People's Fear," the balance, updated October 13, 2016, https://www.thebalance.com/managing-change-managing-people-s-fear-2275302.

[94] Ibid.

[95] Intrado, *Next-Generation 9-1-1: The Essential Guide to Getting Started*, vol. 1 (Omaha, NE: Intrado, 2013), 10, https://www.intrado.com/sites/default/files/documents/NextGen%209-1-1%20The%20Essential%20Guide%20to%20Getting%20Started.pdf.

time with audio and video, exposing 9-1-1 telecommunicators, both rookie and veteran, to a completely new and graphic emergency communications experience.

1. Digital Still Images

Still images can be captured, processed, and transmitted in a variety of different ways. When an image is digitally captured, the photographer selects the image file format best suited for the need of the image, prior to storing or sending it. Of the five still-image file formats available, the most common used by today's smartphones are joint photographic experts group (JPEG) or digital negative (DNG) (aka RAW).[96]

Digital still images remain the most prevalent method of image capture today, with the average user taking roughly 150 photos per month, or five per day.[97] In contrast, video capture is occurring at a rate of 7.5 videos per month (on average), which means for every video recorded, mobile phone users take an average of 20 photos.[98] These figures imply that still images will likely be the most common form of media sent to an emergency communications center following the implementation of NG9-1-1.

Consideration must also be given to the hundreds of millions of images being captured using smartphone resident applications like Snapchat and Instagram.[99] With hundreds of millions of mobile applications currently available, and 210 billion

---

[96] Caroline Green, "The Five Types of Digital Image Files: TIFF, JPEG, GIF, PNG, and Raw Image Files, and When to Use each One," IvanExpert.com, May 14, 2010, https://www.ivanexpert.com/blog/2010/05/the-5-types-of-digital-image-files-tiff-jpeg-gif-png-and-raw-image-files-and-when-to-use-each-one/; Victor H., "Raw (DNG) vs JPEG on a Smartphone: Comparison Images," phonearena, July 23, 2014, http://www.phonearena.com/news/Raw-DNG-vs-JPEG-on-a-smartphone-comparison-images_id58538.

[97] Janko Roettgers, "Special Report: How We Really Use our Camera Phones," gigaom, January 23 2015, https://gigaom.com/2015/01/23/personal-photos-videos-user-generated-content-statistics/.

[98] Ibid.

[99] Christopher Ratcliff, "23 Up-to-Date Stats and Facts about Instagram You Need to Know," Search Engine Watch, April 20, 2016, https://searchenginewatch.com/2016/04/20/23-stats-and-facts-about-instagram/; Jordan Crook, "Snapchat Sees More Daily Photos than Facebook," TechCrunch, November 19, 2013, https://techcrunch.com/2013/11/19/snapchat-reportedly-sees-more-daily-photos-than-facebook/.

application downloads anticipated by 2020, the desire to send photos to 9-1-1 using one of these mediums can be expected to increase considerably.[100]

The foremost concern of public safety answering point administrators and trainers (relative to the receipt of IRI in the communications center) will likely be the nature or content of the images being received during a 9-1-1 call. Routine calls for service, like non-injury motor vehicle accidents, property damage reports, and barking dog complaints, may not include any images whatsoever. Calls of a more extreme nature however could be laden with IRI, some of which might be graphically intense or horrific to the telecommunicator assigned to the call. The emergency call center professionals' ability to assess a situation over the phone quickly and accurately (as graphically intense images arrive from the scene) and function effectively in their assigned role after viewing those images will likely be one of the greatest challenges for 9-1-1 centers nationwide.

2. Pre-recorded Video

As NG9-1-1 evolves, the variety of ways in which callers will connect and interact with emergency communications centers will likely grow at an equal or greater pace. Sending pre-recorded video files to 9-1-1 is just one more way the public will interact with emergency service providers once NG9-1-1 is nationally enabled. Where still images provide the 9-1-1 telecommunicator with an additional layer of incident-related information, pre-recorded video captures both audio and video from the scene of an incident, which may prove beneficial on a number of levels to the first responders assigned to the incident.

Of the three image formats mentioned in this chapter, pre-recorded video may end up being the least used format transmitted to a 9-1-1 center. During an emergency situation, if the person in need of assistance opts to capture and transmit incident-related imagery, speed or discretion will likely be two of the greatest concerns. Events unfolding quickly might be captured in a number of still image photographs, like a hit and run

[100] "Statistics and Facts about Mobile App Usage," accessed January 7, 2017, https://www.statista.com/topics/1002/mobile-app-usage/; Fredric Paul, "Worldwide Mobile App Market Hits $34 Billion," NetworkWorld, May 10, 2016, http://www.networkworld.com/article/3068376/mobile-wireless/worldwide-mobile-app-market-hits-34-billion.html.

motor vehicle accident where the caller is trying quickly to take a picture of the striking vehicle. Longer or more drawn out incidents might be streamed to the 9-1-1 center live, like a burglary in progress where the caller is actively transmitting a live feed of the suspect breaking and entering.

Recording a video for transmission to a 9-1-1 center at a later time would be ideal for any non-exigent situation. A non-injury motor vehicle accident where the caller is capturing images of property damage only is an excellent example of such a situation.

3. Live Video and Streaming Media

Broadcasting video in real-time over the internet, or "live streaming" as it is more commonly known has quickly become one of the most popular activities to participate in online. Social media outlets like Facebook and Twitter are providing convenient and easy-to-use interfaces to their users in an effort to promote the activity. The ability to stream live video over the internet is not limited to established social media providers. Live streaming platforms are available in a number of desktop and smartphone-based formats, the majority of which are free to use.

The challenge for the 9-1-1 profession as it pertains to the use of these applications during an emergency comes down to the nature of the content being streamed into the 9-1-1 center. Suicidal individuals who decide to broadcast their final moments could easily do so while on the line with a 9-1-1 call taker. Another chilling scenario is an active shooter who decides to live broadcast a shooting rampage as it is occurring. Each of these scenarios is entirely plausible, and both have already occurred in today's audio only 9-1-1 environment.[101]

Horrific or graphic videos streamed live into an emergency communications center have to be treated in the same manner as a conventional 9-1-1 call. If circumstances require a 9-1-1 call taker to remain on the line with a caller due to the perceived nature of the situation, a live video feed depicting a situation of equal severity

[101] Tom Cleary, "LISTEN: Omar Mateen 911 Calls from Orlando Shooting [FULL AUDIO]," Heavy, updated November 1, 2016, http://heavy.com/news/2016/10/omar-mateen-pulse-orlando-nightclub-shooting-911-calls-audio-full-recordings-isis/.

must be kept open. Situationally speaking, keeping a 9-1-1 caller on the phone is a relatively common practice. Doing so allows the call taker to feed a continuous stream of real time information to the first responders assigned to the incident. A streaming media feed would likely provide a greater level of situational awareness, but would also expose the 9-1-1 call taker to a greater deal of vicarious trauma.

That America's 9-1-1 system must adapt to a changing technological landscape is without question. Across the country, agency heads, directors, and other senior level public safety answering point officials are considering the software, hardware, and infrastructure needed to support an NG9-1-1 implementation, as technology procurement decisions are being made. What has not been given the appropriate amount of attention however is the impact of IRI on communications center personnel. Call center personnel must be adequately prepared for the viewing of potentially graphic imagery following the implementation of NG9-1-1. Knowing if an image or video is pertinent to a law enforcement investigation will only be possible through extensive pre-implementation training. Legal obligations for call takers and dispatchers who have viewed IRI received during the commission of a crime must be considered.[102] Stress levels of call takers and dispatchers needs to be monitored and hiring and training practices for prospective 9-1-1 staff members have to be evaluated. These concerns only a few the 9-1-1 profession can expect following the implementation of NG9-1-1.

[102] "Court Admissibility of 911 Calls and its Importance to Your PSAP," accessed March 1, 2017, https://www.versadial.com/court-admissibility-of-911-calls-and-its-importance-to-your-psap/.

IV. STRESS FROM INCIDENT RELATED IMAGERY

A. THE STRESSFUL NATURE OF 9-1-1

By its very nature, the work of a 9-1-1 telecommunicator makes the profession one of the most stressful in the nation. From the moment they are hired, call takers and dispatchers are expected to learn work-related tasks quickly, function effectively at any given hour, deal with life and death situations at a moment's notice, and make zero mistakes while doing so. Stress in this role is not derived solely from the content of the 9-1-1 calls being answered. Internal policy and procedure changes, inadequate staffing resulting in mandated overtime and an overall rise in the number of 9-1-1 calls made nationally are just some of the factors contributing to increased stress levels in emergency communication workers.[103]

The arrival of NG9-1-1 in this nation's emergency communications centers will bring with it not only a considerable amount of change, but likely a great deal of additional stress. One of the single biggest changes associated with the migration to an NG9-1-1 environment will be the introduction of IRI. To navigate these changes effectively and manage the added stress, 9-1-1 administrators should consider the following. First, it will be critical to recognize the signs of stress or stress indicators in floor personnel. Educating staff on the importance of developing stress-coping strategies is also of critical importance. Treatment options must be considered quickly for staff members who have experienced an excessive amount of stress relative to an individual incident or who are having a particularly difficult time dealing with change related stress. Finally, the overall impact of NG9-1-1 and IRI on PSAP personnel should be evaluated periodically following implementation to help ensure staff members are adjusting well to the changes associated with the implementation and identify the need for assistance with those having a difficult time.

---

[103] iCERT, *Overloaded: The Growing Challenge of 9-1-1 Overload and How to Talk about It in Your Community* (Washington, DC: The Industry Council for Emergency Response Technologies, n.d.), http://www.theindustrycouncil.org/publications/9-1-1overloadfactsheet.pdf.

1. Recognizing Stress

Stress in the workplace can occur for a variety of reasons. High-pressure atmospheres, excessive workloads, inadequate staffing, or a lack of support from superiors are just some of the factors that contribute to a stressful work environment.[104] The amount of stress a worker is exposed to also has a great deal to do with the type of work being performed, which is certainly the case when it comes to the work of a public-safety professional. In fact, according to a definition provided by the World Health Organization (WHO), the work of most public-safety professionals falls far outside of the realm of a "healthy job."[105] What makes public-safety even more "unhealthy" for the individuals working in the profession is not being able to mitigate or eliminate stress through conventional means. A good example of conventional means would be the Mayo Clinic's "4 A's of Stress Relief," the four A's being avoid, alter, accept, and adapt.[106] Members of the public-safety community cannot avoid people who bother them. First-responders certainly cannot communicate their feelings openly, at least not to the citizens they are serving. Controlling their surroundings may or may not be possible, as public-safety personnel are continually cast into unstable and unpredictable situations. Saying "no" and walking away from a stressful situation simply is not possible for those who have chosen to serve and protect.

According to licensed mental health counselor Donna M. White, recognizing stress is just the first step toward managing it.[107] Through recognition or self-awareness, people identify their stress triggers, which allow them to develop more effective methods of stress management.[108] Eliminating stress completely will not always be possible;

---

[104] Mark Bond, "Emergency Call Centers Bring Stress 24-7," In Public Safety, February 10, 2015, http://inpublicsafety.com/2015/02/emergency-911-call-centers-bring-stress-24-7/.

[105] "Stress at the Workplace," accessed January 19, 2017, http://www.who.int/occupational_health/topics/stressatwp/en/.

[106] Mayo Clinic Staff, "Need Stress Relief? Try the 4 A's," *Mayo Clinic*, April 28, 2016, http://www.mayoclinic.org/healthy-lifestyle/stress-management/in-depth/stress-relief/art-20044476.

[107] Donna M. White, "Understanding & Recognizing Stress," PsychCentral, accessed January 21, 2017, http://psychcentral.com/lib/understanding-recognizing-stress/.

[108] Ibid.

however, stress management techniques like relaxation and meditation, or keeping a stress journal, may help mitigate common stress symptoms.[109]

In his book, *Bulletproof Spirit*, Captain Dan Willis of the La Mesa Police Department speaks to the importance of self-awareness, as it pertains to recognizing and dealing with workplace related stress. He opens up one of the early chapters of his book with the following:

> There are numerous specific warning signs that should alert you, as an emergency first responder, and your family members to the fact that you are becoming a victim of your profession. These warning signs and associated problems never simply go away on their own. Instead, they progressively, insidiously, worsen over time if not corrected. You need to become self-aware, realize when you are displaying these danger signs, and then chose to proactively address the problem in a constructive way, before it becomes too late and the problem irreparably harms the quality of your personal and professional life.[110]

Unless specifically requested or trained to do so, emergency communications personnel do not physically respond to emergencies.[111] Interaction with 9-1-1 callers during the first few moments of a traumatic situation however likely exposes the 9-1-1 professional to stress levels similar to that of a field-based first-responder. The introduction of IRI following the arrival of NG9-1-1 will not only transform the way in which an emergency call is processed, it will presumably create a more stressful and traumatic work environment for those charged with fielding emergency calls for service. This new environment, combined with the belief that conventional stress mitigation and elimination techniques will be ineffective for many working within the public-safety arena, makes a good case for stress recognition and self-awareness training in the public safety answering point.

---

[109] White, "Understanding & Recognizing Stress."

[110] Willis, *Bulletproof Spirit—The First Responder's Essential Resource for Protecting and Healing Mind and Heart*.

[111] Rhonda Harper, "Tactical Dispatch," Public Safety Communications, July 2015, https://www.apcointl.org/doc/training-certification-1/577-cde-38939-tactical-dispatch/file.html.

2. Coping Mechanisms

Stress is divided into three different types: acute, episodic acute, and chronic.[112] By definition, people working in the emergency communications field could be exposed to any one of these stress types during an average workday, and certainly during the course of their career. Just as conventional stress management techniques are always effective for members of the public-safety community, employing the use of common coping methods when addressing the emotional well-being of a traumatized first-responder may prove to be equally as ineffective.

Regardless of public-safety discipline, signs, and symptoms of stress are often overlooked or dismissed. This inattention occurs for a variety of reasons, but primarily because the individuals needing assistance do not acknowledge the existence of a problem or do not want to be perceived as weak or unable to handle their professional responsibilities.[113] The dismissive behavior and perception of weakness appears to be culturally driven, and though the article cited in the previous sentence is directed toward the law enforcement community, similar behaviors are easily identifiable in the fire, emergency medical service, and 9-1-1 community.[114] Jeff Dill, retired Captain of the Palatine Rural Fire Protection District in Inverness, Illinois, offered the following in relation to stress recognition and coping mechanisms in emergency service:

> We suffer what I call cultural brainwashing. Once we put this uniform on, we're expected to act a certain way: Be strong. Don't show weakness. Don't be the weak link of the company—we can handle problems on our own. Then when things go wrong, either on the job or because of the things we see or what's going on in our personal lives, we try to handle everything on our own. That can include things like stress, anxiety, depression and post-traumatic stress. We forget we're human beings first, and it becomes quite overwhelming.[115]

---

[112] American Psychological Association, "Stress: The Different Kinds of Stress," American Psychological Association, accessed January 27, 2017, http://www.apa.org/helpcenter/stress-kinds.aspx.

[113] Dean Scoville, "Police and PTSD," The Law Enforcement Magazine," February 22, 2013, http://www.policemag.com/channel/careers-training/articles/2013/02/police-and-ptsd.aspx.

[114] John Erich, "Earlier than Too Late: Stopping Stress and Suicide among Emergency Personnel," EMSWorld, November 1, 2014, http://www.emsworld.com/article/12009260/suicide-stress-and-ptsd-among-emergency-personnel.

[115] Ibid.

Pressures and criticisms from an individual's peers also appear to contribute to the dismissive attitude of emergency service personnel toward stress. Vince Savoia, Executive Director of Canada's Tema Conter Memorial Trust, contributed the following to Erich's article relative to the lack of co-worker support in the workplace:

> I've seen many cases of harassment and bullying among peers who will criticize someone who seeks help. We're all very empathetic toward our patients, but how many show empathy toward our peers? We need to understand that it's not a weakness to ask for help. In fact, it's a strength—asking for help is a tool that allows us to do our job more effectively.[116]

The impulsive and spur of the moment nature of decision making inherent with emergency service work likely adds a considerable amount of stress to the first responder work environment.[117] Powering through whatever situation occurs and accepting the consequences of any decision made in the process is routine for those working in this critical line of work. Pete Volkmann, an 18-year veteran of the Ossining, New York Police Department offered the following in reference to stress associated with decision making in public-safety:

> Most people think first and then act. First responders are trained to act without hesitation. To do that, they can't consider their feelings. They're taught to think and not feel or they'll make a mistake and someone might die. The normal human mechanism in a crisis is to feel. But we try to keep those feelings to ourselves because otherwise we'll be perceived as weak.[118]

This perception of weakness as it pertains to stress mitigation appears to be prevalent across all disciplines of public safety. To combat this view among the first responder community and encourage an attitude of outreach as a means of coping, workplace culture will likely have to be changed. Removing "the stigma of seeking help and a belief of being weak" while "breaking down the emotional and cultural barriers"

---

[116] Erich, "Earlier than Too Late: Stopping Stress and Suicide among Emergency Personnel."

[117] "Stress Changes How People Make Decisions," accessed March 1, 2017, http://www.psychological science.org/news/releases/stress-changes-how-people-make-decisions.html#.WLbN4m8rKUm.

[118] Alan S. Brown, "Finally, A Stress Program Designed for First Responders," EHS Today, December 17, 2003, http://ehstoday.com/training/ehs_imp_12402.

inherent in public-safety work may best be addressed during academy training, or as early as possible following the hiring of the applicant.[119]

3. Stress Related Risks in the Communications Center

Stress recognition and coping strategies are an excellent starting point when it comes to mitigating the impact of a stressful work environment. The unique nature of 9-1-1 professionals' duties however and their exposure to varying forms of stress reinforces the need for a more targeted and customized coping strategy. To understand this need better, NENA developed the "Standard on 9-1-1 Acute/Traumatic and Chronic Stress Management."[120] In essence, the standard "provides for essential awareness of the serious risks posed by work-related stress on the mental and physical health of 9-1-1 emergency Telecommunicators/Dispatchers in their role as our *first* first responders."[121] While the standard notes an overall deficiency in the number of stress studies conducted relative to the 9-1-1 profession, the document references a 2008 study that offers compelling evidence of stress-related issues in emergency communications center work. Research conducted by doctoral candidate Roberta Troxell yielded the following findings:

> 16.3 percent of 9-1-1 Telecommunicators/Dispatchers may be at risk of Secondary Traumatic Stress Disorder (STSD). She found that nearly half of 9-1-1 Telecommunicators/Dispatchers in her study reported feelings of intense fear, horror and or helplessness in response to calls involving death or injury to members of field response teams, death or serious injury to children, and interactions with suicidal callers.[122]

Building on Troxell's findings and the American Psychological Association's stress typing description, NENA's standard provides a more detailed narrative of stress classes, with specific emphasis on the 9-1-1 professional. Those discipline specific stress types are as follows:

---

[119] Scoville, "Police and PTSD," The Law Enforcement Magazine."

[120] "NENA Standard on 9-1-1 Acute/Traumatic and Chronic Stress Management."

[121] Ibid.

[122] Ibid.

> ***Acute Traumatic Stress***—related to the 9-1-1 Telecommunicator/ Dispatcher's exposure to tragic call conditions and radio contact with field responders in perceived life-death scenarios.
>
> ***Acute Sub-Threshold Stress***—experienced by 9-1-1 Telecommunicators/ Dispatchers as they relate to the public, field responders, and other PSAP personnel. While non-traumatic, such commonly occurring events and work conditions still can produce stress and pose health and performance risks. Both these forms of acute stress can lead to Acute Stress Disorder (ASD), Post Traumatic Stress Disorder (PTSD), and the clinical Secondary Traumatic Stress Disorder (STSD), and Compassion Fatigue.
>
> ***Chronic Stress Response***—results from long term exposure to ongoing and repeated activation of the acute stress response. It is known to increase the risk of numerous physical diseases that can seriously impair health and performance.[123]

Where the standard makes occupational-related stressors explicit, it also recommends the creation of PSAP comprehensive stress management programs (CSMP) in PSAPs throughout the country, with implementation to include the following:

> Training in 9-1-1 acute and chronic stress risk management, educational materials and resources on stress management, standardized participation of PSAP personnel in Critical Incidence Stress Management (CISM), and, as needed in relation to such events, active encouragement of PSAP employee use of psychotherapy delivered by qualified trauma therapists and supported by Employee Assistance Programs and/or insurance benefits, and PSAP Peer Support Programs.[124]

All this research and its associated findings were based on current (2013) call taking and dispatching practices in the PSAP.[125] The standard does acknowledge the likelihood of increases in stress following the arrival of NG9-1-1, but does not elaborate further on the topic, stating the concern is beyond the scope of the document.[126]

The existence of work-related stress and emotional trauma in the 9-1-1 profession is clearly evident in NENA's standard and associated research. NENA's recommendation that call centers nationwide develop stress management, education, and treatment

[123] "NENA Standard on 9-1-1 Acute/Traumatic and Chronic Stress Management."

[124] Ibid.

[125] Ibid.

[126] Ibid.

programs substantiates the concerns of health care professionals for personnel within this public-safety discipline. In all likelihood, the introduction of IRI following the arrival of NG9-1-1 will only serve to increase the mental and physical risks to the 9-1-1 professional and community as a whole, as emergency situations will now be conveyed both audibly and visibly.

4. Stress Treatment Options—Pre- and Post-exposure

More than likely, those entering the 9-1-1 profession do so knowing they will be exposed to a variety of tense situations and scenarios, either during the call-taking process, or while dispatching public-safety resources to calls for service. The statistic these new first responders are not likely aware of is the percentage of calls they will be taking, which fall into the high-stress category. One study conducted by researchers at Northern Illinois University concluded that thirty-two percent of 9-1-1 calls received create high stress in call takers and telecommunicators.[127] The same study deduced that of those high stress calls, situations involving unexpected child injury or death, suicidal persons, and officer involved shootings were considered by telecommunicators and dispatchers to be the worst of all call types.[128] If realizing from Pierce and Lilly's research that the three previously mentioned call types are the most stress-inducing of all 9-1-1 calls, incorporating elements of IRI into each of these scenarios is a logical first-step in estimating the added impact of visual information on the call-taking and dispatching process.

A study conducted by psychological scientist Roxanne Cohen Silver of the University of California at Irvine yielded the following hypothesis:

> That repeated exposure to vivid traumatic images from the media could lead to long-lasting negative consequences, not just for mental health but also for physical health. They speculated that such media exposure could

[127] Dorothy Cave, "Telecommunicators & Mental Health: Taking Care of the People Who Protect the Public," Public Safety Communications, June 2014, https://www.apcointl.org/doc/training-certification-1/501-cde-36488-telecommunicators-mental-health/file.html.

[128] Heather Pierce and Michelle Lilly, "NIU Psychology Study Links 9-1-1 Dispatchers with Post-traumatic Stress Disorder Symptoms," Northern Illinois University Today, March 29, 2012, http://www.niutoday.info/2012/03/29/niu-psychology-study-links-9-1-1-dispatchers-with-post-traumatic-stress-disorder-symptoms/.

> result in a stress response that triggers various physiologic processes associated with increased health problems over time.[129]

The Silver study consisted of an internet-based survey conducted over a three-year period, which examined the relationship between trauma-related media exposure and mental and physical health outcomes among 1,322 adult participants.[130] Using September 11, 2001 as an incident measuring point, study participants provided assessments of their mental and physical health standing prior to the attacks and "media exposure and acute stress responses immediately after the attacks and after the initiation of the Iraq war."[131] Follow-up assessments were conducted with all the study participants in the three years following September 11th.[132] Of the subjects who participated in the study, nearly twelve percent reported high levels of acute stress related to September 11th while almost seven percent reported high levels of acute stress related to the Iraq war. Silver's conclusion, "a steady diet of graphic media images is likely to have serious and long-lasting consequences on those viewing the material."[133]

Where Silver's study provided feedback from a random sampling of participants who do not routinely view graphically intense material, a similar research study focusing on the impact of traumatic images on media personnel produced a number of interesting findings and suggestions. One segment of the study asked media personnel to "identify different situations and types of content that made the impact of viewing more traumatic for themselves individually."[134] In reading through the responses of those who contributed, a common theme became apparent. All the situations described could easily be experienced by a 9-1-1 professional once IRI is introduced to the emergency communications center. The following are some of the circumstances that created a more traumatic situation for the viewer:

---

[129] Silver, "Repeated Exposure to Media Images of Traumatic Events May Be Harmful to Mental and Physical Health."

[130] Ibid.

[131] Ibid.

[132] Ibid.

[133] Ibid.

[134] "What Makes Eyewitness Media Traumatic," accessed February 2, 2017, http://eyewitnessmedia hub.com/research/vicarious-trauma/findings/what-makes-eyewitness-media-traumatic-.

- When the individual was not expecting to see something horrific.
- When the individual was repeatedly exposed to distressing content.
- When content reminded the individual of personal experiences or was in some way connected to them.
- When the audio in a video contained sounds of human suffering, such as screaming or people begging for their lives.[135]

Expanding on this idea, Professor of Psychiatry and Neuropsychiatrist Anthony Feinstein suggested that "(PTSD) type symptoms are generated by the viewing of traumatic images" and that "frequency rather than duration of exposure appears to be the critical variable."[136]

None of the three previously mentioned studies were conducted in a public PSAP with telecommunicators and dispatchers viewing images from actual 9-1-1 emergencies. What the Silver study and two journalist studies do provide however is the emotional and physical impact data needed to approximate the toll of graphically intense images on emergency communications personnel. Of the four visual circumstances mentioned in the eyewitness media hub study, all are currently experienced audibly by 9-1-1 professionals during the processing of a 9-1-1 call. That said, it is a very good possibility the addition of IRI to the 9-1-1 call intake process will intensify the already emotionally and psychologically charged work environment for 9-1-1 personnel.

a. Pre-exposure

One suggested method for preparing personnel for the viewing of traumatic or disturbing imagery is resilience training. In fact, employee resilience is one of the key training methodologies used by law enforcement trainers to prepare the personnel responsible for investigating child exploitation and child pornography cases.[137] Although

---

[135] "What Makes Eyewitness Media Traumatic."

[136] Anthony Feinstein, "Witnessing Images of Extreme Violence: A Psychological Study of Journalists in the Newsroom," National Center for Biotechnology Information, *U.S. National Library of Medicine*, 5, no 8 (2014): 1–7, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4100239/.

[137] The Technology Coalition, *Employee Resilience Guidebook for Handling Child Sexual Abuse Images* (The Technology Coalition, 2015), http://www.technologycoalition.org/wp-content/uploads/2015/01/TechnologyCoalitionEmployeeResilienceGuidebookV2January2015.pdf.

9-1-1 professionals probably will not be exposed to the level of deviance and depravity witnessed by law enforcement officials working in the child exploitation field, exposure to imagery of an equally obscene level during the 9-1-1 call taking process is a very real possibility. With this in mind, employing some of the strategies used by law enforcement to make their personnel more resilient to graphically intense imagery may provide some benefit to emergency communications personnel exposed to content of a similar nature.

One program that seeks to alleviate job trauma resulting from visual exposure to child exploitation is the National Center for Missing and Exploited Children (NCMEC) Safeguard Program.[138] The mission of the program, working in unison with its CyberTipline, is to provide job-specific training and consultation to those working in the child exploitation field, with an emphasis on minimizing potential harm as a result of viewing objectionable material.[139] Pertinent to the 9-1-1 community is a recommendation by NCMEC that those viewing objectionable material be monitored proactively to prevent severe secondary traumatization. In addition, support resources, counseling, and peer support programs should be developed to mitigate the effects of secondary trauma and compassion fatigue.[140]

The Technology Coalition report also suggests that resiliency begins with the hiring process. While newly appointed and veteran 9-1-1 personnel will likely have little choice when it comes to viewing graphic imagery in a post-NG9-1-1 environment, the following suggestions from the report may help to alleviate stress and emotional trauma associated with the viewing of these images. Communications center management staff should "be transparent throughout the hiring process about the type of content" to which the new 9-1-1 employee will potentially be exposed.[141] "Additionally, it is important to set realistic expectations about how much exposure employees can expect in their role.

---

[138] Judith A. Reisman, "Picture Poison: Viewing Pornography for a Living Can Be Deadly," *Scribd*, Autumn 2009, https://www.scribd.com/document/24133366/Judith-A-Reisman-PhD-Picture-Poison.

[139] Ibid.

[140] Ibid.

[141] The Technology Coalition, *Employee Resilience Guidebook for Handling Child Sexual Abuse Images*.

Some care needs to be taken to adequately prepare employees without traumatizing or overwhelming them before they even start in the position."[142]

b. Post-exposure

Once 9-1-1 professionals have been exposed to graphically intense IRI, their ability to continue functioning at an effective level will likely be of great concern to communications center leadership due in no small part to an overall lack of available staffing at 9-1-1 centers nationwide and an increased reliance on emergency services.[143] Every new employee walking through the door of an emergency communications center will need to move through the training process quickly, become familiar with internal policies and procedures, and begin fielding emergency calls as quickly as possible following training. This situation makes for an extremely short period of adjustment in an occupation well-known for being one of the most stressful in the country. The tension and pace of the 9-1-1 profession is what makes stress mitigation in the communications center so vital.

One of the most widely known and well respected stress mitigation programs in the nation for 9-1-1 professionals is CISM. Developed almost 30 years ago, "CISM is a peer-led approach to crisis intervention developed specifically for responders dealing with major stress-producing events."[144] "Interventions include stress management education, stress resistance, and crisis mitigation training for both individuals and organizations."[145]

"EMDR" "or eye movement desensitization and reprocessing is a psychotherapy treatment that was originally designed to alleviate the distress associated with traumatic memories."[146] The belief is that this treatment will clear the nervous system of the

---

[142] The Technology Coalition, *Employee Resilience Guidebook for Handling Child Sexual Abuse Images*.

[143] The 9-1-1 Industry Alliance, *The National Workshop on 9-1-1 Overload, The Overloaded 9-1-1 System* (Washington, DC: Industry Council for Emergency Response Technologies (iCERT), 2011), http://www.theindustrycouncil.org/publications/overloaded9-1-1system.pdf.

[144] Brown, "Finally, A Stress Program Designed for First Responders."

[145] "NENA Standard on 9-1-1 Acute/Traumatic and Chronic Stress Management."

[146] "What is EMDR," accessed February 3, 2017, https://www.emdr.com/what-is-emdr/.

residue left by psychological trauma, ultimately reducing the risk of depression, anxiety, addiction, and personal relationship problems.[147]

In extreme cases, where the 9-1-1 employee is exhibiting signs and symptoms of PTSD, cognitive behavioral therapy and exposure therapy are two additional treatment options.[148] A number of prescription medications are also available to help alleviate the symptoms of PTSD.[149]

B. CONCLUSION

How the emergency communications profession prepares its personnel for the arrival of NG9-1-1 and IRI will likely be based on a variety of factors. It is plausible that agency size, personnel numbers, call volume, and fiscal resources will dictate the level of support available to new and veteran 9-1-1 professionals. These same factors may also determine the ways in which emergency communications personnel will receive treatment following an adverse exposure to IRI. Information derived from occupational comparisons like the Silver study and the two journalist studies can be expected to provide some guidance during the creation of any stress treatment policy. Modifications to existing stress awareness and stress management policies will likely be considered, as will input from contracted EAP providers. Counseling referrals, peer-support groups, and temporary leaves of absence are all viable options for staff members encountering episodes of emotional trauma following the viewing of IRI. Finally, the benefits associated with the development of a dedicated employee resilience program are already evident in the law enforcement community and would likely provide a similar level of support and assistance to 9-1-1 professionals exposed to traumatic imagery.[150] Clearly evident from the research in this chapter is the importance of preparing employees for the

---

147 Jim Marshall, *The EMDR for 911 Campaign, Resource Information to Share with 911 Local Professionals* (Austin, TX: EMDRIA EMDR International, 2011), http://c.ymcdn.com/sites/www.emdria.org/resource/resmgr/imported/EMDR%20n%20The%20First%20Responder_%20Bringing%20hope%20and%20healing%20to%20those%20suffering%20in%20silence%20with%20hidden%20symptoms.pdf.

148 "Treatment of PTSD," accessed February 3, 2017, http://www.ptsd.va.gov/public/treatment/therapy-med/treatment-ptsd.asp.

149 Ibid.

150 Ibid.

viewing of traumatic images and having programs in place to assist employees who are having a difficult time emotionally, physically, and psychologically following the viewing of these images.

V. HIRING AND TRAINING FOR NEXT GENERATION 9-1-1 AND IRI

Adequately staffing an emergency communications center and training the personnel responsible for performing the tasks associated with this critical public safety role are likely two of the most daunting tasks associated with the profession. A high-stress, mistake-free, and mostly sedentary work environment coupled with work hours that include nights, weekends, and holidays makes attracting prospective candidates for the telecommunicator position somewhat of a challenge. Governance, standards, and certification requirements have created similar issues on the training front.[151] All these issues exist in a 9-1-1 system that has seen very little change since its humble beginnings almost 50 years ago.[152] This lack of change has likely kept established hiring and training processes static while stifling creativity and opportunities to innovate. The extensive number of changes NG9-1-1 will introduce to the emergency communications profession will not only change the way in which emergency calls are processed; they will likely serve to make staffing and training for this profession even more of a challenge.

Trade-based organizations like APCO, NENA, and the National Fire Protection Association (NFPA) have developed programs and authored documentation to assist PSAP administrators with a variety of staffing-related matters.[153] While these documents and programs provide a considerable amount of operational guidance for the leadership of today's 9-1-1 centers, they do little to address the staffing implications likely to follow a NG9-1-1 deployment.

Significant changes to the training methods of 9-1-1 personnel are also foreseeable once NG9-1-1 arrives in the communications center. Instructors in today's 9-

---

[151] International City/County Management Association, *Standards, Training, and Certification* (Washington, DC: International City/County Management Association, 2004), https://www.emergency dispatch.org/downloads/IQreport.pdf.

[152] "9-1-1 Origin & History."

[153] "Staffing and Retention Toolkit for Public Safety Communications Center Managers," accessed February 6, 2017, http://retains.apcointl.org/; "Comm Center Staffing Workshop," accessed February 6, 2017, http://www.nena.org/?page=; "NFPA 1221: Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems," accessed February 6, 2017, http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards?mode=code&code=1221

1-1 centers probably deviate little from established training practices since the equipment new personnel are being trained on does not change very often. The visual element associated with NG9-1-1 however may require 9-1-1 center trainers to alter dramatically the content of classroom instruction, as well as their teaching style, as viewing the details of an in-progress emergency will likely impact call center personnel in a completely new way.

A. HIRING

Like many of its public safety counterparts, 9-1-1 centers nationwide are having a difficult time attracting and retaining quality personnel.[154] A variety of reasons are responsible for this problem. Perin's article cites economics, decreasing unemployment rates, and increases in private sector pay as major causes for the dwindling pool of candidates. Retention of existing personnel is a challenge for all the aforementioned reasons; however, retirements and departures due to mandatory overtime, disability, and stress lead this category.[155] While all these situations currently pose a problem for those responsible for 9-1-1 center staffing, the arrival of NG9-1-1 will likely serve to aggravate matters further while creating a variety of new issues for communications center management.

a. Evolution of Technology

The Perin article speaks directly to what could easily be considered the biggest obstacle to 9-1-1 staff selection and retention post-NG9-1-1, the evolution of technology. The article's author shared the following relative to the topic:

> Technology is another huge issue. Operators no longer answer one phone and jot penciled notes onto a notepad. A visit to most centers reveals consoles covered in various computer components. Unfortunately, the change from manual to highly technical job expectations did not include correspondingly high compensation. Many technically-savvy individuals opted for private sector jobs which pay more. Along with this, many emergency communications center employees are leaving for the same

[154] Michelle Perin, "Where Did All the Dispatchers Go," Officer.com, July 4, 2007, http://www.officer.com/article/10249677/where-did-all-the-dispatchers-go.

[155] Ibid.

reason. Retention, in addition to recruitment problems, adds an additional strain.[156]

Former FCC Chairman Tom Wheeler reinforced the need for technology acceptance in the 9-1-1 community when he stated the following, "Technology is changing our world, and those of us charged with protecting public safety need to change with it. If we work together to tackle the challenges and seize the opportunities of new technology, we can save lives and build a safer America."[157]

From a human resource perspective, these statements make several inferences. One, that the 9-1-1 profession is technology driven and changes in job expectations as a result of new technology have resulted in personnel leaving this critical role for higher paying technology positions. Two, the pace at which technology is evolving and the changes associated with this evolution must be embraced by the 9-1-1 community. The common thread in both these situations appears to be the idea of change; specifically, the inability or outright reluctance of communications center personnel to accept it or adapt to it.

Understanding why change is so problematic in an organization is a logical first step for anyone rolling out a new agency-wide program. As NG9-1-1 implementations commence across the country, understanding the organizational impact of change, as well as the best methods for mitigating the impact, may help alleviate unnecessary stress during the deployment process. Susan Heathfield, a recognized human resources expert and member of the Society for Human Resource Management provides several suggestions for effectively managing change in the workplace. Preparing personnel well in advance of any anticipated change is key, as doing so will build trust and demonstrate value for each employee.[158] Heathfield goes on to suggest that organizations with frequent, honest communication, and widespread agreement about the need to change

[156] Perin, "Where Did All the Dispatchers Go."

[157] Tom Wheeler, "The 911 System Isn't Ready for the iPhone Era," *The New York Times*, November 23, 2015, https://www.nytimes.com/2015/11/23/opinion/the-911-system-isnt-ready-for-the-iphone-era.html?_r=0.

[158] Susan M. Heathfield, "Build Support for Effective Change Management," The Balance, updated May 28, 2016, https://www.thebalance.com/build-support-for-effective-change-management-1917807.

will manage the adjustment far more effectively.[159] Other tips include creating urgency around the need to change, obtaining buy-in from front line supervisory staff and personnel, ensuring front line supervisors can effectively convey the benefits of the change, and helping all employees feel as if they are involved in the process.[160] Granted, Heathfield's recommendations do not necessarily consider the unique nature of a 9-1-1 work environment; however, many of the suggestions she makes could easily be applied to the organizational structure of an emergency communications center. Common practices, like open communication and honesty are obviously beneficial in any organization. Creating urgency for change in the communications center might best be accomplished by explaining how much easier it will be for call takers and dispatchers to handle work related tasks once the NG9-1-1 implementation is complete. Providing specific examples, like the ability to instantaneously transfer calls from one public safety answering point to another, intrastate or interstate, without having to look up a number or being able to automatically locate a wireless caller using the coordinates generated from their phone instead of through cellular tower triangulation.[161] Educating front line supervisory staff about NG9-1-1's features and highlighting how it will help them handle their professional responsibilities will likely create buy-in while making them more proficient in the use of the product. Designating discipline specific (telecommunicator, dispatcher, or supervisor) subject matter experts on the NG9-1-1 product may also boost confidence on the newly deployed solution.

Unilateral support for a newly deployed technology from floor personnel, supervisors, and even some managers, will not be easy to achieve. In fact, a MIT study that polled the opinion of a variety of managers discovered that sixty-three percent believed "the pace of technological change in their workplaces is too slow, primarily due to a lack of urgency and poor communication about the strategic benefits of" the

[159] Heathfield, "Build Support for Effective Change Management."

[160] Ibid.

[161] "Next-Generation 9-1-1," accessed February 12, 2017, http://www.its.dot.gov/research_archives/ng911/.

solution.[162] For the true skeptics in the organization, the earlier recommendations still apply; however, the following suggestions should persuade even the most stubborn of employees. Reward "employees in ways that are most meaningful to them, build the new technology into the routines and rhythms of the workday as soon as possible," and do not "leap to punish employees who don't use the technology" immediately.[163]

Patience, open communication, honesty, and involving staff early on in the NG9-1-1 deployment process will likely pay dividends to communications center leadership and administrators in the form of happier staff members and agency wide use of the product.

b. Different Generations in the Workplace

Change and technology appear to be two major areas of concern for 9-1-1 administrators relative to the recruitment and retention of quality personnel. The multigenerational workforce in place in the emergency communications center of tomorrow will almost certainly be an additional point of discussion regarding NG9-1-1 planning. As IRI begins arriving in the communications center, and 9-1-1 calls previously isolated to audio alone suddenly include graphically intense images and video, how this information will be received and processed by different generations of 9-1-1 workers will likely be of particular interest to 9-1-1 administrators. Since little data exists on the impact of traumatic imagery on 9-1-1 personnel relative to their generational position, understanding how different generations handle themselves in similar work settings may help the leadership of America's 9-1-1 centers prepare and hire more effectively.

Pew Research suggests that "an individual's age is one of the most common predictors of differences in attitudes and behaviors."[164] "Age denotes two important characteristics about an individual; their place in the life cycle—whether a young adult,

---

[162] Rebecca Knight, "Convincing Skeptical Employees to Adopt New Technology," *Harvard Business Review*, March 19, 2015, https://hbr.org/2015/03/convincing-skeptical-employees-to-adopt-new-technology.

[163] Ibid.

[164] "The Whys and Hows of Generations Research," September 3, 2015, http://www.people-press.org/2015/09/03/the-whys-and-hows-of-generations-research/.

middle-aged parent or retiree, and their membership in a cohort of individuals who were born at a similar time."[165] While it would be unethical and irresponsible to classify an entire generation as being technology averse based on age alone, studies and surveys of specific age groups may yield findings that would help 9-1-1 administrators better plan a NG9-1-1 project implementation. These findings might also make it easier to provide support services for communications center staff post-implementation.

Of the five generational groups, three account for ninety-seven percent of the current American workforce.[166] Those groups are the Baby Boomers (born 1946 to 1964) at 29 percent, Generation X (born 1965 to 1976) at 34 percent, and the Millennial Generation/Generation Y (born 1977 to 1995) at 34 percent.[167] The eldest generation, traditionalists (often referred to as the silent generation), are for the most part retired and not likely to re-enter the workforce.[168] Generation Z, the youngest of the five groups, is just now entering the workforce. While their impact as workers will not be felt by the 9-1-1 community for some time, as the most technologically "plugged-in" of all generations, it is reasonable to believe this group's knowledge and use of technology will put the capabilities of NG9-1-1 to the test, long before Generation Z seeks out a career in emergency communications.[169]

The lack of available data relative to the impact of graphic imagery on emergency communications center personnel necessitates examining a staff member's ability to work and function after viewing these images from a slightly different perspective. One perspective is the generational use of technology.

---

165 "The Whys and Hows of Generations Research."

166 Richard Fry, "Millennials Surpass Gen Xers as the Largest Generation in U.S. Labor Force," Pew Research Center, May 11, 2015, http://www.pewresearch.org/fact-tank/2015/05/11/millennials-surpass-gen-xers-as-the-largest-generation-in-u-s-labor-force/.

167 Ibid.

168 Anick Tolbize, *Generational Differences in the Workplace* (Minneapolis, MN: University of Minnesota, 2008), http://rtc.umn.edu/docs/2_18_Gen_diff_workplace.pdf.

169 Dan Bursch, *Managing the Multigenerational Workplace* (Chapel Hill, NC: UNC Kenan-Flagler Business School, 2014), http://www.kenan-flagler.unc.edu/~/media/Files/documents/executive-development/managing-the-multigenerational-workplace-white-paper.pdf.

Like many of the tools used by telecommunicators and dispatchers, NG9-1-1 will be technology driven. While the evolution of technology and hiring for 9-1-1 was analyzed earlier in this chapter, examining how each generation uses technology in the workplace today may provide 9-1-1 administrators with an indicator of potential roadblocks to success prior to and following an NG9-1-1 deployment. One such examination occurred in a study conducted by CompTIA where workers were analyzed by generation about their adoption and use of technology in the workplace. Several interesting points were derived from the study. The use of common workplace applications like Microsoft Word, Excel, and PowerPoint were relatively consistent among all the age groups included in the study.[170] Significant differences in usage were noted however when online versions of the applications were used to access work-related documentation or mobile applications were used to access the documents remotely.[171] In these cases, staff members in the 20 to 39 age range were far more likely to use the technology than that of their 40 to 60-year-old counterparts.[172] This finding does not necessarily infer that older generations are reluctant to use newer forms of technology; however, it is plausible Generation Xers and Baby Boomers see technology as a necessity only for certain aspects of their work.

Social media will likely play a major role in the evolution of NG9-1-1, especially when considering the emphasis companies like Facebook, Instagram, Twitter, and others are putting on still image, video, and streaming media transmission for their users.[173] The CompTIA study analyzed generational use of social media and found that while the role of these applications in the life of younger workers was rather prominent, as the study navigated its way through the older generations, fewer and fewer workers were using

---

[170] CompTIA, *Generational Research on Technology and its Impact in the Workplace* (Downers Grove, IL: CompTIA, 2013), http://www.unify.com/~/media/internet-2012/documents/report/CompTIA-Generational-Study.pdf.

[171] Ibid.

[172] Ibid.

[173] Eleonora Israele, "Get Camera Ready: Live Streaming Is the Future of Social Media," business.com, last modified February 22, 2017, http://www.business.com/social-media-marketing/why-live-streaming-is-the-future-of-social-media/.

social media.[174] In fact, twenty-five percent of the Baby Boomers analyzed in the study did not use Facebook at all.[175] The following is one of the key summarizing points of the study:

> Generational differences are apparent with respect to newer forms of communication. Text and instant messaging are more commonly used for work purposes among individuals who are less than fifty years old. Likewise, confirming a popular stereotype, twenty and thirty something employees are much more likely to use social media such as Facebook for work-related purposes.[176]

Although the CompTIA study provided an interesting perspective on the varying uses of technology by members of different generational groups, it established no specific conclusions relative to the ability of one particular age group to succeed in a technology centric workplace. Yes, stereotypical thinking suggests younger generations will be more open to the use of newer forms of technology; however, the ability to learn and adapt to a changing technological landscape appears to be based more on the attitude of the individual than it does generational aptitude.[177]

People's ability to work effectively with IRI in the public safety answering point may also have a great deal to do with how resilient they are to traumatic situations. In a paper by Ann Kaiser Stearns, PhD, the author cites a 1992 study that suggests that resilience to traumatic situations has a lot to do with the upbringing of the individual. The following quote comes directly from that study:

> Those who received better parenting and had better cognitive skills as children continue to be resilient in adult life. The children who experienced clear advantages (1) had at least one competent parent who valued his or her child; (2) received support from other caregivers; and (3) grew up in a family with fewer than five children spaced at least two years apart. Other protective factors include having an easygoing, sociable

---

[174] CompTIA, *Generational Research on Technology and its Impact in the Workplace*.

[175] Ibid.

[176] Ibid.

[177] Christopher J. Godfrey, "The New Old(er) US: Are You Ready for Tech Savvy Older Adults," *American Society for Public Administration*, accessed February 15, 2017, http://patimes.org/older-us-ready-tech-savvy-older-adults/.

> temperament, a positive self-concept, and the ability to self-regulate and plan ahead.[178]

A similar study noted that vulnerabilities to traumatic situations, especially cortisol depleting events like September 11th or the Holocaust, can be passed down from one generation to the next.[179] Events of an equally traumatic but more personal nature (domestic violence, or emotional abuse, etc.) can also make an individual more vulnerable to PTSD symptoms.[180] The author expands on the idea of the generational transfer of resilience with the following:

> This increased vulnerability is biologically transmissible during pregnancy through hormonal (chemical) and genetic means to her child. The child may then grow up to be biologically less able to cope with stress and trauma. Their own biology will be more predisposed to being overwhelmed by feelings of anxiety, fear and stress, and if confronted with a traumatic experience, they will have a significantly higher likelihood of developing PTSD.[181]

Where the idea of generational transfer of resilience provides a thought provoking perspective on stress management ability, a research study conducted in Finland looked more at specific types of stress as a means of assessing an age group's ability to cope. While the study did not specifically target the work-related stressors of a public safety professional, the types of job stressors and types of well-being considered for the study are likely present in any occupational setting. Two findings from the study were pertinent relative to the generational impact of stress in the workplace. First, "the authors found that different professions had different relationships between age, well-being, and work stress," and secondly, "that older and younger workers may require different forms of stress management assistance, which in turn may differ across industries."[182]

---

[178] Ann Kaiser Stearns, *Resilience in the Aftermath of Adverse or Traumatic Events* (Washington, DC: American Psychological Association, 2004), http://www.apadivisions.org/division-31/publications/articles/maryland/stearns-resilience.pdf.

[179] Stewart Canter, "Transmitting PTSD from Generation to Generation," New Synapse, February 21, 2015, http://www.new-synapse.com/aps/wordpress/?p=861.

[180] Ibid.

[181] Ibid.

[182] John Davy, "Age May Moderate the Impact of Work Stress," Institute on Aging, August 7, 2013, http://www.investigage.com/2013/08/07/age-may-moderate-the-impact-of-work-stress/.

Where none of these studies note the ability or inability of a specific age group or generation to be more resilient to work-related stressors, they do provide research-based evidence that upbringing, past experience, and generational transfer of vulnerability has a considerable amount to do with a person's ability to handle a traumatic incident. Moreover, the collective findings of these studies in no way suggest that a specific age group or generation will be better suited for the role of a 9-1-1 professional.

c. Qualifications of New Personnel

For many emergency communications agencies, the hiring process for prospective 9-1-1 professionals is a lengthy one. In many cases, potential applicants are required to participate in a pre-employment examination, the results of which place the candidate in a ranked position by score among all the other candidates. The examination scoring process, like many government processes, does not generally occur that quickly. Candidates may have to wait weeks, and in some cases months, to learn of their exam results.[183] Those agencies not requiring a pre-employment examination of prospective personnel will generally still require a criminal and psychological background check, due to the confidential and sensitive nature of the material being worked with in the communications center. Once hired, the training process for new employees is extensive, including a combination of classroom and on-the-job instruction. By the time the candidate has completed training and been cleared to work independently, well over 12 months may have passed since their application for employment was submitted.[184]

While the lengthy hiring process and low national unemployment rate has hindered the public sector's ability to attract top quality candidates, one aspect of the hiring process that has helped keep the candidate pool full, particularly for those handling 9-1-1 staffing, is the limited amount of experience needed on the part of the job seeker.[185] For the most part, those seeking employment in the emergency

[183] First Contact 9-1-1, LLC, *How Do I Become a 9-1-1 Dispatcher* (Morgan Hill, CA: First Contact 9-1-1, LLC, n.d.), accessed February 15, 2017, http://www.firstcontact911.com/jobs.pdf.

[184] Ibid.

[185] Katherine Barrett and Richard Greene, "Can Government Hiring Get Out of the Stone Age," Governing, February 2016, http://www.governing.com/topics/mgmt/gov-government-hiring-best-practices.html.

communications field need only a high school diploma to meet the educational requirement for the position.[186] Although this arrangement has served the profession well since its beginnings, the technology rich environment, increased levels of stress, and necessity for quicker decision making expected to follow a NG9-1-1 deployment may require the 9-1-1 industry to rethink this occupational practice of the past.

Many of the skills recommended for the role of a 9-1-1 professional are critical for other lines of work; however, few occupations outside of the 9-1-1 profession require the worker to be perfect nearly all of the time. Some of these skills include effective listening, empathy, the ability to multi-task, leadership, problem-solving, typing, and proficiency in the use of a computer.[187] The problem some industry professionals have discovered however is the majority of these skills cannot be taught in a classroom setting.[188] While many institutions of higher learning offer specialized training, and in some cases, degree programs for law enforcement, fire, and emergency medical service professionals, the majority of emergency communications training is conducted in-house, using industry prepared or agency specific training.[189]

Once IRI arrives in the communications center and 9-1-1 professionals suddenly hear and see what is going on during an emergency, the profession will likely be changed forever. Personnel who have been successful in the role may continue to function effectively without reservation or may simply require some additional support in the weeks and months following implementation. Others may leave the profession entirely after viewing a single traumatic image or video. Unfortunately, the reactive nature of the training currently available to help first responders deal with traumatic situations like this

186 "Become a 911 Dispatcher: Education Requirements and Salary Info," accessed February 15, 2017, http://study.com/articles/Become_a_911_Dispatcher_Education_Requirements_and_Salary_Info.html.

187 Ibid.

188 Sue Pivetta, "Where Are The 9-1-1 College Programs," 9-1-1 Magazine, September 2, 2011, http://www.9-1-1magazine.com/Pivetta-911-College-Programs.

189 "Police, Fire & EMS Training," accessed February 15, 2017, http://gotoltc.edu/business-industry/training-topics/police-fire-ems/index.html.

probably will not help 9-1-1 professionals prepare for what they are going to see.[190] While a number of communications vendors and organizations like APCO and NENA have developed a considerable amount of documentation to inform 9-1-1 stakeholders about NG9-1-1, little content has been developed to prepare 9-1-1 personnel for the viewing of this imagery.

Since most 9-1-1 training is conducted in-house using industry prepared curriculum or internally developed content, this training combined with the unique nature of the profession, current staffing challenges, and a relatively non-existent collegiate program offering will likely stifle any effort to expect a higher level of academic proficiency from 9-1-1 candidates.

B. TRAINING

Training is already a large part of a career in emergency communications, be it classroom instruction for a group of new recruits or continuing dispatch education (CDE) for a seasoned 9-1-1 professional.[191] Whether the material being presented is created internally by the hiring agency or purchased from a professional curriculum developer, the stakeholders who make up the National 9-1-1 program workgroup recommend that among a variety of other important topics, NG9-1-1 be included in all public safety answering point instruction nationwide.[192]

While a wealth of information is available online about NG9-1-1, much of what trainers and instructors will find during curriculum development research will be introductory based or speculative in nature. This information, while very basic, should not be discounted, as it provides a baseline technical understanding of the industry's plan for implementation, as well as a prospective roadmap for the initiative. What this

---

[190] Joseph A. Davis, "Critical Incident Stress Debriefing from a Traumatic Event," Psychology Today, February 12, 2013, https://www.psychologytoday.com/blog/crimes-and-misdemeanors/201302/critical-incident-stress-debriefing-traumatic-event; Adam Stone, "Beyond Debriefing: How to Address Responders' Emotional Health," Emergency Management Magazine, September 30, 2013, http://www.govtech.com/em/training/Beyond-Debriefing-Responders-Emotional-Health.html.

[191] 911.gov, *Recommended Minimum Training Guidelines for the Telecommunicator* (Washington, DC: 911.gov, 2016), https://www.911.gov/pdf/Recommended_Minimum_Training_Guidelines_for_the_9-1-1_Telecommunicator_FINAL_May_19_2016.pdf.

[192] Ibid.

information does not provide however is guidance on preparing new and existing emergency communications personnel for the arrival of this technology. This lack of guidance will likely create one of the single biggest instructional challenges for 9-1-1 administrators and trainers as they begin to develop strategies for educating their personnel.

One vendor white paper provided the following relative to NG9-1-1 instruction:

> Training will play a key role in ensuring that call takers, dispatchers and responders are at ease with the increasing amount of data as well as how to interface with it. Interacting with next-generation call screens will be similar to the graphical user interface (GUI) that is common on many modern digital devices. Formal training will need to be organized to teach call takers how to interpret some of the data and will need to include instruction on newly established workflow processes and procedures. With the introduction of NextGen 9-1-1, individual PSAPs should customize their training to match their next-generation environment as well as their operational needs.[193]

While the Intrado summary is more predictive than directive, it does provide some insight into the types of skills and training styles needed to educate America's emergency communications personnel effectively about NG9-1-1. Unfortunately, such documents are few and far between, as vendors and industry experts appear to be spending more time publishing white papers on technology and infrastructure needs, and less on personnel development.

What this means for 9-1-1 instructors and administrators, at least for the foreseeable future, is that NG9-1-1 training will likely have to be created in-house, without the assistance of a professional content designer. For larger agencies with the personnel and financial wherewithal to support such an effort, developing a NG9-1-1 training program from the ground up may not be as challenging. The same cannot be said for smaller call centers already struggling with staffing and with little to no training budget. Both situations will likely require agency personnel selected for the task to be creative, tenacious, patient, and knowledgeable enough to conduct extensive research.

[193] Intrado, *Next-Generation 9-1-1: The Essential Guide to Getting Started*.

The involvement of industry and vendor partners, as well as occupational stress experts, may also require a team-spirited and collaborative attitude of these same individuals.

Any proven method of curriculum development will likely provide the foundation necessary for constructing a NG9-1-1 training program. Elements of existing 9-1-1 training programs may also be incorporated into NG9-1-1 curriculum, if the presenter or instructor feels the content is appropriate and relevant to the intent of the instruction. While current 9-1-1 training programs generally include a module on stress, the time allocated to discussing stress in a post-NG9-1-1 setting may not be adequate once the visual component of IRI has been added, which is due in part to the increased levels of stress expected with the arrival of NG9-1-1.[194] Moreover, since instructors are accustomed to presenting the audio portion of a 9-1-1 call during training and know what to expect from people hearing traumatic situations for the first time, introducing graphic images and video in the same setting has never been done, thus the practice may require additional layers of support during instruction.

Once a communications center learns it will be deploying NG9-1-1 and receiving IRI, those charged with training and curriculum development should be given immediate access to the technology. Supervisors, management staff, and any administrative personnel involved with the technology should also be included in the familiarization training. All these personnel should be thoroughly familiar with the system interface, be subject matter experts in the use of the system, and have a firm understanding of the expectations of 9-1-1 center leadership relative to the use of the technology. As is the case with many new technology installations in emergency communications centers nationwide, having the manufacturer or vendor of the product available during the initial testing and familiarization phase of a deployment is imperative.[195] Representatives from

[194] As stated in Chapter IV of this thesis.

[195] National Emergency Number Association, *NENA Recommended Generic Standards for E9-1-1 PSAP Equipment* (Alexandria, VA: National Emergency Number Association, 2000), https://c.ymcdn.com/sites/www.nena.org/resource/collection/6EE32917-37BD-4FA0-838C-026931F702A6/NENA_04-001-v2_E9-1-1_PSAP_Equipment.pdf.

the same two entities should be on-site during deployment and for several weeks thereafter to assist with questions and to address technical anomalies in the system.[196]

While many communications center trainers routinely use actual 9-1-1 phone calls during classroom instruction, in the earliest stages of NG9-1-1 training, still images, video, and streaming media samples from actual 9-1-1 calls may not be available.[197] Manufacturers or vendors may have some pre-developed images and video available for training; however, individual agencies could decide to create their own examples of IRI for use in a test setting. Input from the public safety agencies the 9-1-1 center serves may be valuable as well when it comes to preparing content for a test environment, especially if emergency calls of a more unique nature are likely due to special areas of concern within a given jurisdiction. In the same way trainers ask veteran call center personnel to place test 9-1-1 calls to assist with the training of candidates, IRI could be transmitted in a test setting by the same individuals, making call scenarios in the training environment far more realistic. Involving current staff members in the training and mentoring process provides the candidate with a level of guidance and learning not easily matched in a classroom setting.[198]

The instructional process for NG9-1-1 should also consider the ways in which adult learners most effectively receive and process new information. For example, a 9-1-1 instructor responsible for training a group of emergency communications professionals might best be able to convey the intent of a controversial message by drawing off the experiences of one or two members in the class. This practice would be in line with Pike's Five Laws of Adult Learning, a program designed to guide those responsible for the education of adult learners.[199] Using Pike's Laws, when introducing the concept of

---

[196] National Emergency Number Association, *NENA Recommended Generic Standards for E9-1-1 PSAP Equipment*.

[197] Dan Merritt, "Hammer Beating: One of the Real Calls, Part of His 911 Training," Winner Advocate, accessed February 18, 2017, http://thewinneradvocate.com/hammer-beating-one-of-the-real-calls-part-of-his-911-training/.

[198] Heather R. Huhman, "Train to Retain: 7 Tips for Better Employee Training," Poll Everywhere, March 21, 2016, http://www.polleverywhere.com/blog/train-to-retain-7-tips-for-better-employee-training/.

[199] "Creative Training Techniques 101: The Basics," June 3, 2013, https://www.bobpikegroup.com/blog/78.

IRI to a group of new 9-1-1 professionals, polling the group for ideas on how best to handle stress associated with the viewing of this material might be an excellent starting point. Adult learners bring a tremendous amount of experience to any training program, and acknowledging that experience is one way to create additional buy in during the learning process.[200] The successful transfer of learning also has a great deal to do with the ratio of information coming from the instructor versus members of the class.[201] 9-1-1 instructors presenting on NG9-1-1 for the first time will not be drawing from a specific pool of knowledge. In this situation, having class participants speak about their experiences with the use of technology, specifically the sending of images, video, and streaming media, might be an effective way to initiate classroom conversation. As each participant makes a personal contribution to the conversation, others in the class will likely follow. Before too long, the instructor will have assembled a list of ideas, questions, and concerns contributed by those who will be using the systems directly. Achieving the same level of interaction and retention in a lecture setting alone would likely be far more difficult. These types of training are only two examples of the benefits derived from an instructional setting where the importance of adult learning is understood.

Creating a confidential reporting and support system for employees having a difficult time adjusting to the viewing of IRI should also be considered. Supervisors should be trained on the use of this system and should be prepared to receive inquiries the moment NG9-1-1 is up and running. Having this option in place and available for use at time of implementation will help to ensure staff members have the support they need.

Once 9-1-1 trainers and other essential personnel have had the opportunity to work with the application, its features and functionality have been successfully tested, and the interface is deployed in a test setting, it will be time to introduce NG9-1-1 to those who will be using it on a daily basis. This critical step in the training process must not be carried out in haste, since trainers will be presenting the material for the first time to trainees who will be seeing it for the first time. To prepare the trainees better for what

[200] "Creative Training Techniques 101: The Basics."

[201] Ibid.

they are about to see, it might be advantageous to have members of the public safety community come in prior to the viewing of IRI in the classroom to discuss personal experiences dealing with visually traumatic incidents. As mentioned previously, interaction among everyone in the classroom should be encouraged at all times, especially when sensitive topics like stress, secondary trauma, and compassion fatigue are discussed. Involving mental health professionals at this point in the process might also be helpful, as representatives from this group can share information with trainees about how they might feel while viewing these images and immediately thereafter. Having supervisors and management staff present prior to the viewing of IRI might be beneficial as well, as members of these groups can reassure staff members about the availability of internal support systems and the methods for reporting IRI-related emotional stress. Finally, critical incident stress debriefing sessions should be scheduled for each shift on the day of deployment, and for each day thereafter for the first week, with periodic visits to the center weekly or every other week going forward.[202] Emergency communications personnel should have access to all the aforementioned individuals and support systems during the implementation phase of NG9-1-1 , as having these personnel and preventative measures available may help prevent trauma-related illnesses, absences, and resignations.

C. CONCLUSION

The hiring and training practices currently in place in America's emergency communications centers may provide call center trainers and administrators with some guidance when it comes to planning for the arrival of NG9-1-1. Existing policies and procedures will likely cease to be beneficial in the area of IRI, as the audio only 9-1-1 environment of today is replaced by the media rich audio and video environment of tomorrow. Vendors and industry professionals have yet to produce sufficient documentation to assist 9-1-1 center leadership in the successful implementation of NG9-1-1 technologies. That said, much of the planning and preparation for hiring and training in a post-NG9-1-1 setting will be based on past experience, with input from public safety

[202] Davis, "Critical Incident Stress Debriefing from a Traumatic Event."

personnel who have been exposed to the viewing of traumatic situations in the past. Emotional support from peers and professionals for all 9-1-1 personnel will likely be critical in the days and weeks following NG9-1-1 implementation. Not having these support mechanisms in place from the very beginning may result in a variety of trauma related illnesses, absences, and resignations.

VI. CONCLUSION AND RECOMMENDATIONS

> What exactly is next-generation 911? When people talk about it, they use the phrase like a noun, yet it's not a person and it's not a place. You may consider it a "thing," although I can tell you that it most certainly is not, at least in the physical sense. NG911 is not something you can buy and plug into your existing public safety network, miraculously transforming a legacy environment into a "next generation" environment. And yet, it's often described that way.[203]

As the Fletcher quote infers, confusion about NG9-1-1 is omnipresent in the 9-1-1 community. This confusion was the inspiration for the author's research. However, he knew answering the question "What exactly is Next Generation 9-1-1" was too broad of an inquiry to pursue. Instead, he chose to focus his efforts on a specific feature of NG9-1-1, IRI, specifically, the operational impact of this technology on the PSAP. When a profession has had to rely solely on the audio portion of an emergency incident to determine what type of assistance to send, suddenly introducing images, video, and streaming media to the process brings with it an additional layer of uncertainty. Providing clarity and perhaps a few recommendations for how the arrival of this technology could best benefit the hiring, training, and supervisory processes of a 9-1-1 center was his mission. Identifying areas of concern for communications center leadership and administrators relative to the arrival of this technology was a secondary goal.

Since he was researching and writing about a technology offering not currently in existence, he looked to other public safety professions and service providers to learn more about the methods they had used to implement similar technology-based initiatives. This chapter highlights those findings, notes potential issues to be considered during the implementation process, and makes recommendations for addressing those concerns once the move to NG9-1-1 begins in the PSAP.

[203] Mark J. Fletcher, "NG911: The Industry's Most Misunderstood Buzzword," Avaya, April 4, 2016, http://www.avaya.com/blogs/archives/2016/04/ng911-the-industrys-most-misunderstood-buzzword.html.

A. CONCLUSIONS

1. A Lack of Urgency Fuels a Lack of Preparedness

Until the NG911 NOW Coalition's national plan for implementation became public in the form of a press release on June 13, 2016, no vendor partner, industry expert, or 9-1-1 stakeholder had formally announced an anticipated or desired "go-live" date for NG9-1-1.[204] While the industry has been discussing the idea of NG9-1-1 since 2000, the majority of the information produced on the topic by subject matter experts and those close to the initiative has been somewhat "future-tense" in nature.[205] This shortfall, combined with the fact that ESInets, the foundation of NG9-1-1, do not exist in most states, has likely stifled any sense of urgency for NG9-1-1 preparation on the part of emergency communications leadership nationwide. The FCC's 2016 Task Force on Optimal PSAP Architecture report offered the following relative to the lack of NG9-1-1 awareness on the part of key players in the initiative:

> With the evolution of 9-1-1 technologies, it is clear that the term "Next Generation 9-1-1" needs to be better understood by all stakeholders. Many organizations and industry authorities have contributed to the development of NG9-1-1, and several well-respected reports were completed in the early stages of the evolution. What was lacking in these efforts however was an overall comprehensive understanding and roadmap pooling of the disparate "facts" into a single resource that would provide guidance to decision makers as they moved forward with their vision and ideas.[206]

Optimistically speaking, if the coalition were to accomplish its goal of implementing NG9-1-1 services by the end of 2020, as of the writing of this thesis, technology vendors, industry experts, and emergency communications stakeholders would have less than three years to prepare for the arrival of these technologies. Whether those tasked with overseeing the nation's 9-1-1 centers believe in the coalition's schedule or not, the responsible thing for emergency communications leadership to do is

---

[204] Brittingham, "Press Release: New Report Details Important Steps to Accelerate NG911 Implementation."

[205] National Emergency Number Association, *NENA NG9-1-1 Project History*.

[206] Federal Communications Commission, *Task Force on Optimal PSAP Architecture* (Washington, DC: Federal Communications Commission, 2016), https://apps.fcc.gov/edocs_public/attachmatch/DA-16-179A2.pdf.

immediately begin preparing their agencies and personnel for the changes associated with a NG9-1-1 migration.

2. Incident Related Imagery Compounds Stress in the PSAP

Stress is already a known problem for those working in or considering a career in public safety communications.[207] While it has been determined a variety of organizational and occupational stressors contribute to the overall stress level of America's emergency communications professionals, a similar study concluded that 32 percent of 9-1-1 calls received create the highest levels of stress in call takers and dispatchers.[208] Those calls include unexpected child injuries or death, suicidal persons, and officer-involved shootings.[209] Where researchers arrived at these conclusions after assessing the current "audio only" work environment of 9-1-1 professionals, it is extremely likely that the viewing of a child's death, a person committing suicide, or an officer-involved shooting will elevate stress levels even further for telecommunicators, possibly to the point of causing irreparable emotional or physiological damage.[210]

3. Hiring and Training for the Next Generation

Where the emergency communications profession is already technology driven, as work-related solutions in this public safety realm continue to evolve, the need for more tech-savvy staff members will likely evolve with it. It is plausible the hiring and training practices employed by today's emergency communications center administrators and trainers will have to be completely reworked if attracting and retaining top candidates for this critical public safety role remains a priority.

---

[207] Antonya English, "Stress and the 9-1-1 Telecommunicator," Public Safety Communications, September 3, 2015, http://psc.apcointl.org/2015/09/03/stress-and-the-9-1-1-telecommunicator/.

[208] Pierce and Lilly, "NIU Psychology Study Links 9-1-1 Dispatchers with Post-traumatic Stress Disorder Symptoms."

[209] Ibid.

[210] Silver, "Repeated Exposure to Media Images of Traumatic Events May Be Harmful to Mental and Physical Health."

One study concluded increases in the use of technology in America's emergency call centers was not being met with an equally increasing compensation rate.[211] The result of this situation is twofold. One, prospective personnel are abandoning efforts to secure public sector employment in this field, feeling higher compensation is available in the private sector.[212] Two, personnel already working in emergency communications are leaving the profession for the same reason.[213] Since many of this nation's emergency communications centers are municipal or civil service-based entities, lengthy hiring processes are also hindering the profession's ability to attract and hire top quality talent.[214] Finally, since candidates for 9-1-1 center positions generally need only a high school diploma to fulfill the educational requirement of the application, those applying for the position, especially right out of high school, are doing so with an extremely limited professional and technical background.[215]

Training is a constant in the 9-1-1 profession. From the moment a 9-1-1 professional is selected for the position, candidates are immersed in a combination of classroom, on-the-job, and continuing dispatch instruction.[216] While existing hiring practices for emergency communications professionals will likely have to adapt with 9-1-1's changing technological landscape, training for those selected to begin a career in this rapidly changing public safety role may have to change at a similar pace.

Research suggests the introduction of NG9-1-1 to the public safety answering point will bring with it an increased need for a more formalized training process for 9-1-1 personnel.[217] This process is due primarily to the need for data interpretation, a skill

---

[211] Perin, "Where Did All the Dispatchers Go."

[212] Ibid.

[213] Ibid.

[214] Rachel Burger, "Why Millennials Want Government Jobs (and Then Quit Them)," The Hill, October 15, 2014, http://thehill.com/blogs/congress-blog/labor/220696-why-millennials-want-government-jobs-and-then-quit-them.

[215] Sue Pivetta, "9-1-1: An Emerging 'Hidden' Career," 9-1-1 Magazine, accessed February 27, 2017, http://9-1-1magazine.com/Pivetta-911-Emerging-Hidden-Career.

[216] Paul Logan, "How Long Should Training Take," 9-1-1 Magazine, accessed February 27, 2017, http://www.9-1-1magazine.com/how-long-should-training-take.

[217] Intrado, *Next-Generation 9-1-1: The Essential Guide to Getting Started*.

likely to become critical as telecommunicators begin viewing emergency situations instead of simply listening to them. Preparation of trainers prior to the rollout of NG9-1-1 may be even more critical, as a fundamental understanding of the technology, its capabilities, and the expectations of 9-1-1 center leadership will likely be vital to ensuring the success of any new training initiative.

B. RECOMMENDATIONS

1. A Lack of Urgency Fuels a Lack of Preparedness

One NG9-1-1 product offering currently available and deployable is Text-to-9-1-1; however, the technology is only operational in about 10 percent of the nation's public safety answering points.[218] While the service will become more widely available as 9-1-1 centers throughout the country modernize their systems, the fact that more centers are not currently providing this readily available feature to their callers paints a bleak picture for future NG9-1-1 implementations.[219]

Creating a sense of urgency by getting 9-1-1 administrative and leadership members on board likely begins with education. Stakeholders at the local, state, and federal level need to be aware of important figures, like the percentage of users calling or sending text messages to 9-1-1 from a wireless device. These individuals also need to understand that the aging infrastructure in place in the majority of the nation's emergency call centers will not support the needs of newer and more advanced communications technologies.[220] Administrative personnel and leadership at the PSAP level should begin to discuss added infrastructure costs. Collaborative costs for call centers contributing to the NG9-1-1 effort at the state and regional level should also be made explicit, which will be especially important when it comes to connecting individual PSAPs to the statewide ESInet.

---

[218] "Is Your County Able to Receive Text-to-9-1-1," accessed February 25, 2017, https://www.motorolasolutions.com/en_us/products/smart-public-safety-solutions/ng911.html#taboverview.

[219] "Text-to-911: Quick Facts & FAQs."

[220] Federal Communications Commission, *Task Force on Optimal PSAP Architecture*.

Although the foundational pieces of NG9-1-1 will need to be in place before IRI can be delivered to the PSAP, it may be advantageous to share the expectations of IRI with 9-1-1 trainers and front line personnel prior to the technology's arrival. Providing staff members with as much information as possible about the feature, its capabilities, and its anticipated use may help alleviate some of the stress likely to follow the deployment of this new technology.

2. Incident Related Imagery Compounds Stress in the PSAP

Resilience building appears to be one of the best courses of action for those preparing emergency communications personnel for the viewing of IRI. While the NCMEC Safeguard Program is designed to provide job-specific training and consultation services to members of the law enforcement community working in child exploitation, 9-1-1 leadership might consider reaching out to or partnering with NCMEC to provide a similar genre of training to their personnel. Since many law enforcement agencies throughout the country likely have some form of resiliency training in place for their personnel, it may be even easier for communications center administrators to engage local law enforcement in a conversation about this form of training. The research also suggests that proactive monitoring of personnel viewing objectionable material is beneficial when it comes to mitigating the effects of secondary trauma and compassion fatigue.[221] To bolster this effort, enrolling all communications personnel in a stress or trauma awareness program and encouraging co-workers to watch out for one another may help reduce the likelihood of a traumatized worker going unnoticed. Since communication center supervisors will likely be some of the first staff members tasked with addressing employees having emotional difficulties with IRI, a more advanced level of stress awareness training may be appropriate. Offering this enhanced level of training to peer support group members already in place in the PSAP could also be advantageous. Stress awareness and mitigation measures should be reinforced with all personnel in the days and weeks following an NG9-1-1 deployment, when reactions to graphic images and video will likely be most prevalent.

[221] Reisman, "Picture Poison: Viewing Pornography for a Living Can Be Deadly."

The research also suggests that resiliency begins with the hiring process.[222] Employment announcements for the positions of telecommunicator and dispatcher should probably include some mention of exposure to graphic or objectionable material, even before IRI becomes available in the PSAP. If those applying for either of the positions understand from the very beginning that their future occupation could expose them to this type of imagery, some might expect it and not be bothered at all, while others might conduct some preliminary research on the topic to determine if the position is right for them. Others may decide the role is not right for them at all and may not apply. This action could serve to save the candidate and the employer a considerable amount of time and money.

If the hiring process for either role requires a psychological evaluation, it might be beneficial to have samples of the types of images and video the candidate will be exposed to available for review during this step in the process. Learning about the potential for exposure to this type of imagery in an occupational announcement is one thing. Reinforcing the likelihood of exposure to this type of material during a psychological evaluation by showing candidates sample imagery may serve to solidify the need for resiliency in the role. In addition, since the candidates will likely be in the presence of a mental health professional during the psychological evaluation, if they have difficulty with what they have viewed or a severe emotional reaction follows, specially trained staff will be instantly available to provide immediate assistance.

3. Hiring and Training for the Next Generation

Attracting and retaining communications and dispatch personnel is already an issue for many public safety agencies across the country.[223] It is plausible the introduction of NG9-1-1 and IRI to the public safety answering point will only serve to aggravate this problem further. To help alleviate predicted issues with 9-1-1's hiring and

---

[222] The Technology Coalition, *Employee Resilience Guidebook for Handling Child Sexual Abuse Images*.

[223] John R. Santomauro, "Recruitment and Retention Challenges—One Department's Approach," CALEA, accessed February 27, 2017, http://www.calea.org/calea-update-magazine/issue-97/recruitment-and-retention-challenges-one-department-s-approac.

training process following the introduction of NG9-1-1, communications center leadership should familiarize itself with known obstacles to technology deployments in other public and private sector settings. Center personnel should be notified well in advance of any NG9-1-1 deployment about anticipated changes to existing processes, the creation of new processes, and expected policy and procedural changes likely to follow an implementation. Providing simple documentation about the technology or sending out a link to the website of the vendor selected to deploy the NG9-1-1 technology is a great way for center leadership to build trust and demonstrate value among its employees.[224]

Technology acceptance was identified by the research to be a common denominator for hiring and training, particularly for those in the public safety community.[225] Since employees are generally resistant to change, it is important for those leading America's emergency communications centers not only to embrace the evolution of technology, but to allow the workplace to change as needed with technologies' influence.[226] On the hiring front, making the use of technology explicit to those seeking employment in the emergency communications field will help eliminate questions regarding its use once the candidate has been hired. Since the 9-1-1 center of the future is expected to be technology centric, making pre-employment orientation programs available to prospective candidates may also have a great deal of value. Providing this forum to anyone considering employment in the profession would allow 9-1-1 staff responsible for hiring to convey the level of technology awareness needed for the position in a more personal setting. This program would also be an ideal setting for discussing the types of situations the prospective telecommunicator would be exposed to, up to and including the showing of sample IRI. A question and answer session immediately following the orientation would help to eliminate concerns on the part of the candidates that might otherwise go unaddressed.

For new and existing personnel receiving NG9-1-1 training, effectively conveying the advantages of the technology and rewarding those who are quick adopters and

[224] Heathfield, "Build Support for Effective Change Management."

[225] Wheeler, "The 911 System Isn't Ready for the iPhone Era."

[226] Ibid.

promoters of the program may also help to move the implementation process forward. Doing so will help create buy-in on the part of center personnel, and may even reduce some of the negativity associated with change in the workplace. Trainers should also be careful when it comes to dealing with different generations of employees and NG9-1-1 instruction. Research suggests that the ability to learn and adapt to a changing technological landscape appears to be more about the attitude of the individual and less about generational aptitude.[227] Being cognizant of each age group, the different ways in which each generation learns, encouraging questions and open dialogue during the entire learning process as well and the use of individual follow-up sessions for those having a difficult time adapting to the training may foster a more productive and participatory environment for learning.

C. FORGING AHEAD

While a great deal of information is available from industry experts, vendor partners, and 9-1-1 stakeholders relative to the NG9-1-1 initiative, the majority is written in a future tense. This writing, combined with the fact that the basic fundamental architecture of NG9-1-1, an ESInet, does not exist in most states, as well as a lack of awareness about NG9-1-1 on the part of so many in the profession, has resulted in an overall lack of urgency for implementation. Content created about NG9-1-1 should convey the technology as being in the here and now, not something requiring consideration years from now. This message should be unilateral, delivered in a consistent manner by those designing, deploying, maintaining, and using NG9-1-1 systems.

More research needs to be conducted on the impact of graphic and traumatic images on emergency communications personnel. While other emergency service professions have practices in place to prepare their personnel for the objectionable material they are likely to view during the course of their duties, the emergency communications profession has done little to prepare its personnel for the same, which likely results from the lack of urgency created by the situation previously mentioned.

[227] CompTIA, *Generational Research on Technology and its Impact in the Workplace*.

Moreover, the support measures currently in place to assist 9-1-1 personnel following a traumatic call may also need to be reevaluated, as occurrences of vicarious trauma and compassion fatigue will likely increase following the introduction of IRI. Supervisory personnel and those offering peer support services in the PSAP should also receive a higher level of stress awareness training, as increasing their knowledge base may better equip them to handle the situations likely to occur following an NG9-1-1 deployment.

Consideration should also be given to whether or not the 9-1-1 profession can remain an entry level field. Increases in the use of technology, higher levels of analytical thinking and problem solving, and the potential need for quicker decision making may result in the need for a more academically proficient candidate.

Those tasked with developing training programs and curriculum for new and existing emergency communications personnel need to begin researching the anticipated capabilities and features of deployed NG9-1-1 systems. This baseline knowledge will be important when it comes to developing a curriculum for a technology whose features will likely change on a regular basis. In addition, these individuals should begin developing an implementation plan for instruction, considering different learning styles, generational differences, and the inclusion of outside public safety agencies that have experience training their personnel for traumatic situations.

APPENDIX.

The following is provided by NENA:

- **2001** Technical Committee leaders conceptualize the NENA Future Path Plan
- **2003** Open Conference held in Atlanta to discuss potential of internet protocol (IP) as the base protocol for future 9-1-1 Technical Development Committee formed for IP design for future system Operations Committee formed for future system
- **2004** NG9-1-1 picked as name for future IP-based 9-1-1 system; June: proposal to NENA Board to form a policy arm of the NG9-1-1 project, on basis that funding, regulation, legislation, governance, and other policy areas had to solved in parallel with technical design work
- **2005** Formation of what is now known as the Next Generation Partners Program
- **2006** NG9-1-1 Transition Planning Committee initiated, as joint Tech and Operations endeavor
- **2009** ICE Steering Committee for interoperability testing formed, NENA sponsored, vendor led; The first ICE was held in November 2009; four have been held, with another four planned
- **2010** NG9-1-1 Education Steering Committee formed, joint NENA/APCO effort[228]

[228] National Emergency Number Association, *NENA NG9-1-1 Project History*; "Future Path Plan—FPP," accessed January 1, 2017, https://www.nena.org/?page=FPP; "NENA NG Partner Program," accessed January 1, 2017, https://www.nena.org/?page=NGPartnerProgram; "NG9-1-1 Transition Planning Committee," accessed January 1, 2017, https://www.nena.org/?page=NG911_TransPlanning; "NG9-1-1 ICE—Industry Collaboration Events," accessed January 1, 2017, http://www.nena.org/?page=NG911_ICE.

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF REFERENCES

9-1-1 Industry Alliance, The. *The National Workshop on 9-1-1 Overload, The Overloaded 9-1-1 System*. Washington, DC: Industry Council for Emergency Response Technologies (iCERT), 2011. http://www.theindustrycouncil.org/publications/overloaded9-1-1system.pdf.

911.gov. "Benefits of Next Generation 911—A Video." 2016. http://www.911.gov/ng911movie.html.

———. "December—U.S. DOT NG911 Initiative Starts." 2016. http://www.911.gov/historyof911.html.

———. "Next Generation 911 (NG911)." Accessed March 13, 2017. https://www.911.gov/911-issues/standards.html.

———. *Recommended Minimum Training Guidelines for the Telecommunicator*. Washington, DC: 911.gov, 2016. https://www.911.gov/pdf/Recommended_Minimum_Training_Guidelines_for_the_9-1-1_Telecommunicator_FINAL_May_19_2016.pdf.

———. "Standards for Next Generation 911." Accessed December 27, 2016. https://www.911.gov/911-issues/standards.html.

911DispatcherEDU.org. "Job Duties of 911 Dispatchers." 2016. http://www.911dispatcheredu.org/job-description/.

American Psychological Association. "Stress: The Different Kinds of Stress." American Psychological Association. Accessed January 27, 2017. http://www.apa.org/helpcenter/stress-kinds.aspx.

APCO International. "Interim SMS Text-to-9-1-1 Information and Planning Guide." May 2014. https://www.apcointl.org/resources/next-generation-communications-systems/text-to-9-1-1.html.

———. "Next Generation 9-1-1: The Stakeholders." Accessed January 1, 2017. https://www.apcointl.org/resources/next-generation-communications-systems.html.

———. "Staffing and Retention Toolkit for Public Safety Communications Center Managers." Accessed February 6, 2017. http://retains.apcointl.org/.

———. "Surviving Stress." Accessed December 27, 2016. https://www.apcointl.org/training-and-certification/continuing-dispatch-education/cde-courses/surviving-stress.html.

Association for Psychological Science. “Stress Changes How People Make Decisions.” Accessed March 1, 2017. http://www.psychologicalscience.org/news/releases/stress-changes-how-people-make-decisions.html#.WLbN4m8rKUm.

Association of Public Safety Communications Officials. “Project RETAINS.” Accessed December 27, 2016. https://www.apcointl.org/resources/staffing-and-retention/retains.html.

Barrett, Katherine, and Richard Greene. “Can Government Hiring Get Out of the Stone Age.” Governing, February 2016. http://www.governing.com/topics/mgmt/gov-government-hiring-best-practices.html.

Beaver, Laurie. “Here’s How Millennials Are Impacting the Future of Communication.” *Business Insider*, January 6, 2017. http://www.businessinsider.com/heres-how-millennials-are-impacting-the-future-of-communication-2017-1.

Blake, Dave, and Lesli Prado. “Stress & Stress Inoculation Training.” *9-1-1 Magazine*. Accessed December 27, 2016. http://www.9-1-1magazine.com/Blake-Prado-Dispatcher-Training-Col?TopicID=538.

Bob Pike Group, The. “Creative Training Techniques 101: The Basics.” June 3, 2013. https://www.bobpikegroup.com/blog/78.

Bond, Mark. “Emergency Call Centers Bring Stress 24-7.” In Public Safety, February 10, 2015. http://inpublicsafety.com/2015/02/emergency-911-call-centers-bring-stress-24-7/.

Brittingham, Don. “Press Release: New Report Details Important Steps to Accelerate NG911 Implementation.” NG911 NOW, June 13, 2016. http://www.ng911now.org/blog/2016/6/13/press-release-new-report-details-important-steps-to-accelerate-ng911-implementation.

Brown, Alan S. “Finally, A Stress Program Designed for First Responders.” EHS Today, December 17, 2003. http://ehstoday.com/training/ehs_imp_12402.

Bureau of Labor Statistics. “Police, Fire, and Ambulance Dispatchers.” Accessed December 27, 2016. https://www.bls.gov/soc/2010/soc435031.htm.

———. “Police, Fire, and Ambulance Dispatchers—Work Environment.” December 17, 2015. https://www.bls.gov/ooh/office-and-administrative-support/police-fire-and-ambulance-dispatchers.htm#tab-3.

Burger, Rachel. “Why Millennials Want Government Jobs (and Then Quit Them).” The Hill, October 15, 2014. http://thehill.com/blogs/congress-blog/labor/220696-why-millennials-want-government-jobs-and-then-quit-them.

Bursch, Dan. *Managing the Multigenerational Workplace*. Chapel Hill, NC: UNC Kenan-Flagler Business School, 2014. http://www.kenan-flagler.unc.edu/~/media/Files/documents/executive-development/managing-the-multigenerational-workplace-white-paper.pdf.

Call Centre Helper. "Call Centre Erlang Staffing Calculator—Including Shrinkage." Accessed December 27, 2016. https://www.callcentrehelper.com/online-call-centre-staffing-calculator-77780.htm.

Canter, Stewart. "Transmitting PTSD from Generation to Generation." New Synapse, February 21, 2015. http://www.new-synapse.com/aps/wordpress/?p=861.

Cardinal, Sherry. "What is CISM." CISM International." Accessed December 27, 2016. http://www.criticalincidentstress.com/what_is_cism_.

Cave, Dorothy. "Telecommunicators & Mental Health: Taking Care of the People Who Protect the Public." Public Safety Communications, June 2014. https://www.apcointl.org/doc/training-certification-1/501-cde-36488-telecommunicators-mental-health/file.html.

Cisco. "Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2015–2020 White Paper." Updated February 9, 2017. http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/mobile-white-paper-c11-520862.html.

Cleary, Tom. "LISTEN: Omar Mateen 911 Calls from Orlando Shooting [FULL AUDIO]." Heavy. Updated November 1, 2016. http://heavy.com/news/2016/10/omar-mateen-pulse-orlando-nightclub-shooting-911-calls-audio-full-recordings-isis/.

Communications Commission (FCC). "911 Master PSAP Registry." 2016. https://www.fcc.gov/general/9-1-1-master-psap-registry. Federal

CompTIA. *Generational Research on Technology and its Impact in the Workplace*. Downers Grove, IL: CompTIA, 2013. http://www.unify.com/~/media/internet-2012/documents/report/CompTIA-Generational-Study.pdf.

Crook, Jordan. "Snapchat Sees More Daily Photos than Facebook." TechCrunch, November 19, 2013. https://techcrunch.com/2013/11/19/snapchat-reportedly-sees-more-daily-photos-than-facebook/.

Davis, Joseph A. "Critical Incident Stress Debriefing from a Traumatic Event." Psychology Today, February 12, 2013. https://www.psychologytoday.com/blog/crimes-and-misdemeanors/201302/critical-incident-stress-debriefing-traumatic-event.

Davy, John. “Age May Moderate the Impact of Work Stress.” Institute on Aging, August 7, 2013. http://www.investigage.com/2013/08/07/age-may-moderate-the-impact-of-work-stress/.

Dean, Jason. “Slack CEO Stewart Butterfield on the Future of Communication.” *The Wall Street Journal*, October 25, 2016. http://www.wsj.com/articles/slack-ceo-stewart-butterfield-on-the-future-of-communication-1477405213.

Dotinga, Randy. “911 Explained: Why Uber Can Find You but maybe Not 911.” *Voice of San Diego*, June 16, 2016. http://www.voiceofsandiego.org/topics/news/the-411-on-911-why-help-might-not-be-on-the-way/.

EMDR Institute, Inc. “What is EMDR.” Accessed February 3, 2017. https://www.emdr.com/what-is-emdr/.

Emergency Communications Network. “State & Local Government.” Accessed March 1, 2017. https://ecnetwork.com/state-local-government/.

Emery, Mike. “9-1-1 Dispatchers Vital to Public Safety Efforts.” Pal-Item, April 19, 2015. http://www.pal-item.com/story/news/local/2015/04/19/dispatchers-mainbar/26041587/.

English, Antonya. “Stress and the 9-1-1 Telecommunicator.” Public Safety Communications, September 3, 2015. http://psc.apcointl.org/2015/09/03/stress-and-the-9-1-1-telecommunicator/.

English, Jay. “NG9-1-1 & FirstNet.” Association of Public Safety Communications Officials. Accessed December 27, 2016. http://techforum.apcointl.org/wp-content/uploads/2H-English-NG911-FirstNet.pdf.

———. *NG911 Implementation*. Daytona Beach, FL and Alexandria, VA: Association of Public Safety Communications Officials, 2013. http://techforum.apcointl.org/wp-content/uploads/English_NG911_Implementation_ETF214.pdf.

Erich, John. “Earlier than Too Late: Stopping Stress and Suicide among Emergency Personnel.” EMSWorld, November 1, 2014. http://www.emsworld.com/article/12009260/suicide-stress-and-ptsd-among-emergency-personnel.

ESI Employee Assistance Group. “Solutions for Common Issues—EAP Employee Assistance Program.” Accessed December 27, 2016. http://www.theeap.com/solutions-for-common-issues/.

Eyewitness Media Hub. “What Makes Eyewitness Media Traumatic.” Accessed February 2, 2017. http://eyewitnessmediahub.com/research/vicarious-trauma/findings/what-makes-eyewitness-media-traumatic-.

Federal Communications Commission. *Task Force on Optimal PSAP Architecture*. Washington, DC: Federal Communications Commission, 2016. https://apps.fcc.gov/edocs_public/attachmatch/DA-16-179A2.pdf.

———. “Text-to-911: Quick Facts & FAQs.” Last updated/reviewed November 1, 2016. https://www.fcc.gov/consumers/guides/text-911-quick-facts-faqs.

———. “What You Need to Know about Text to 911.” Last updated/reviewed October 25, 2016. https://www.fcc.gov/consumers/guides/what-you-need-know-about-text-911.

Federal Emergency Management Agency. “Integrated Public Alert and Warning System.” Last updated December 6, 2016. http://www.fema.gov/integrated-public-alert-warning-system.

Feinstein, Anthony. “Witnessing Images of Extreme Violence: A Psychological Study of Journalists in the Newsroom.” National Center for Biotechnology Information, *U.S. National Library of Medicine*, 5, no 8 (2014): 1–7. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4100239/.

First Contact 9-1-1, LLC. *How Do I Become a 9-1-1 Dispatcher*. Morgan Hill, CA: First Contact 9-1-1, LLC, n.d. Accessed February 15, 2017. http://www.firstcontact911.com/jobs.pdf.

First Responder Support Network. “About the First Responder Support Network.” Accessed December 27, 2016. http://www.frsn.org/.

FirstNet. “About FirstNet.” *First Responder Network Authority*. Accessed December 27, 2016. http://firstnet.gov/about.

Fletcher, Mark J. “NG911: The Industry’s Most Misunderstood Buzzword.” Avaya, April 4, 2016. http://www.avaya.com/blogs/archives/2016/04/ng911-the-industrys-most-misunderstood-buzzword.html.

———. “The Truth about 911: How Outdated Technology Is Putting your Life at Risk.” Avaya, July 22, 2015. https://www.avaya.com/blogs/archives/2015/07/the-truth-about-911-how-outdated-technology-is-putting-your-life-at-risk.html.

Fontes, Brian. “America’s 9-1-1 Infrastructure Is Showing Cracks, too.” *The Hill*. Accessed February 23, 2017. http://thehill.com/blogs/congress-blog/technology/320743-americas-9-1-1-infrastructure-is-showing-cracks-too.

Fredric, Paul. “Worldwide Mobile App Market Hits $34 Billion.” NetworkWorld, May 10, 2016. http://www.networkworld.com/article/3068376/mobile-wireless/worldwide-mobile-app-market-hits-34-billion.html.

Fry, Richard. “Millennials Surpass Gen Xers as the Largest Generation in U.S. Labor Force.” Pew Research Center, May 11, 2015. http://www.pewresearch.org/fact-tank/2015/05/11/millennials-surpass-gen-xers-as-the-largest-generation-in-u-s-labor-force/.

Furey, Barry. “9-1-1 Center Staffing & Standards: Stop Pointing Fingers and Give Us a Hand.” *9-1-1 Magazine*. Accessed December 27, 2016. http://www.9-1-1magazine.com/Furey-Sep-2016-Stop-Pointing-Fingers.

Geering, James. “I Wish My Head Could Forget the Things My Eyes Have Seen—PTSD in First Responders.” *Behind the Shield*, November 27, 2016. http://www.jamesgeering.com/blog/2016/11/27/i-wish-my-head-could-forget-the-things-my-eyes-have-seen.

Godfrey, Christopher J. “The New Old(er) US: Are You Ready for Tech Savvy Older Adults.” *American Society for Public Administration*. Accessed February 15, 2017. http://patimes.org/older-us-ready-tech-savvy-older-adults/.

GreatAchievements.org. “Telephone Timeline.” 2016. http://www.greatachievements.org/?id=3625.

Green, Caroline. “The Five Types of Digital Image Files: TIFF, JPEG, GIF, PNG, and Raw Image Files, and When to Use each One.” IvanExpert.com, May 14, 2010. https://www.ivanexpert.com/blog/2010/05/the-5-types-of-digital-image-files-tiff-jpeg-gif-png-and-raw-image-files-and-when-to-use-each-one/.

Gursahaney, Suresh. “Next Generation 911 Is the Future for Our Antiquated 911 Infrastructure.” *Micro Automation*. Accessed December 27, 2016. http://www.microautomation.com/new-blog/next-generation-9-1-1-is-the-future-for-our-antiquated-9-1-1-infrastructure.

H., Victor. “Raw (DNG) vs JPEG on a Smartphone: Comparison Images.” phonearena, July 23, 2014. http://www.phonearena.com/news/Raw-DNG-vs-JPEG-on-a-smartphone-comparison-images_id58538.

Harper, Rhonda. “Tactical Dispatch.” Public Safety Communications, July 2015. https://www.apcointl.org/doc/training-certification-1/577-cde-38939-tactical-dispatch/file.html.

Heathfield, Susan M. “Build Support for Effective Change Management.” The Balance. Updated May 28, 2016. https://www.thebalance.com/build-support-for-effective-change-management-1917807.

Huhman, Heather R. “Train to Retain: 7 Tips for Better Employee Training.” Poll Everywhere, March 21, 2016. http://www.polleverywhere.com/blog/train-to-retain-7-tips-for-better-employee-training/.

iCERT. *Overloaded: The Growing Challenge of 9-1-1 Overload and How to Talk about It in Your Community*. Washington, DC: The Industry Council for Emergency Response Technologies, n.d. http://www.theindustrycouncil.org/publications/9-1-1overloadfactsheet.pdf.

Intelligent Transportation Systems. "Next-Generation 9-1-1." Accessed February 12, 2017. http://www.its.dot.gov/research_archives/ng911/.

———. *Next Generation 9-1-1 (NG9-1-1) System Initiative*. Washington, DC: United States Department of Transportation, 2009. http://ntl.bts.gov/lib/35000/35600/35654/NG911_Transition_PlanFinal.pdf.

International City/County Management Association. *Standards, Training, and Certification*. Washington, DC: International City/County Management Association, 2004. https://www.emergencydispatch.org/downloads/IQreport.pdf.

Intrado. *NextGen9-1-1 Insights into Text-to-9-1-1 Implementation*, vol. 2. Omaha, NE: Intrado, 2013. https://www.intrado.com/sites/default/files/documents/NextGen9-1-1_Insights%20Into%20Text-to-9-1-1%20Implementation.pdf.

———. *Next-Generation 9-1-1: The Essential Guide to Getting Started*, vol. 1. Omaha, NE: Intrado, 2013. https://www.intrado.com/sites/default/files/documents/NextGen%209-1-1%20The%20Essential%20Guide%20to%20Getting%20Started.pdf.

Israele, Eleonora. "Get Camera Ready: Live Streaming Is the Future of Social Media." business.com. Last modified February 22, 2017. http://www.business.com/social-media-marketing/why-live-streaming-is-the-future-of-social-media/.

Jonathan Gunderson, Mike Grill, Philip Callahan, and Michael Marks. "Responder Resilience." *JEMS*, March 2014. http://cdpsdocs.state.co.us/safeschools/Resources/First%20Responder%20Resiliency%20Article.pdf.

Kelly, John, and Brendan Keefe. "911's Deadly Flaw: Lack of Location Data." *USA Today*, February 22, 2015. http://www.usatoday.com/story/news/2015/02/22/cellphone-911-lack-location-data/23570499/.

Knezevich, Alison, and Pamela Wood. "How Cellphones Are Changing 9-1-1." *The Baltimore Sun*, February 6, 2016. http://www.baltimoresun.com/news/maryland/crime/bs-md-911-cell-phones-20160206-story.html.

Knight, Rebecca. "Convincing Skeptical Employees to Adopt New Technology." *Harvard Business Review*, March 19, 2015. https://hbr.org/2015/03/convincing-skeptical-employees-to-adopt-new-technology.

Lakeshore Technical College. "Police, Fire & EMS Training." Accessed February 15, 2017. http://gotoltc.edu/business-industry/training-topics/police-fire-ems/index.html.

Lee, Paul, and Duncan Stewart. “Photo Sharing: Trillions and Rising.” *Deloitte*. Accessed January 1, 2017. http://www2.deloitte.com/global/en/pages/technology-media-and-telecommunications/articles/tmt-pred16-telecomm-photo-sharing-trillions-and-rising.html#.

Leese, Steve. “Next Generation 9-1-1 Staffing.” PSC Online, June 13, 2016. http://psc.apcointl.org/2016/06/13/next-generation-9-1-1-staffing/.

———. “The PSAP of Tomorrow.” PSC Online, May 3, 2016. http://psc.apcointl.org/2016/05/03/the-psap-of-tomorrow/.

Logan, Paul. “How Long Should Training Take.” 9-1-1 Magazine. Accessed February 27, 2017. http://www.9-1-1magazine.com/how-long-should-training-take.

Mander, Jason. “Trends 2016: Rise of Live Streaming.” globalwebindex, January 7, 2016. https://www.globalwebindex.net/blog/trends-2016-rise-of-live-streaming.

Mann, Melissa. “Dispatcher Trauma: The Unique Stress of the Job (and How to Overcome It).” *PoliceOne*, April 12, 2016. https://www.policeone.com/health-fitness/articles/171323006-Dispatcher-trauma-The-unique-stress-of-the-job-and-how-to-overcome-it/.

Marshall, Jim. *The EMDR for 911 Campaign, Resource Information to Share with 911 Local Professionals*. Austin, TX: EMDRIA EMDR International, 2011. http://c.ymcdn.com/sites/www.emdria.org/resource/resmgr/imported/EMDR%20n%20The%20First%20Responder_%20Bringing%20hope%20and%20healing%20to%20those%20suffering%20in%20silence%20with%20hidden%20symptoms.pdf.

Mayo Clinic Staff. “Need Stress Relief? Try the 4 A’s.” *Mayo Clinic*, April 28, 2016. http://www.mayoclinic.org/healthy-lifestyle/stress-management/in-depth/stress-relief/art-20044476.

Merritt, Dan. “Hammer Beating: One of the Real Calls, Part of His 911 Training.” Winner Advocate. Accessed February 18, 2017. http://thewinneradvocate.com/hammer-beating-one-of-the-real-calls-part-of-his-911-training/.

Motorola Solutions. “Is Your County Able to Receive Text-to-9-1-1.” Accessed February 25, 2017. https://www.motorolasolutions.com/en_us/products/smart-public-safety-solutions/ng911.html#taboverview.

National Academies Press, The. “The Legal Definitions of First Responder.” Accessed December 27, 2016. https://www.nap.edu/read/22451/chapter/1.

National Center for PTSD. “How Common is PTSD.” United States Department of Veterans Affairs, last updated October 3, 2016. http://www.ptsd.va.gov/public/PTSD-overview/basics/how-common-is-ptsd.asp.

National E9-1-1 Implementation Coordination Office. “A National Plan for Migrating to IP-Enabled 9-1-1 Systems.” Accessed December 27, 2016. http://c.ymcdn.com/sites/www.nena.org/resource/collection/22dbdb9d-fbd7-445e-a760-1c39a222ed34/National_NG911_Migration_Plan.pdf?hhSearchTerms=%22Next+and+Generation+and+9-1-1%22.

———. “9-1-1 Origin & History.” Accessed February 6, 2017. https://www.nena.org/?page=911overviewfacts.

———. “9-1-1 Statistics.” 2014. https://www.nena.org/?page=911Statistics.

———. “Cell Phones and 9-1-1.” 2013–2014. https://www.nena.org/?page=911Cellphones.

———. “Comm Center Staffing Workshop.” Accessed February 6, 2017. http://www.nena.org/?page=CommCenterStaffin.

———. “Future Path Plan—FPP.” Accessed January 1, 2017. https://www.nena.org/?page=FPP.

———. *Minimum Standards for Emergency Telephone Notification Systems*. Arlington, VA: National Emergency Number Association, 2004. https://transition.fcc.gov/pshs/docs-psap/etns060404.pdf.

———. “NENA NG Partner Program.” Accessed January 1, 2017. https://www.nena.org/?page=NGPartnerProgram.

———. *NENA NG9-1-1 Project History*. Alexandria, VA: National Emergency Number Association, n.d. http://c.ymcdn.com/sites/www.nena.org/resource/resmgr/ng9-1-1_project/ng9-1-1_history.pdf.

———. *NENA Recommended Generic Standards for E9-1-1 PSAP Equipment*. Alexandria, VA: National Emergency Number Association, 2000. https://c.ymcdn.com/sites/www.nena.org/resource/collection/6EE32917-37BD-4FA0-838C-026931F702A6/NENA_04-001-v2_E9-1-1_PSAP_Equipment.pdf.

———. *NENA NG9-1-1 Transition Plan Considerations Information Document*. Alexandria, VA: National Emergency Number Association, 2013. http://c.ymcdn.com/sites/www.nena.org/resource/resmgr/Standards/NENA-INF-008.2.1-2013_NG9-1-.pdf.

———. “NENA Standard on 9-1-1 Acute/Traumatic and Chronic Stress Management.” August 5, 2013. https://nebula.wsimg.com/711721acb5a76c6e020996ba09a3dfd4?AccessKeyId=3210927A8AD89F7745AA&disposition=0&alloworigin=1.

———. *NG9-1-1 History*. Alexandria, VA: National Emergency Number Association, n.d. Accessed December 27, 2016. http://c.ymcdn.com/sites/www.nena.org/resource/resmgr/ng9-1-1_project/ng9-1-1_history.pdf.

———. "NG9-1-1 ICE—Industry Collaboration Events." Accessed January 1, 2017. http://www.nena.org/?page=NG911_ICE.

———. "NG9-1-1 Project." Accessed January 1, 2017. http://www.nena.org/?page=NG911_Project&hhSearchTerms=%22NG911.+and+Project%22&#rescol_372926.

———. "NG9-1-1 Transition Planning Committee." Accessed January 1, 2017. https://www.nena.org/?page=NG911_TransPlanning.

———. "PSAP Staffing Guidelines Report." Accessed December 27, 2016. https://www.nena.org/?PSAP_StaffingGuide.

———. *What is NG9-1-1*. Alexandria, VA: National Emergency Number Association, 2008. http://c.ymcdn.com/sites/www.nena.org/resource/resmgr/ng9-1-1_project/whatisng911.pdf.

National Fire Protection Association. "NFPA 1221: Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems." Accessed February 6, 2017. http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards?mode=code&code=1221.

Next Generation 911 Now. *Nation NG9-1-1 Gap Analyses and Next Steps*. Arlington, VA: Next Generation 911 Now, 2016. https://static1.squarespace.com/static/56bb58608a65e27aeda89c9c/t/575eadd4746fb9dbf86f7d76/1465822676753/NG911NOW+National+Gap+Analysis+and+Strategy+Document+Draft+6-13-16+Final%5B1%5D.pdf.

NG911 NOW. "Next Generation 911 NOW." 2016. http://www.ng911now.org/#about.

———. "Voice, Video, Text, and Data by 2020." Accessed January 1, 2017. http://www.ng911now.org/#about.

Norwood, P. J. "Handling the Mayday: The Fire Dispatcher's Crucial Role." *Fire Engineering*, June 1, 2012. http://www.fireengineering.com/articles/print/volume-165/issue-6/departments/real-world-rit/handling-the-mayday-the-fire-dispatchers-crucial-role.html.

O'Grady, Susan. "Post-Traumatic Stress Disorder and Post-Traumatic Stress Injury." *O'Grady Psychology Associates*, March 29, 2014. https://ogradywellbeing.com/post-traumatic-stress-disorder-post-traumatic-stress-injury/.

Perin, Michelle. “Where Did All the Dispatchers Go.” Officer.com, July 4, 2007. http://www.officer.com/article/10249677/where-did-all-the-dispatchers-go.

Perrin, Andrew. “Social Media Usage: 2005–2015.” Pew Research Center, October 8, 2015. http://www.pewinternet.org/2015/10/08/social-networking-usage-2005-2015/.

Pew Research Center. “The Whys and Hows of Generations Research.” September 3, 2015. http://www.people-press.org/2015/09/03/the-whys-and-hows-of-generations-research/.

Pierce, Heather, and Michelle Lilly. “NIU Psychology Study Links 9-1-1 Dispatchers with Post-traumatic Stress Disorder Symptoms.” Northern Illinois University Today, March 29, 2012. http://www.niutoday.info/2012/03/29/niu-psychology-study-links-9-1-1-dispatchers-with-post-traumatic-stress-disorder-symptoms/.

Pivetta, Sue. “9-1-1: An Emerging ‘Hidden’ Career.” 9-1-1 Magazine. Accessed February 27, 2017. http://9-1-1magazine.com/Pivetta-911-Emerging-Hidden-Career.

———. “Where Are The 9-1-1 College Programs.” 9-1-1 Magazine, September 2, 2011. http://www.9-1-1magazine.com/Pivetta-911-College-Programs.

Priority Dispatch. “ProQA Call Taking Software.” 2016. http://www.prioritydispatch.net/proqa/.

Ratcliff, Christopher. “23 Up-to-Date Stats and Facts about Instagram You Need to Know.” Search Engine Watch, April 20, 2016. https://searchenginewatch.com/2016/04/20/23-stats-and-facts-about-instagram/.

Reh, F. John. “Managing Change: Managing People’s Fear.” the balance. Updated October 13, 2016. https://www.thebalance.com/managing-change-managing-people-s-fear-2275302.

Reisman, Judith A. “Picture Poison: Viewing Pornography for a Living Can Be Deadly.” *Scribd*, Autumn 2009. https://www.scribd.com/document/24133366/Judith-A-Reisman-PhD-Picture-Poison.

Ridolphi, Jim. “Call if You Can, Text if You Can’t.” *Richmond Times Dispatch*, 2015. http://www.richmond.com/news/local/hanover/mechanicsville-local/article_024a00a2-9dc3-11e5-98ef-8bef11ed16be.html.

Roettgers, Janko. “Special Report: How We Really Use our Camera Phones.” gigaom, January 23 2015. https://gigaom.com/2015/01/23/personal-photos-videos-user-generated-content-statistics/.

Rossen, Jeff, and Charlie McLravy. “Some 911 Systems Can’t Find You in an Emergency due to Dated Technology.” *TODAY*, 2015. http://www.today.com/news/some-911-systems-cant-find-you-emergency-due-dated-technology-t4756.

Rouse, Margaret. “Internet of Things (IoT).” TechTarget. Accessed January 1, 2017. http://internetofthingsagenda.techtarget.com/definition/Internet-of-Things-IoT.

Santomauro, John R. “Recruitment and Retention Challenges—One Department’s Approach.” CALEA. Accessed February 27, 2017. http://www.calea.org/calea-update-magazine/issue-97/recruitment-and-retention-challenges-one-department-s-approac.

Scoville, Dean. “Police and PTSD.” The Law Enforcement Magazine.” February 22, 2013. http://www.policemag.com/channel/careers-training/articles/2013/02/police-and-ptsd.aspx.

Silver, Roxanne Cohen. “Repeated Exposure to Media Images of Traumatic Events May Be Harmful to Mental and Physical Health.” September 4, 2012, Association for Psychological Science. http://www.psychologicalscience.org/news/releases/repeated-exposure-to-media-images-of-traumatic-events-may-be-harmful-to-mental-and-physical-health.html.

Situational Awareness Matters. “Dispatchers Role in Situational Awareness.” Accessed March 1, 2017. http://www.samatters.com/dispatchers-role-in-situational-awareness/.

Smith, Aaron. “U.S. Smartphone Use in 2015.” Pew Research Center. Accessed January 1, 2017. http://www.pewinternet.org/2015/04/01/us-smartphone-use-in-2015/.

Statista. “Number of Smartphones Sold to End Users Worldwide from 2007 to 2016 (in Million Units).” Accessed March 1, 2017. https://www.statista.com/statistics/263437/global-smartphone-sales-to-end-users-since-2007/.

———. “Statistics and Facts about Mobile App Usage.” Accessed January 7, 2017. https://www.statista.com/topics/1002/mobile-app-usage/.

Stearns, Ann Kaiser. *Resilience in the Aftermath of Adverse or Traumatic Events*. Washington, DC: American Psychological Association, 2004. http://www.apadivisions.org/division-31/publications/articles/maryland/stearns-resilience.pdf.

Stone, Adam. “Beyond Debriefing: How to Address Responders’ Emotional Health.” Emergency Management Magazine, September 30, 2013. http://www.govtech.com/em/training/Beyond-Debriefing-Responders-Emotional-Health.html.

Study.com. “Become a 911 Dispatcher: Education Requirements and Salary Info.” Accessed February 15, 2017. http://study.com/articles/Become_a_911_Dispatcher_Education_Requirements_and_Salary_Info.html.

Technology Coalition, The. *Employee Resilience Guidebook for Handling Child Sexual Abuse Images*. The Technology Coalition, 2015. http://www.technologycoalition.org/wp-content/uploads/2015/01/TechnologyCoalitionEmployeeResilienceGuidebookV2January2015.pdf.

Tolbize, Anick. *Generational Differences in the Workplace*. Minneapolis, MN: University of Minnesota, 2008. http://rtc.umn.edu/docs/2_18_Gen_diff_workplace.pdf.

Turner, Kimberly D. "Effects of Stress on 9-1-1 Call-Takers and Police Dispatchers: A Study at the San Jose Police Department." Master's thesis, San Jose State University, 2015. http://scholarworks.sjsu.edu/cgi/viewcontent.cgi?article=8109&context=etd_theses.

U.S. Department of Veterans Affairs. "Treatment of PTSD." Accessed February 3, 2017. http://www.ptsd.va.gov/public/treatment/therapy-med/treatment-ptsd.asp.

Versadial. "Court Admissibility of 911 Calls and its Importance to Your PSAP." Accessed March 1, 2017. https://www.versadial.com/court-admissibility-of-911-calls-and-its-importance-to-your-psap/.

Walter, Laura. "First Responders and Emotional Distress." *EHS Today*. Accessed December 27, 2016. http://ehstoday.com/fire_emergencyresponse/news/first-responders-emotional-distress-5444.

Weisbaum, Herb. "Dispatch Centers Slow to Adopt 'Lifesaving' Text to 911 Technology." *NBCNEWS*, June 10, 2015. http://www.nbcnews.com/business/consumer/dispatch-centers-slow-adopt-lifesaving-text-911-technology-n372321.

Wheeler, Tom. "The 911 System Isn't Ready for the iPhone Era." *The New York Times*, November 23, 2015. https://www.nytimes.com/2015/11/23/opinion/the-911-system-isnt-ready-for-the-iphone-era.html?_r=0.

White, Donna M. "Understanding & Recognizing Stress." PsychCentral. Accessed January 21, 2017. http://psychcentral.com/lib/understanding-recognizing-stress/.

Williams, Geoff. "Is It Finally Time to Get Rid of your Landline?" *USNews*, 2015. http://money.usnews.com/money/personal-finance/articles/2015/10/08/is-it-finally-time-to-get-rid-of-your-landline.

Willis, Dan. *Bulletproof Spirit—The First Responder's Essential Resource for Protecting and Healing Mind and Heart*. Novato, CA: New World Library, 2014.

World Health Organization. "Stress at the Workplace." Accessed January 19, 2017. http://www.who.int/occupational_health/topics/stressatwp/en/.

THIS PAGE INTENTIONALLY LEFT BLANK

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center
   Ft. Belvoir, Virginia

2. Dudley Knox Library
   Naval Postgraduate School
   Monterey, California