STRUCTURE FIRE RESPONSE UNDER ACTIVE THREAT: A CRITICAL ANALYSIS OF URBAN FIRE SERVICE STRATEGIES IN SOUTH TEXAS

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Abstract: Structure fire response involving an active threat creates a unique hazard for first responders, and the challenge is manifested in the varying missions and authorities of responding agencies. Specifically, when fire is combined with an active threat, the lines between law enforcement and the fire service become blurred. Moreover, history has demonstrated that structure fires involving active threats are deadly. However, fire service strategies for these events are not well understood. Still, the potential for events involving fire and active attackers continues to exist. Therefore, this study aims to develop a theoretical analysis of structure fire response under active threat conditions to inform policy and practice.

This study employs the constructivist form of grounded theory to investigate the research question, *"What strategies are needed by Incident Commanders to support safe and effective structure fire response while under active threat?"* To answer the question, study participants were selected from the fire service and emergency management disciplines. Specifically, data was collected from a large urban-based all-hazards fire department in South Texas with a history of high-threat response, and regional support. Also, supporting data was collected from local and regional All-Hazards Incident Management Teams (AHIMT) and emergency management coordinators in South Texas.

This study focuses on the perceptions of Incident Commanders and includes 31 semi-structured interviews and three focus groups. The combination of semi-structured interviews and focus group participants totals a sample size of 47. The data revealed five themes, supported by 15 categories and 103 concepts. The themes constructed from the data are Interoperability Needs, Incident Command System Components, Risk-based Strategies, Resource Management, and Support Functions. Finally, recommendations are provided based on the findings. The recommendations are intended to improve fire service strategies for structure fire under active threat response.

Key words: fire service response, high-threat response, hostile response, integrated response, fire as a weapon, pyro-terrorism, active threat, active shooter, civil unrest, incident command system, unified command, interoperability, firefighter risk, firefighter safety, all-hazards incident management teams, emergency management, constructivist grounded theory

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CHAPTER I

INTRODUCTION

In the United States, the fire service is considered an all-hazards profession (Weeks, 2007; DHS, 2008; USFA, 2018). The all-hazards approach is applied through the four phases of emergency management: preparedness, response, recovery, and mitigation (Neal, 1997; USFA, 2018). Similarly, the all-hazards paradigm is supported in the five missions of the National Preparedness Goal: prevention, protection, mitigation, response, and recovery (DHS, 2015).

Moreover, all-hazards are typically encompassed in two broad categories: natural and human-made (McEntire, 2014). Natural hazards include earthquakes, tsunamis, hurricanes, tornadoes, and the like (McEntire, 2014). Examples of human-made hazards are industrial, technological, war, terrorism, and similar events (McEntire, 2014). Therefore, the overarching strategic approach of the fire service is to address natural and human-made hazards (Weeks, 2007; McEntire, 2014; USFA, 2018). As a result, diverse response capabilities and strategies are essential for effective service (Weeks, 2007; USFA, 2018).

According to the United States Fire Administration (2013), fire service response incorporates three distinct hazard zones: hot, warm, and cold. The hot zone is the area where an active hazard or threat is present (Atwater, 2012; USFA, 2013; Pennardt & Schwartz, 2022). Only response personnel equipped and trained for the hazard involved operate in the hot zone (USFA, 2013; Goldstein et al., 2022). The warm zone is just outside the hot zone and is primarily safe from the hazard (Atwater, 2012; USFA, 2013; IAFC, 2018). For the most part, individuals in the warm zone act in support of those in the hot zone (Atwater, 2012; USFA, 2013). Finally, the cold zone is outside the warm zone and is designated as safe (IAFC, 2018; Pennardt & Schwartz, 2022).

An active threat event occurs when one or more persons attempt to harm or kill people in a populated area (DOE, 2016; NCBRT, 2022; UPenn, 2022). As a result, fire service response during active threat incidents focuses on patient care and fire suppression in relatively safe areas, the warm and cold zones (Johnson, 2014; FEMA, 2016). However, safe zone operations are atypical for fire service responders, as the fire service operates within the hazard zone and as the lead agency during most other response types (Buck et al., 2006). For example, firefighters enter the hot zone during most structure fires to rescue people and save property (USFA, 2013). Similarly, firefighters will operate in the hazard zone for events that include wildland and aircraft fires, vehicle extrications, hazardous materials, and trench, high-angle, swift-water, and confined space rescues; thus, the all-hazards label. Consequently, Johnson (2014) posits that when fire is combined with an active threat and rescues are possible, the fire service may need to enter the hot zone to save lives.

Structure fire response involving an active threat creates a unique hazard for first responders, and the challenge is manifested in the varying missions and authorities of responding agencies (DHS, 2012; Pfeifer, 2013; McAleavy, 2021). For example, during a terrorist attack in the United States, the lead agency is the Federal Bureau of Investigation (FBI), with supporting law enforcement (McEntire, 2014; FBI, 2022). Law enforcement's mission is to control human-induced threats (McEntire, 2014). However, tasking becomes complicated in the case of fire, as the hazard of fire is not well navigated

by law enforcement (Pfeifer, 2013; Sheppard, 2017). In general, fire is not a hazard for which law enforcement is trained or equipped.

The fire service is the government agency best equipped to navigate the hazard of fire. Therefore, during an active threat event involving fire, fire suppression and rescue activities require personnel to enter hostile environments for which they are not equipped (Newman, 2011; Atwater, 2012; Pfeifer, 2013; Sheppard, 2017). Thus, the dilemma; when fire is combined with an active threat, the lines between law enforcement and the fire service become blurred (Newman, 2011; Atwater, 2012; Sheppard, 2017).

History has demonstrated that structure fires involving active threats are deadly (Rabasa, 2009; DHS, 2012; Pfeifer, 2013; FEMA, 2016; CISA, 2021; CPNI, 2022). Moreover, fire service strategies for these events are not well understood (Deshpande, 2008; Sheppard, 2017; Miletta, 2021; Marino, 2022). Still, the potential for events involving fire and active attackers continues to exist (DHS, 2012; Pfeifer, 2013; Nesser, 2014; UFF, 2014; DHS, 2018; CISA, 2021; CPNI, 2022; NCTC, 2022; Marino, 2022). As a result, multiple government and fire service organizations warn that the fire service in the United States must prepare for fires involving active threats (DHS, 2012; Pfeifer, 2013; Nesser, 2014; UFF, 2014; NCTC, 2022; Marino, 2022). However, research on fire service response to structure fires combined with an active threat is limited (Deshpande, 2008; Sheppard, 2017; Miletta, 2021).

This study aims to:

"Develop a theoretical analysis of structure fire response under active threat conditions to inform policy and practice."

The aim is supported by three objectives:

1. Assemble a comprehensive review of structure fire response under active threat relevant literature.

2. Identify subject matter experts engaged in structure fire response involving active threats and collect data through semi-structured interviews and focus groups.

3. Analyze the data to inform policy and practice for structure fire response under active threat conditions.

CHAPTER II

LITERATURE REVIEW

Structure fire response under an active threat is best viewed as a concept that includes a family of events that combine aspects of harm with the use of fire (DHS, 2012, Pfeifer, 2013; Sheppard, 2017; CPNI, 2022). An active threat event occurs when one or more persons attempt to kill or harm people in a populated area (DOE, 2016; NCBRT, 2022; UPenn, 2022). In addition, an active threat can incorporate several weapon types, such as firearms, knives, or explosives (DOE, 2016; NCBRT, 2022; UPenn, 2022).

The literature identifies event types that will likely require fire service personnel to operate under active threat conditions (Deshpande, 2008; Newman, 2011; Atwater, 2012; Pfeifer, 2013; Shepard, 2017; Miletta, 2021; Marino, 2022). Conceptually, these events can occur in many forms. However, based on previous events and current threats, barricaded individuals, ambush, terrorism, and civil unrest are the most commonly discussed (Baird, 2005; Deshpande, 2008; DHS, 2012; Pfeifer, 2013; FEMA, 2016; Miletta, 2021). Therefore, these event types are described herein.

Barricaded Individuals

A barricaded individual is a person who takes a covered or confined position in a structure to resist capture from law enforcement (IACP, 2020). Barricaded individuals are often suspected of a crime (IACP, 202). However, not all barricaded subject incidents involve weapons, although the threat of a weapon is apparent (IACP, 2020). In some instances, barricaded individuals can take hostages (IACP, 2020). Most importantly, barricaded individuals have the potential to set fire to the structure out of a desire to end the conflict or cause harm to hostages (IACP, 2020). As a result, the fire service may need to rescue occupants or hostages while there is an active threat.

Ambush

An ambush involving fire occurs when a hostile actor sets a fire to draw firefighters and other responders to the scene (NCTC, 2020). Once on-scene responders are attacked by the hostile actor (NCTC, 2020). Typically, the ambush involves using an automatic weapon on unsuspecting responders (NCTC, 2020). For example, on Christmas Eve in 2012, in Webster, New York, a disgruntled citizen set his house on fire and hid behind a berm across the street (Goldman, 2012). When emergency crews arrived, the assailant shot four firefighters, killing two (Goldman, 2012). In addition to the Webster attack, ambushes involving fire have occurred on numerous occasions, including in Houston, Texas (2022), Long Beach, California (2018), LeRoy, New York (2015), and Tallahassee, Florida (2014).

Terrorism

Terrorism is a critical human-made hazard involving illegal violence or the threat thereof and is designed to intimidate or coerce a population (LaFree and Dugan, 2007; Nemeth, 2010; FBI, 2022). In addition, terrorism often incorporates religious, social, economic, and political goals (LaFree and Dugan, 2007; Nemeth, 2010; FBI, 2022). Also, terrorism can take many forms and integrate multiple weapon types (Jackson & Frelinger, 2008; Martin, 2017, 2020). Furthermore,

the conditions of attack and types of weapons are only limited by the imagination of the terrorist (Jackson & Frelinger, 2008). Consequently, terrorism can range from a lone attacker using one weapon to multiple coordinated attackers using several weapon types (Jackson & Frelinger, 2008; FEMA, 2016; GTD, 2022).

A fundamental goal of terrorism is to garner attention for a cause (Duyvesteyn, 2004). According to Conner (1987), to gain attention for their cause, a common strategy of terrorists is to induce fear among the targeted population. The anxiety that results from terrorism may disrupt the normal functions of societies and fundamental human rights (Galea et al., 2002, 2003; Gearty, 2007; U.N., 2008). Therefore, the effects of terrorism move beyond the initial attack and result in long-lasting psychological and sociological consequences (Galea et al., 2002, 2003)

Providing a standard definition of terrorism is challenging, as views vary based on those who seek to label the phenomenon (Duyvesteyn, 2004; Nemeth, 2010; Martin, 2017, 2020). Therefore, terrorism is a concept that has many definitions (Nemeth, 2010; Stohl, 2007; Duyvesteyn, 2004; Stohl, 2007; Nemeth, 2010; Martin, 2017, 2020). For example, Stohl (2007) says there are over 200 definitions of terrorism. However, according to Schmid (1988), most terrorism definitions include aspects of violence, political means, and fear or terror.

The Federal Bureau of Investigation (FBI) is the lead agency for terrorism response in the United States and, therefore, provides an influential definition of terrorism (Hoffman, 1988; Nemeth, 2010; McEntire, 2014, FBI, 2022). Nemeth (2010) says that the FBI's definition of terrorism is broad and designed to justify their involvement in a greater range of events. For example, according to the FBI (2022), domestic terrorism is *"violent, criminal acts committed by individuals and/or groups to further ideological goals stemming from domestic influences, such as those of a political, religious, social, racial, or environmental nature."* Whereas international

terrorism is *"violent, criminal acts committed by individuals and/or groups who are inspired by, or associated with, designated foreign terrorist organizations or nations (state-sponsored)."*

Fire as a Weapon

The federal government has cautioned emergency responders in the United States concerning the threat of terrorists, both domestic and foreign, using fire as a weapon (DHS, 2012; UFF, 2014; FEMA, 2016; DHS, 2018; CISA, 2021; NCTC, 2022). The United States Department of Homeland Security (2012, 2018) and the National Counterterrorism Center (2022) have warned that fire is a convenient weapon for terrorists. As opposed to other forms of terrorism, the ingredients for fire are readily assessable, cheap, low risk, and easy to conceal (DHS, 2012; Pfeifer, 2013; Repousis, 2018). For example, purchasing an automatic weapon requires background checks and the need to showcase identification (Pfeifer, 2013; FEMA, 2016). Similarly, buying common ingredients for making bombs will likely raise red flags (DHS, 2012; FEMA, 2016; DHS, 2018). However, purchasing gasoline at a conventional gas station to weaponize for an attack is unlikely to generate concern (Pfeifer, 2013; Marino et al., 2015).

In addition to the ease of creating destruction, fire also provides the dramatic visual effect terrorists seek (Marino et al., 2015; Pfeifer, 2013). Moreover, fire is deadly, especially in population-dense urban environments (DHS, 2012; Pfeifer, 2013; DHS, 2018). For these reasons, terrorist leaders continue to encourage the use of fire in terrorist attacks (DHS, 2012; UFF, 2014; CISA, 2021; CPNI, 2022; NCTC, 2022; Marino, 2022). According to Jackson and Frelinger (2008), from 1980 to 2005, fire or firebombs were used as a terroristic weapon on 133 different occasions. Moreover, according to the Global Terrorism Database (GTD), incendiary attacks from 2000 to 2020 totaled 832, indicating an increase in the use of fire as a weapon globally (GTD, 2023).

According to fire service response literature, terrorism involving fire frequently merges with other weapon types. These events are known as multi-modal and complex coordinated attacks (Deshpande, 2008; Rabasa, 2009; DHS, 2012; Pfeifer, 2013; FEMA, 2016). Multi-modal attacks occur when fire is combined with other attack methods (Rabasa, 2009; FDNY, 2012; Pfeifer, 2013; Marino et al., 2015; FEMA, 2016). The methods often include weapons such as firearms and bombs (Pfeifer, 2013; FEMA, 2016; CPNI, 2022). Historically, multi-modal attacks are closely associated with complex coordinated attacks (FEMA, 2016; CPNI, 2022).

Complex Coordinated Attacks (CCAs), also known as Mumbai-style attacks, are coordinated attacks utilizing various weapons, including fire, and spanning a large area (Rabasa et al., 2009, FDNY, 2012; Pfeifer, 2013; FEMA, 2016). CCAs overwhelm first responders and their resources while producing maximum causalities and destruction (Rabasa et al., 2009; FDNY, 2012). Typically, CCAs target various sites within one jurisdiction (Rabasa et al., 2009; Pfeifer, 2013). However, according to FEMA (2016), though CCAs tend to target a single jurisdiction, the demand for resources will likely require a multi-jurisdictional response. As a result, CCAs are a significant challenge for emergency responders (FDNY, 2012; Pfeifer, 2013; FEMA, 2016).

In 2008, the Lashkar-e-Taiba militant group directed a complex coordinated attack on the city of Mumbai (Rabasa et al., 2009; Pfeifer, 2013; DHS, 2016; Martin, 2017). The attackers used multiple weapons, including guns, bombs, and fire, maintaining the siege for three days and overwhelming local first responders (Pfeifer, 2013; FEMA, 2016; Martin, 2017).

During the attack, the Taj, an upscale, highly occupied hotel, was captured (Rabasa et al., 2009; Pfeifer, 2013; FEMA, 2016; Martin, 2017). Inside the Taj hotel were multiple hostages, some captured, others hiding on the upper floors (Rabasa et al., 2009; Pfeifer, 2013; FEMA, 2016; Martin, 2017). During the siege, the terrorists ignited several fires in the hotel, with the hostages trapped inside (Rabasa et al., 2009; Pfeifer, 2013; FEMA, 2016, Martin, 2017). Most of the

Mumbai fire service and law enforcement were unprepared to respond to the attack and remained outside with minimal engagement (Pfeifer, 2013; FEMA, 2016). Ultimately, the attacks resulted in 172 casualties and served as a warning to the rest of the world (FEMA, 2016).

In 2015, the terrorist organization, the Islamic State (IS), executed a CCA in Paris, France. As with the Mumbai CCA, the attack in Paris was directed by a prominent terrorist organization (FEMA, 2016; Lesaffre et al., 2017; Martin, 2017). The attack involved the coordination of attackers with bombs and automatic weapons in several heavily populated locations (Lesaffre et al., 2017; Martin, 2017). As a result, the Paris CCA ended with 130 deaths and marked the deadliest incident in France since World War II (FEMA, 2016; Lesaffre et al., 2017). Consequently, terrorist organizations are likely to view the CCAs in Mumbai and Paris as the method of attack that creates the desired result (FEMA, 2016).

During a terrorist event, first responders must be aware of the potential of a secondary attack (DHS, 2012). Secondary attacks are often designed to target first responders after arrival (DHS, 2012; FEMA, 2016). For example, during the terrorist attack in San Bernardino (2015), a secondary explosive device designed to target first responders was discovered (Straub et al., 2017). Though secondary attacks have been a part of the terrorist playbook throughout history, there is a growing concern about an increased focus on targeting first responders (UFF, 2014; Lesaffre et al., 2017). In addition, the Department of Homeland Security (2012) warns first responders to be alert for booby traps and multiple devices. Therefore, upon recognizing a terrorist event, emergency responders must be cognizant of the potential for secondary attacks (DHS, 2012; UFF, 2014).

Notable Events

Significant real-world incidents involving structure fires with active threats have occurred in contemporary history. Examples of prominent events associated with fire combined with active

threats include the incidents at Waco, Texas (1993), Columbine, Colorado (1999), the September 11th attacks (2001), Beslan, Russia (2004), Mumbai, India (2008) and Benghazi, Libya (2012). These events are described herein.

In Waco, Texas (1993), the Branch Davidians, a religious sect, endured a 51-day stand-off with United States law enforcement (Pearson & Efrron, 2018). The group barricaded themselves in their compound with armed resistance (Pearson & Efrron, 2018). Ultimately, the stand-off ended when a fire ignited inside the structure (Pearson & Effron, 2018; Pendrotti, 2017). Once the fire started, no attempts at extinguishment or rescue were made (Pendrotti, 2017). As a result, the fire killed 76 people (Pendrotti, 2017).

In Columbine, Colorado (1999), two students attacked Columbine High School with automatic weapons, incendiary devices, and small explosives (Marino et al., 2015). The attack resulted in 15 deaths. According to Marino et al. (2015), the Columbine shooters planned to detonate propane bombs to create fire and then shoot fleeing students and teachers. Fortunately, the attackers were unsuccessful in creating fire (Marino et al., 2015). However, if successful, the resulting fire would have added a dimension the fire service was unprepared to handle (USFA, 2018; Marino et al., 2015). As a result, the United States Fire Administration (USFA) says the Columbine attack highlights the need for an integrated response by law enforcement and the fire service (Mario et al., 2015). In addition, Marino et al. (2015) say the Columbine attack is an example of the length hostile actors will go to maim and kill.

The events of 9/11 were a defining moment for the fire service in the United States (Buck et al., 2006; Weeks, 2007). The attack's results generated significant changes in how the fire service responds to acts of terrorism (Buck et al., 2006; Weeks, 2007). While many remember 9/11 for the planes flying into buildings and the World Trade Center's collapse, the fires significantly contributed to the disaster (Sheppard, 2017). Sheppard (2017) argues that the fire caused the

most destruction, resulting in trapped occupants and the ultimate collapse of the World Trade Centers.

The World Trade Center fires are an example of the extreme nature in which terrorism can be manifested (Sheppard, 2017). The conditions caused by the fires forced firefighters to endure extraordinary circumstances to save those trapped above (Sheppard, 2017). Moreover, firefighters attempted rescues while under threat of subsequent attack. Ultimately, the fire was a significant cause of the collapse of both buildings resulting in the death of 2,763 people, including 343 firefighters and 71 law enforcement officers (FEMA, 2016).

Similar to the World Trade Center fires were the fires caused by the plane crash at the Pentagon (Buck et al., 2006). While less televised than the World Trade Center fires, the firefighters responding to the Pentagon were met with significant challenges, including the potential for subsequent attack. Historically, most terrorist attacks involving fire have overwhelmed the local fire service (Pfeifer, 2013; FEMA, 2016). However, Buck et al. (2006) say the response to the Pentagon is an exception and is widely considered successful. As a result, the Pentagon response has been the subject of many response-based studies and has informed ICS use for significant incidents (Buck et al., 2006).

In Beslan, Russia (2004), 32 members of the Chechen terrorist group Riyad-us Saliheen took control of a school, holding the children hostage inside (McDaniel & Ellis, 2009). The group was armed with automatic weapons and suicide bombs and had booby-trapped the school with explosives. On day three of the event, a fire ignited on the roof of the school gym, where many of the students were being held; the fire killed 186 children (McDaniel & Ellis, 2009). According to McDaniel and Ellis (2009), the local fire service did not respond to the event until two hours after the fire had started. Ultimately, 333 people died (McDaniel & Ellis, 2009).

As previously described, in Mumbai, India (2008), the Lashkar-e-Taiba militant group conducted a complex coordinated attack (CCA) on the city of Mumbai (Rabasa, 2009; Pfeifer, 2013; FEMA, 2016; Martin, 2017). The attackers used multiple weapons, including guns, bombs, and fire (FEMA, 2016). Moreover, the siege lasted three days, creating extended emergency operations and overwhelming local first responders (Rabasa, 2009; Pfeifer, 2013; FEMA, 2016). As a result, emergency responders from neighboring jurisdictions were called to help; however, delays in response were significant (Rabasa, 2009; Pfeifer, 2013; FEMA, 2016).

During the attack, the heavily occupied Taj hotel was taken by the terrorists (Rabasa, 2009; Pfeifer, 2013; FEMA, 2016; Martin, 2017). Also, numerous hostages were captured (Rabasa, 2009; Pfeifer, 2013; FEMA, 2016). With victims trapped inside, the terrorists set several fires to the structure (Rabasa, 2009; Pfeifer, 2013; FEMA, 2016). However, the Mumbai fire service and law enforcement were unprepared to respond to the combination of automatic weapons and fire and remained outside with little engagement (Pfeifer, 2013; FEMA, 2016).

According to the literature, the fire at the Taj hotel had two presumed goals. First, the fires were intended to force hiding hostages to escape, allowing terrorists the opportunity to shoot fleeing victims (Rabasa, 2009; Pfeifer, 2013; FEMA, 2016). Second, the fires were used to increase media attention and help draw awareness to the terrorist's cause (Rabasa, 2009; Pfeifer, 2013; FEMA, 2016). Ultimately, the attacks resulted in 172 casualties and served as a warning to emergency responders worldwide (Rabasa, 2009; Pfeifer, 2013; FEMA, 2016).

Notably, for the fire service, the attack on Mumbai signified a watershed event (Pfeifer, 2013; FEMA, 2016). The hazards faced during the Taj hotel fire created a new paradigm not typically encountered by fire service personnel (Pfeifer, 2013; FEMA, 2016). As a result of the attack on Mumbai, fire service organizations in the United States began to recognize the potential for fire as a terroristic weapon (DHS, 2012; FDNY, 2012; FEMA, 2016).

In Benghazi, Libya (2012), the United States Embassy was attacked by members of Ansar al-Sharia, an Islamic militant group (Pfeifer, 2013; U.S. Senate, 2014; Martin, 2017). An array of weapons were used, including grenades, assault rifles, and various forms of artillery (Pfeifer, 2013; U.S. Senate, 2014). Also, during the incident, fires were set in the building housing the American Ambassador to Libya, Christopher Stevens, and staff members (Pfeifer, 2013; U.S. Senate, 2014; Martin, 2017). The smoke from the fire killed Ambassador Stevens and three staff members (U.S. Senate, 2014).

Threat Assessment

Notable terrorism expert, Brian Jenkins (1974), famously said, *"Terrorism is theater."* In other words, for terrorists to create the impact they seek, they must ensure that the world watches (Jenkins, 1974; Ahern et al., 2002). Fire and its visual effects ultimately make for the theater terrorist desire (Pfeifer, 2013; FEMA, 2016). Roman (2014) says the terrorist attack in Mumbai was a prime example of terrorist theater. Though the attackers created mass destruction, deploying an array of weapons in multiple locations, the fire at the Taj hotel garnered most of the media attention (Pfeifer, 2013; Roman, 2014; FEMA, 2016).

In 2020, the Islamic State of Iraq and Syria (ISIS) released propaganda online whereby the narrator urged the use of fire as a means of attack, "*consider that which you can use easily and without drawing attention to yourself and making the result be death, destruction and heavy losses to the enemies… people have used it since ancient times to harm their enemies — yes, it is fire."* (Johnson, 2020).

According to Nesser (2014), fire has been promoted as a form of attack by several online terrorist platforms. Multiple jihadist websites, including the jihadist magazines, Inspire and Rumiyah, have encouraged terrorists in the United States to set fire in urban and wildland areas (DHS, 2012, NCTC, 2022). Also, Baird (2005) and Pfeifer (2013) warn that Al Qaeda leaders have

intended to use improvised incendiary devices in United States cities. Therefore, the United States government should prepare for fire-based terrorist incidents (DHS, 2012; Pfeifer, 2013; Deshpande, 2008; FEMA, 2016; NCTC, 2022).

In the United States, government organizations such as the Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA), United States Fire Administration (USFA), and The National Counterterrorism Center (NCTC) have acknowledged the threat of fire as a terroristic weapon. Also, supporting agencies such as the International Association of Fire Chiefs (IAFC) and the International Association of Firefighters (IAFF) have expressed concern over the fire as a weapon threat.

Consequently, practitioner-based educational programs such as Louisiana State Universities counter-terrorism division (NCBRT), the Texas A&M Engineering Extension Service (TEEX), and Texas State Universities Advanced Law Enforcement Rapid Response Training program (ALERRT) have provided guidance to address the potential challenges of fire as a weapon events (FEMA, 2016; ALERRT, 2022). Moreover, these agencies have started operating outreach programs to train practitioners on integrated responses to terrorism, active threat, and high-consequence events (FEMA, 2016).

The threat of terrorists using fire as a weapon can further be assessed through the rational choice theory. The rational choice perspective posits that humans are rational and form decisions based on logical criteria (Nalbandov, 2013; Browning et al., 2000). As such, the perspective aims to predict human behavior based on rationality (Levin & Milgrom, 2004). Therefore, the rational choice model applies to terrorist behavior predictions (Nalbandov, 2013; Nemeth, 2010; Findley, 2008; Goodwin, 2006; Bloom, 2005; Browning et al., 2000; Ross, 1993; Sandler et al., 1983)

The rational choice theory says that people form criteria based on an internal cost-benefit analysis when making decisions (Browning et al., 2000; Nemeth, 2010, 2017). As a result, the prediction

of future choices can be determined by understanding the internal cost-benefit analysis of the individual (Levin & Milgrom, 2004; Nemeth, 2010, 2017). Ultimately, as a general theory on individual and group behavior, the rational choice theory provides a framework that helps assess the factors that influence acts of terrorism (Levin & Milgrom, 2004; Abrahms, 2008; Nemeth, 2010, 2017).

There may be several logical reasons for terrorists to choose fire as a weapon of attack (DHS, 2012). First, governments have become efficient at monitoring the purchase of firearms and bomb-making materials, thus causing terrorists to risk discovery before executing their plans (FEMA, 2016). However, the elements needed to produce fire are not typically scrutinized (DHS, 2012; FEMA, 2016). For example, driving to the local gas station and purchasing gasoline is not considered risky. However, that same gas can initiate a fire-based terrorist attack, causing death and destruction. For a terrorist, using fire as a weapon is a low-risk, high-success venture; thus, it may be viewed as a rational choice (Baird, 2005; Deshpande, 2008; DHS, 2012; Pfeifer, 2013; FEMA, 2016; NCTC, 2022).

The literature identifies an emerging threat of terrorist attacks with fire in urban locations (Baird, 2005; DHS, 2012; Pfeifer, 2013; UFF, 2014; Sheppard, 2017; NCTC, 2022; Marino, 2022). According to Jackson and Frelinger (2008), fire attacks are likely to occur against structures and vehicles. In addition, recent terrorist propaganda calls for using incendiary devices near buildings to create mass casualties (DHS, 2012). Pfeifer (2013) says fire-based terrorism in urban environments creates unique challenges for the fire service. The challenge resides in the dense populations and confined locations, making for evacuation difficulties and preventing fire spread (Pfeifer, 2013).

Furthermore, according to the Department of Homeland Security (2012), terrorist organizations are increasingly targeting highly populated areas and desire to use fire as a weapon in locations

affecting infrastructure. Several significant terrorist plots to use fire in densely populated urban environments in the United States and the United Kingdom have been thwarted (Pfeifer, 2013). Specifically, schemes designed to disable fire protection systems in buildings in London, New York City, and Washington D.C. were discovered and stopped (Pfeifer, 2013).

Civil Unrest

According to the National Fire Protection Agency (NFPA), civil unrest events and the use of fire are well established. Part of the goal of civil unrest is to create attention for the cause (NFPA, 2015). As a result, fires are frequently set during periods of turmoil to create the visual appeal that attracts media coverage (Deshpande, 2008; NFPA, 2015; Donohue, 2019). Therefore, the fire service should be prepared to respond to fires during civil unrest (Donohue, 2019; NFPA, 2015).

Recent Events

According to Repousis (2018), fire has been used to protest against those in power for centuries. Thus, fire has a long history of use during riots and civil unrest (NFPA, 2015; Donohue, 2019). Although examples of civil unrest involving fire are numerous, a few recent examples include the protests in Baltimore, Maryland (2015), Hong Kong (2019), the United States (2020), and Sri Lanka (2022). These events are briefly described herein.

In Baltimore, Maryland (2015), significant riots and civil unrest occurred over perceived police brutality and social inequities (Fenton, 2015). The unrest included the mass burning of property (Fenton, 2015). During the protests, fires were set to over 60 structures and several vehicles (Fenton, 2015). According to Terhune (2015), the massive number of fires proved overwhelming for the local fire service, and much of the city burned out of control. As a result, local residences and businesses sustained significant financial losses (Fenton, 2015).

In Hong Kong (2019) there was a series of riots and civil unrest due to political disagreements (NPR, 2020). Most initial protestors were peaceful; however extremist groups were also involved (NPR, 2020). The extremist groups used more aggressive tactics and set significant fires that strained the Hong Kong fire service and caused large amounts of damage (NPR, 2020).

In the United States (2020), several major cities experienced civil unrest. The unrest was underpinned by a call for political and social change (IAFF, 2020). Though, for the most part, meant to be peaceful, extremist groups infiltrated the demonstrations (IAFF, 2020). As a result, fires were set to vehicles and structures throughout many cities in the United States (IAFF, 2020). Consequently, many high-profile buildings were burned during the protests, including historic buildings in Washington, D.C., and police stations in large cities. During the demonstrations, many local fire departments maintained a modified response, in most cases only responding to fires they could safely extinguish (IAFF, 2020). As a result, buildings in hostile locations were often left to burn (IAFF, 2020).

In Sri Lanka (2022), protest and civil unrest occurred due to economic and political turmoil. The protests included the burning of military vehicles and other government property (Aljazeera, 2022). More notably, the protestors targeted and set fire to the homes of political figures. Specifically, fires were set to the home of the Prime Minister, a local mayor, three ministers, and three member of parliament (Aljazeera, 2022). Also, a hotel associated with a local political figure was set on-fire (Aljazeera, 2022). Though no causalities emerged from the fires, the event demonstrates the potential for death caused by fire during civil unrest.

Applicable Response Elements

Structure fire response during an active threat will require pre-planning, training, and interagency coordination (UFF, 2014). Retired FDNY Assistant Chief of Counterterrorism and Emergency Preparedness, Joseph Pfeifer (2013) believes that a complete understanding of these events will

require new policies and partnerships essential to homeland security. Baird (2005) says there are two main strategic goals during pyro-terrorist event responses. The first is early recognition, and the second is to protect firefighters during operations (Baird, 2005). Also, a vital component of an effective response is the ability to remain fluid while maintaining a clear strategic vision (Lesaffre et al., 2017).

Fire service and emergency management literature identifies several common elements of emergency and disaster response that are likely applicable to structure fire under active threat events. The most commonly described element of response is the Incident Command System (ICS) (Bigley & Roberts, 2001; Brunacini, 2002; Buck et al., 2006; Coleman, 2008; O'Neill, 2008; Moynihan, 2009; McAleavy, 2016, 2020). Other response elements frequently described in the literature are interoperability, operational risk, and resource management (Newman, 2011; FDNY, 2012; Pfeifer, 2013; FEMA, 2016). These standard strategies are discussed herein.

Incident Command System

The Incident Command System (ICS) is a modular framework designed to enable hierarchical command and control to enhance coordination during emergency and disaster response (Bigley & Roberts, 2001; Buck et al., 2006; O'Neill, 2008; Moynihan, 2009; McAleavy, 2016, 2020). In the United States, Homeland Security Presidential Directive Five (HSPD-5) mandates that the ICS will be utilized to organize the emergency response to all-hazards, including any act of terrorism. Therefore, ICS will likely be the framework for structure fire response under an active threat. As such, it is critical to understand the ICS's history, structure, and functions to understand its strengths and weaknesses fully.

The roots of ICS connect with classic management and organizational theory (Buck et al., 2006; Moynihan, 2009; McAleavy, 2016). The industrial revolution of the early 20th century changed the working environment for most organizations (Shafritz, 2001, 2008; Daft, 2009; Tierney,

1999). As a result, societies, particularly those in the United States and Europe, transitioned from rural labor to manufacturing (Tierney, 1999; Shafritz, 2001, 2008; Daft, 2009). This change required the management of large numbers of people and spurred the growth of classical management theory (Shafritz, 2001, 2008; Daft, 2009). Ultimately, classic management theory underpins the control aspects of the ICS, which will be essential for emergency responders during active threat events. Classical management theory is typically attributed to three prominent scholars, Henri Fayol (1888), Frederick Taylor (1912), and Max Weber (1922) (Shafritz, 2001; Daft, 2009). Other influential authors include Luther Gulick (1937) and Herbert Simon (1946).

Table 1

Classical Management Theory and ICS

Author	Contribution
Henri Fayol (1888)	Administrative Management: Defines five functions of management; Planning, Organizing, Command, Coordination, and Control. These functions are core characteristics of ICS.
Fredrick Taylor (1912)	Scientific Management: Emphasis on cooperation and the division of work between workers and management. Observed in the ICS pillars that promote efficiencies such as the elimination of duplication of effort, the use of specialized responders, the promotion of coordination, and the subdivision of supervisory positions during the expansion of the ICS structure (FEMA, 2017)
Max Weber (1922)	Bureaucracy: Establishes organizational and management structures synonymous with ICS (McAleavy, 2016). These structures include hierarchies, division of labor, and clear rules. Bureaucratic organizations are efficient and predictable, which are core characteristics of the ICS (Weber, 1922; Bigley & Roberts, 2001; Buck et al., 2006; Moynihan, 2009).

Table 1 (continued)

Luther Gulick (1937)	Notes on Theory of Organization: Furthers several organizational concepts such as span of control, unity of command, technical efficiency, and co-coordination of work. Establishment of the duties of the executive, which is operationalized with the acronym PODSCORPB; Planning, Organizing, Staffing, Directing, Co-coordinating, Reporting, and Budgeting. Many of these functions are relevant to the duties of the Incident Commander (FEMA, 2017).
Herbert Simon (1946)	The Proverbs of Administration: Critiques the organizational frameworks established in the classical management era. The bureaucratic structure limits performance and the ability to make timely and correct decisions; removing these limits will increase efficiency.

Fundamental to the ICS philosophy is the idea of a modular organization, built on mechanical bureaucratic principles, traditionally relegated to stable conditions, and applied to assert control over dynamic emergency environments (Bigley & Roberts, 2001; Buck et al., 2006; Moynihan, 2009; Jensen & Thomas, 2016; McAleavy, 2016, 2020; Chang, 2017). Moreover, the ICS structure is designed to expand and contract to meet the needs of the incident, a process known as the scalar principle (Buck et al., 2006). Likewise, active threat events involving fire are dynamic and have the potential to expand from a lone attacker to a complex coordinated terrorist attack (FEMA, 2016). Therefore, the ICS framework provides the structure and scalability needed to organize a response to a structure fire under active threat event (Bigley & Roberts, 2001; Buck et al., 2006; Moynihan, 2009; FEMA, 2016).

Several versions of ICS exist (Buck et al., 2006; O'Neill, 2008). However, all versions have standard components (O'Neill, 2008). These components standardize response to emergencies and disasters (O'Neill, 2008). The common elements reflect classical management theory and

include the following: standardized terminology and job descriptions, a strict chain of command, unity of command, sectoring and division of labor, task-oriented assignments, and span of control (Bigley & Roberts, 2001; Buck et al., 2006; Moynihan, 2009; Chang, 2017, Jensen & Thompson, 2016). Also, the duties of the Incident Commander (IC), who is responsible for the overall outcome of the incident, are divided into four functional categories: Operations, Planning, Logistics, and Administration. These functions are designed to be handled by the Incident Commander (IC) by direct application or delegation (Brunacini, 2002; O'Neill, 2008).

In addition to the influences of classical management theory, the origin of ICS is guided by the military backgrounds of those who first established its framework, which further contributes to the command-and-control structure (Molino, 2006; McAleavy, 2016; Chang, 2017). ICS emerged in the 1970s due to a series of difficult-to-control wildfires in California (Bigley & Roberts, 2001; Buck et al., 2006; Moynihan, 2009; Jensen & Thompson, 2016; Chang, 2017). At the time, fire service responders identified complications coordinating many fire departments over a vast geographic area (Jensen & Thompson, 2016). As a result, FIRESCOPE was established (Bigley & Roberts, 2001; Buck et al., 2006; Moynihan, 2009; Chang, 2017).

FIRESCOPE, designated Firefighting Resources of California Organized for Potential Emergencies, created a response framework emphasizing interagency coordination (Buck et al., 2006; O'Neill, 2008; Chang, 2017). The focus on interagency coordination is an essential element for complex response types (FEMA, 2016). For example, a structure fire under active threat event will require complex interagency operations, thus requiring effective interagency coordination (FEMA, 2016).

The success of FIRESCOPE in California spurred the adoption of similar methods in the structural firefighting realm, as developed by Brunacini (2002) (Chang, 2017). As a result, the ICS was adopted throughout the fire service and incorporated into the curriculum of the National

Fire Academy (NFA). Also, the overall success of ICS enabled its inclusion into the federal response framework (Jensen & Thompson, 2016; Chang, 2017).

The watershed moment for ICS occurred during the terrorist attack on the World Trade Center in 2001 (Buck et al., 2006). The event changed the framework for government response to disasters and initiated legislation that would establish the Department of Homeland Security and create the National Incident Management System (NIMS) as the National Response Framework (Buck et al., 2006). In 2004, NIMS was mandated by the federal government. NIMS utilizes ICS as the framework for all organizations responding to all hazards regardless of size, scope, or duration (Buck et al., 2006). Therefore, making ICS the appropriate model for structure fire combined active threat response.

The influence of ICS as an all-hazards response framework has led to the study of ICS by the scholarly community. Although empirical studies on ICS are limited, those that have occurred verify the positive influence of ICS in practice (Jensen & Thompson, 2016). These studies include Bigley & Roberts (2001), Buck et al. (2006), Arganoff (2006), and Trainor (2018). However, many scholars are critical of ICS, likely due to their understanding of the limitations of the management and organizational theories that underpin its framework (Dynes, 1983, 1993, 2000; Wenger et al., 1990; Walker et al., 1994; Neal and Phillips, 1995; Schroeder et al., 2001; Tierney et al., 2001; Wise & Nader, 2002; Drabek, 2003; Waugh & Streib, 2006).

The divide between scholars and practitioners on the efficacy of ICS revolves around several similar concepts. These concepts center around the topic of control, often advocated by practitioners, and the topic of flexibility, often revered by scholars (Bigley & Roberts, 2001; Buck et al., 2006; Moynihan, 2009; Jensen & Thompson, 2016; Chang, 2017). Essential concepts discussed in the ICS literature include organic vs. mechanical, network vs. hierarchy, and tightly coupled vs. loosely coupled systems (Drabek, 1983; Ellis, 1998; Agranoff, 2007;

Moynihan, 2009; Chang, 2017). These issues will likely emerge during structure fire response under an active threat; therefore, they will be discussed in detail herein.

In organizational theory, mechanistic and organic systems are opposite paradigms (Burns & Stalker, 1961, 1972, 1994; Chang, 2017). Mechanical organizations are characterized by strict hierarchies and established rules (Burns & Stalker, 1961, 1972, 1994; Chang, 2017). Thus, mechanical organizations are designed for a stable environment where the organization's needs can be predicted (Burns & Stalker, 1961, 1972, 1994; Chang, 2017). In contrast, organic organizations value flexibility and rely on cooperation and communication to achieve organizational goals (Burns & Stalker, 1961, 1972, 1994; Chang, 2017). In both cases, the external environment is the determining factor for an effective management structure (Chang, 2017).

As a rigid hierarchy with clear rules, the ICS framework resembles the structure of mechanical organizations (Chang, 2017). Moreover, as previously stated, mechanistic organizations require stable environments (Burns & Stalker, 1961, 1972, 1994; Chang, 2017). However, since emergencies and disasters, particularly active threat events, create an unstable environment, organizational scholars question the effectiveness of ICS (Wenger et al., 1990). Accordingly, Quarantelli (2002) argues that coordination is needed to manage disasters effectively. Furthermore, adaptability and improvisation are necessary for managing large and complex events; these qualities indicate organic organizations (Burns & Stalker, 1961, 1972, 1994; Chang, 2017).

The mechanical limitations of ICS are similar to Dynes' (1994, 2000) description of the rules of closed systems. Closed systems are para-military frameworks designed to control the chaos of emergencies (Dynes, 1994, 2000). However, scholars point out that numerous studies on mass convergence and collective behavior have effectively debunked the stereotype of chaos and

disorder following disasters (Barton, 1970). Therefore, it is rational to argue that the mechanical nature of ICS is unnecessary. Furthermore, open and organic systems are more appropriate for effective disaster response (Lagadec, 1990; Hatch, 1997; Qauratantelli,2002). To exemplify their arguments, ICS critics point to the failures of the ICS during several large-scale incidents, Hurricane Katrina and the Challenger Incident being chief examples (Buck et al., 2006).

In contrast, several studies on practitioner organizations have resulted in positive assessments of ICS (Bigley & Roberts, 2001; Buck et al., 2006; Moynihan, 2009; Jensen & Thompson, 2016; Chang, 2017; Yonko et al. 2018). Specifically, Bigley and Roberts (2001) utilized grounded theory to study perceptions of the ICS by members of a large county fire department. Data collection via semi-structured interviews and field observations revealed an ICS manifestation resulting in mechanical and organic elements (Bigley & Roberts, 2001; Chang, 2017). In addition, the balance of the mechanical and organic components of ICS was perceived positively by study participants (Bigley & Roberts, 2001; Chang, 2017).

Buck et al. (2006) demonstrate that ICS is effective when specific pre-conditions are met. These pre-conditions include previous training in ICS, interagency familiarity, and interpersonal trust (Buck et al., 2006). Buck et al. (2006) argue that failures of the ICS are not due to the system itself but to the lack of training and inter-organizational trust that must occur during non-emergency periods. Moreover, in instances where such steps have occurred, the ICS has been highly effective; examples include the response to the Pentagon during 9/11, the Atlanta Olympic Bombing, and the Northridge Earthquake (Buck et al., 2006). Similarly, a structure fire with combined active threat event will require previous training and coordination between responding agencies, to facilitate the trust and familiarity needed for ICS to be effective (FEMA, 2016).

According to Moynihan (2009), networks are characterized by numerous organizations working together to achieve a shared goal. The networks that form during large disasters create challenges

that influence the hierarchical functions of the ICS (Moynihan, 2009). There are three ways networks affect ICS (Moynihan, 2009). First, as the number of responding organizations increases, their coordination becomes more complex (Moynihan, 2009). Second, when multiple organizations are involved, the legitimacy of the authority of the Incident Commander is challenged (Moynihan, 2009). Third, the values inherent to successful network collaboration, such as trust developed from familiarity, are critical for success (Moynihan, 2009).

Complex events, similar to a structure fire with an active threat, require sizeable networks of diverse organizations (Moynihan, 2009). As described above, this need challenges the effectiveness of the hierarchical structure of the ICS (Moynihan, 2009). These challenges have been described by multiple scholars (Moynihan, 2009). However, Moynihan (2009) argues that networks and ICS can become mutually influential through network governance. The concept of network governance improves the ICS by clarifying who is in charge, maintaining non-emergency working relationships, incorporating organizational networks, and improving training for all organizations potentially needed during disasters (Moynihan, 2009). As a result, many weaknesses with complex interagency responses can be remedied (Moynihan, 2009). Still, Moynihan (2009) acknowledges that while these steps improve some of the ICS weaknesses described by critics, they do little to address emergent groups, a staple of post-disaster response.

Tightly coupled systems reside in the family of closed systems, where sub-components are closely linked and rely heavily on each other (Drabek, 1983; Ellis, 1998). As such, the failure of one sub-system component can collapse the entire system (Drabek, 1983; Ellis, 1998). The description of ICS as a rigid system that struggles with interagency coordination makes it similar to a tightly coupled system (Drabek, 1983; Ellis, 1998). Therefore, scholars advocate for the advances of loosely coupled systems (Drabek, 1983). These systems encourage flexibility and inclusiveness and find strength in the unstable environments likely to occur during an active threat incident (Drabek, 1983; Ellis, 1998; FEMA, 2016).

A potential solution to the academic and practitioner divide over ICS is exemplified by applying agility and discipline to emergency response (Harrald, 2006). The concepts of agility and discipline are often attributed to the design of software systems (Harrald, 2006). A successful software system incorporates discipline, presented as structure, and agility, represented as adaptability (Harrald, 2006). Harrald (2006) says that these concepts should be the foundations of emergency response, specifically command and control. The ideas of agility and discipline are closely related to mechanical and organic systems (Harrald, 2006; Chang, 2017). Harrald (2006) believes agility and discipline can operate together in a balanced approach. Harrald (2006) outlines degrees of balance in a four-part typology; dysfunctional, ad hoc/reactive, balanced/adaptive, and bureaucratic/procedural.

According to Harrald (2006), type one organizations are unstructured and rigid, resulting in the inability to remain predictable and the inability to adjust. Type one organizations are labeled as dysfunctional (Harrald, 2006). Type two organizations are primarily unstructured and able to adapt; however, they have difficulty coordinating with large organizations (Harrald, 2006). Type two organizations are designated as ad hoc/reactive (Harrald, 2006). Type three organizations have a defined framework and can be adaptive (Harrald, 2006). As a result, type three organizations can coordinate and manage large organizational structures while maintaining the ability to change rapidly (Harrald, 2006). Type three organizations are labeled balanced/adaptive (Harrald, 2006). Finally, type four organizations have well-defined structures, rigid rules and procedures, and the inability to change (Harrald, 2006). These organizations effectively coordinate but cannot adapt to change (Harrald, 2006). Type four organizations are labeled bureaucratic/procedural (Harrald, 2006).

Theoretically, the type three typology effectively balances the arguments between ICS scholars and practitioners (Harrald, 2006). Therefore, it can be viewed as a potential guide for ICS improvements (Harrald, 2006). Ultimately, agility and discipline will be necessary to effectively

respond to a structure fire under an active threat event. Identifying strategies for achieving the appropriate balance of agility and discipline during these responses is one question this study seeks to answer.

Despite the potential negatives of ICS highlighted by scholars, ICS is the mandated response framework for all emergencies in the United States (Buck et al., 2006). Therefore, the ICS will likely be deployed as the guiding framework for structure fire response involving an active threat. Active threat response literature identifies three components of the ICS that will likely be needed. The components are Incident Complex, Area Command, and Unified Command (FEMA, 2016).

An Incident Complex is a form of Incident Command where a single Incident Commander maintains strategic control of multiple incidents in one location (FEMA, 2016). An example of an Incident Complex is separate fires occurring in distant areas of a single large structure (FEMA, 2016). In that case, a single Incident Command would coordinate resources in separate areas of the same building (FEMA, 2016).

Area Command is a form of Incident Management that oversees multiple events in close proximity (Seidel, 2007). As such, a single Area Command manages incidents involving one response entity. For example, multiple fires can be supervised by one Area Command as long as the span of control is not violated. However, Area Command is more likely to be used in significant incidents that involve multiple response entities (Seidel, 2007). Therefore, when multiple agencies are involved Unified Area Command is needed (FEMA, 2016).

In the case of an active threat involving fire, several organizations will likely respond (Newman, 2011; FDNY, 2012; Atwater, 2012; Marino et al., 2015, FEMA, 2016). In most cases, the entities involved must command together (Seidel, 2007). The three organizations typically needed to respond to these events are the fire service, law enforcement, and EMS (H.M., 2013). Therefore, each entity should be represented in the Unified Command Post (Seidel, 2007).

Ultimately, during a significant event in a single jurisdiction, a Unified Area Command will likely manage the overall strategic response (FEMA, 2016).

Interoperability

An effective response to any structure fire combined with an active threat will require interagency cooperation to address the hazards (Newman, 2011; Atwater, 2012; FDNY, 2012; Johnson, 2014; Marion et al., 2015). Thus, in terms of effective emergency response, interoperability is the ability of response organizations to work together (Pollock, 2013, 2017; H.M., 2020; McAleavy, 2021). The better response organization can work together, the stronger the response (Cole, 2010; DHS, 2018; McAleavy, 2021). As a result, measures to improve interoperability before an incident should be considered part of an effective response plan (Cole, 2010; Newman, 2011; Johnson, 2014; Marino et al., 2015; DHS, 2018; H.M., 2020).

Moreover, Buck et al. (2006) argue that for ICS to be effective certain pre-conditions must be met. The necessary pre-conditions are interagency trust and familiarity (Buck et al., 2006). These pre-conditions are key components of interoperability (Buck et al., 2006). As a result, effective interoperability is directly linked to the success and ICS (Bigley & Roberts, 2001, Buck et al., 2006).

During a structure fire response with an active threat, interoperability among agencies will likely include the fire service, emergency medical service, and law enforcement; local, state, and federal (Johnson, 2014; Marino et al., 2015; FEMA, 2016). Typically, these agencies have separate missions and often respond to situations as the lead organization (Johnson, 2014; Marino et al., 2015; Newman, 2011). Furthermore, all three disciplines customarily solve problems singularly (Newman, 2011; Johnson, 2014; Marino et al., 2015; FEMA, 2016). In other words, firefighters fight fire, police officers fight crime, and paramedics provide medical care. However, during

multi-hazard incidents, these three agencies must rely on each other to achieve their goals (H.M., 2013; Johnson, 2014; FEMA, 2016).

During a multi-hazard event, the lead agency becomes unclear (Moynihan, 2009; Newman, 2011; Marino et al., 2015; FEMA, 2016). Therefore, the Incident Command System should be utilized to prepare for the interagency approach to any multi-hazard response (FEMA, 2016, 2017). Specifically, the Unified Command mode should be practiced among all potential response agencies to enhance interoperability (FEMA, 2016, 2017; DHS, 2018). However, interoperability may become more difficult as the incident expands beyond the initial response organizations (Pollock, 2013, 2017; McAleavy, 2021).

Emergency management literature identifies two emergency management support components that will likely be needed if a structure fire combined active threat event expands beyond local capabilities. The support components include emergency management coordinators and All-Hazard Incident Management Teams (AHIMT) (FEMA, 2019). These individuals and teams tend to reside at local or regional Emergency Operation Centers (EOC) and have the capabilities to integrate multiple agencies and organize an expanded ICS structure (FEMA, 2019). Ultimately, the fire service, law enforcement, and emergency medical personnel must work collaboratively during a structure fire response involving an active threat (Newman, 2011; Atwater, 2012; Marino et al., 2015; FEMA, 2016).

For firefighters to operate within an active threat environment, tactical support from law enforcement will be needed to provide a measure of safety (Newman, 2011; Atwater, 2012; H.M., 2013; FEMA, 2016). The literature describes the possibility of tactical firefighting, similar to tactical medics who enter hazard zones with law enforcement (Vargas, 2016; Atwater, 2012). A similar concept has been applied to the active shooter response (Atwater, 2012; Marino et al.,

2015). During active shooter, medics and firefighters enter the warm zone with law enforcement protecting them during patient care (Atwater, 2012; Marino et al., 2015).

During active threat response, law enforcement must dedicate personnel to protecting other first responders (Atwater, 2012; Marino et al., 2015; FEMA, 2016). In terms of active shooter response, force protection is used to protect the Rescue Task Force (RTF) personnel, consisting of fire service and emergency medical personnel operating in the warm zone (Johnson, 2014). Also, law enforcement personnel are put in positions to protect the Incident Command Post and first responder staging locations (FEMA, 2016). Therefore, force protection may be necessary for any response involving a structure fire and an active threat (Atwater, 2012; FEMA, 2016).

Moody (2010) compares the interagency response to fire as a weapon event to that of military combat. Essentially, firefighters, to save lives, are effectively engaging in military-style operations (Moody, 2010). Historically, some public fire service organizations were designed as military corps. For example, the Parisian Fire Brigade was created as a military corps and is considered part of the French Army today. Similarly, in Brazil, firefighters for the State of Parana act as reserve troops for the Brazilian Army (Erven et al., 1954). For the most part, tactical firefighting requires a paradigm shift from the modern fire service approach. However, in the age of extreme terrorist attacks and active threat environments may mean implementing a military-like status to the public fire service (Moody, 2010; Atwater, 2012; Marino et al., 2015; Lesaffre, 2017). Ultimately, any response that requires firefighters to enter the active threat hot zone will demand interoperability with law enforcement to ensure protection (Atwater, 2012; Marino et al., 2015).

Operational Risk in the Fire Service

The modern fire service in the United States makes operational decisions based on a risk-to-benefit analysis (Scarborough, 2017; USFA, 2018). For the most part, the working risk

philosophy is consistent across most professional fire departments (USFA, 2018). In general, firefighters will risk their lives in a calculated or measured manner to save savable lives (Scarborough, 2017; USFA, 2018). The International Association of Fire Chiefs (IAFC) maintains an 11-item scale for firefighter survival. These "rules of engagement" are effective for addressing the traditional hazards of the fire service and state that firefighters should *"extend vigilant and measured risk to protect and rescue savable lives"* (IAFC, 2020).

The current risk paradigm was primarily designed for traditional fire service responses: structure fires, forest fires, water rescues, and similar responses (USFA, 2018; IAFC, 2022). For example, firefighters will search for victims in a house fire if there is survivable space (IAFC, 2022). In contrast, if there is no survivable space, firefighters will not risk their lives for people who have already perished (IAFC, 2022). The philosophy helps guide Incident Commanders to the appropriate strategy given the conditions of the emergency scene (USFA, 2018; IAFC, 2020).

For traditional hazards, the risk philosophy of the American fire service works well. However, firefighters are now expected to assume more significant roles during active threat incidents in increasingly diverse conditions (Roman, 2014). Atwater (2012) argues that active threat incidents involving fire require a calculated risk by fire service personnel to save lives. Unfortunately, the risk philosophy of the fire service primarily applies to standard fire service operational paradigms (Marino et al., 2015). In other words, firefighters expect a range of scenarios to apply the risk philosophy. Mainly, the range does not include active threat situations combined with fire.

According to Roman (2014), the nature of modern-day terrorism requires the fire service to become increasingly more involved in on-scene operations. Moody (2010) describes the multiorganizational response to CCAs involving fire as similar to combat response. Thus, it can be argued that the fire service calculated risk paradigm is abstract and not applicable to the high-

threat response of fire combined with terrorism (Marino et al., 2015). The limitations may make the paradigm more confusing when it needs to be more guiding (Marion et al., 2015).

Studies on cognitive heuristics can be used to highlight the potential problem with the fire service risk philosophy. Heuristics is a mental process whereby people use shortcuts in thinking to make quick decisions (Tversky & Kahneman, 1974; Quarantelli et al., 2007; Kahneman, 2011). Therefore, it can be deduced that the risk philosophy of the fire service is a heuristics device designed to guide rapid decisions concerning operational risk. Critical components of quick decision-making involve the concepts of availability, representativeness, and retrievability (Tversky & Kahneman, 1974; Kahneman, 2011). These concepts relate to experience, as availability, representativeness, and retrievability are influenced by the decision-makers access to previous information (Tversky & Kahneman, 1974; Kahneman, 2011).

The ability to retrieve information is limited based on experience with previous situations that represent similar responses (Tversky & Kahneman, 1974; Kahneman, 2011). Previous experience will likely be limited in the case of structure fire response under an active threat. Therefore, there may be little information to retrieve for decision-making purposes. In such a case, the standard fire service risk philosophy will provide insufficient guidance (Marino et al., 2015). Moreover, a structure fire response during an active threat is likely to be complex, where a chain-like structure of events is necessary to predict outcomes (FEMA, 2016). Tversky and Kahneman (1974) say that people underestimate failures in these situations.

Clarke (1993) suggests that organizations also use heuristics when they develop their risk positions. However, in deciding the types of events to model, organizations prefer easy-to-manage scenarios and low-risk estimates, which are then used to justify their correspondingly optimistic assessments of their ability to respond (Clarke, 1993). Unfortunately, there is no absolute risk, and organizations must have the agility to adjust as needed (Clarke, 1993).

Moreover, it can be argued that structure fire response during an active threat is a unique risk phenomenon that challenges the traditional conceptualization of risk in the fire service. Accordingly, organizational adjustments to risk must include changes to training and education to address novel and unique threats (Clarke, 1993).

Previous incidents where fire has been used as a weapon have demonstrated that the fire service does not have a method for addressing the measured risks necessary for saving lives during a hostile threat environment (Marino et al., 2015). Currently, most fire departments stand by in a safe location during active shootings (Marino et al., 2015). Even with advances in the active shooter response protocol, it is still widely accepted that firefighters should not enter the hot zone (Marino et al., 2015). However, when fire is involved, the lessons from previous incidents demonstrate that the fire service must take calculated risks if lives are to be saved (Atwater, 2012; Marino et al., 2015). The risks that occur with multi-modal attacks require close coordination with other agencies, especially law enforcement (Marino et al., 2015; FEMA, 2016). Due to the different operational paradigms, acceptable risk differs in each organization (Marino et al., 2015).

Concerning risk, a wicked problem presents itself with differences in interagency risk acceptance (Marino et al., 2015; FEMA, 2016). Multiple hazard types merge during a structure fire response under an active threat, requiring separate agencies to respond together (Marino et al., 2015; FEMA, 2016). These agencies must have a firm understanding of the risk philosophy of the other responding organizations (Newman, 2011; Marino et al., 2015).

As discussed, the fire service in the United States operates under a risk philosophy designed for fire service-specific events (USFA, 2018, IAFC, 2020). The philosophy assists firefighters, and their Incident Commanders in determining safe and effective strategies (USFA, 2018; IAFC, 2020). Likewise, law enforcement maintains an awareness of their acceptable risk (Marion et al., 2015). However, each agency's risk acceptance is based on its standard hazard types (Marino et

al., 2015; FEMA, 2016). Therefore, part of an effective response plan for active threat events involving fire is establishing a multi-agency risk philosophy before the event (H.M., 2013; Marino et al., 2015; FEMA, 2016).

Boin (2007) says that citizens expect protection from public safety organizations. Therefore, the ultimate decision on fire service risk may reside in public expectations. Moreover, when an emergency response does not meet public expectations, public officials and organizational leaders are often scrutinized in the media and the legal system. Therefore, fire service leaders must expect to be held accountable for their decisions during the response to a structure fire with an active threat. Boin (2007), when discussing failures in emergency response, says, "accountability debates can easily degenerate into "blame games" with a focus on identifying and punishing "culprits" rather than discursive reflection about the full range of causes and consequences" (p. 33).

Resource Management

Active threat events, especially multiple coordinated attacks, demand emergency resources (FEMA, 2016). The increased demand may stress the response system and force the prioritization of scarce resources (Boin, 2007; McAleavy, 2020). As a result, resource allocation is a significant concern (Sheppard, 2017). Also, the over-commitment and over-convergence of resources to an initial attack create resource shortages for corresponding attacks (FEMA, 2016; Wenger et al., 1990). Therefore, early recognition of active threat events is crucial (DHS, 2012). In the case of coordinated attackers, multiple attacks in a single jurisdiction can quickly overwhelm fire department resources (Boin, 2007). Therefore, over-convergence of fire service resources must be avoided (Wenger et al., 1990; FEMA, 2016). Also, mutual aid should be utilized early (FEMA 2016, Xavier, 2017).

The practice of maximizing awareness of the events occurring in one's jurisdiction and surrounding area is known as domain awareness (Harrald, 2006; FEMA, 2016). For emergency service organizations, domain awareness is critical because it emphasizes maintaining response capabilities to meet the community's overall needs (FEMA, 2016). In addition, domain awareness plays a crucial role in the early recognition of active threat situations and the need to dispatch resources efficiently (FEMA, 2016).

Mass casualty events, such as terrorist attacks, require many emergency response resources (FEMA, 2016). During a terrorist attack, fire service resources are likely to become overwhelmed (FEMA, 2016). As such, plans for effective resource allocation, including mutual aid agreements, should be established as part of the overall response plan (FEMA, 2016). Moreover, dispatch personnel and initial responders should be trained to recognize an active threat event and initiate a pre-determined response plan (FEMA, 2016).

The jurisdictional Emergency Operation Center (EOC) coordinates disaster response. Therefore, emergency management personnel are essential for recognizing and supporting active threat response (Perry, 2003). In addition, local fusion centers, which link information from multiple sources, may be the first to recognize a potential active threat event (DHS, 2019). Therefore, these organizations must operate together to enhance awareness (DHS, 2019).

As a means of preparation, fire service administrators should emphasize the capacity building of operational resources (Deshpande, 2008; Cutter, 2015). Capacity building recognizes the need for high resource demands for events beyond the typical day-to-day response requirements (Deshpande, 2008; Cutter, 2015; FEMA, 2016). In addition to traditional fire service resources, the literature identifies tactical vehicles, known as Med/Fire Cats, and drone technology, known as Small Unmanned Ariel Systems (sUAS), as potential tools for effective response to high-threat environments (Khan & Neustaedter, 2019; FR1, 2021; Jacob & Murphy, 2022).

A significant aspect of capacity building is educating local politicians about the need to prepare for large disasters to secure the necessary support to purchase the required resources (Schwab, 2016). However, public administrators must often find creative ways to solve problems with limited financial support (FEMA, 2012). Therefore, mutual aid agreements with neighboring jurisdictions are an essential preparedness strategy for significant disaster response, including terrorist incidents (Schwab, 2016; FEMA, 2016).

Likewise, preparedness should include interagency scenario training (Marino et al., 2015). However, it should be noted that practice alone will not suffice (De Cauwer, 2016). De Cauwer (2016) argues practice without the appropriate resources for a response means little. Ultimately, fire service administrators must recognize the potential for structure fire response during an active threat and build resources that can meet the needs of these events (Deshpande, 2008).

Relevant Practitioner and Government Work

Practitioner-based models for fire service response during an active threat are limited to guides on fire service response to active shooter and terrorist attacks (FDNY, 2012, FEMA, 2016, H.M., 2013). Concerning terrorism and fire service response, relevant government work has been constructed by the Federal Emergency Management Agency (FEMA), United Kingdom (U.K.), Department of Homeland Security (DHS), and Fire Department New York (FDNY). These documents are discussed herein.

In 2012, the DHS Office of Intelligence and Analysis issued a document titled “Terrorist Interest in Using Fire as a Weapon.” The paper aims to bring first responder awareness to possible fire-based attacks in the United States (DHS, 2012). In addition, the document aims to enhance the understanding of the threat and advocates for proactive measures (DHS, 2012).

In response to the 2001 terrorist attacks in the United States, the United Kingdom (U.K.) created the New Dimensions Programme (Carden, 2021). The program aims to equip, train, and provide

standards for response to terrorist attacks and other significant disasters (Carden, 2021). A critical goal of New Dimensions is interoperability among response agencies (Carden, 2021).

Moreover, in 2013, the U.K.'s Joint Emergency Services Interoperability Programme (JESIP), designed to promote cohesive interagency emergency response, created the "Joint Doctrine: Interoperability Framework." The framework aims to guide cohesive interagency response during major emergencies (H.M., 2013; McAleavy, 2016). In addition, the doctrine focuses on shared situational awareness and risk understanding between first responder organizations (H.M., 2013).

In 2016, FEMA, with the help of Louisiana State University's (LSU) National Center for Biomedical Research and Training (NCBRT) and Texas State University's (TSU) Law Enforcement Rapid Response Training Center (ALERRT), developed a curriculum entitled "Critical Decision Making for Complex Coordinated Attacks.". The curriculum provides first responders, including Fire, EMS, and Law Enforcement, with response training to Complex Coordinated Attacks (FEMA, 2016). More recently, in 2022, ALERRT has begun to develop a curriculum on fire as a weapon response (ALERRT, 2022).

FDNY's Center for Terrorism and Disaster Preparedness, with assistance from the London Fire Brigade, Federal Bureau of Investigation (FBI), Arlington Fire Department, and U.S. Military, has established a protocol for mitigating Mumbai-style attacks. The practitioner-based document establishes Standard Operating Procedures for interagency coordination during Mumbai-style attacks (FDNY, 2012). The model, titled "Interagency Tactical Response Model, Integrating Fire and EMS with Law Enforcement to Mitigate Mumbai-Style Terrorist Attacks," was created in 2012. Mumbai-style attacks are characterized by multiple attackers and targets using various weapons, including fire, over an extended period (FDNY, 2012).

Research Gap and Question

Previous studies are limited concerning published scholarly research on structure fire response under an active threat (Marino et al., 2015). However, academic research relevant to the topic is observed in theses from the Naval Postgraduate School (Newman, 2011; Sheppard, 2017; Vargas, 2016; Johnson, 2014). Also, several literature reviews exist describing fire as a weapon and pyro-terrorism, with limited discussion on fire service response (Baird, 2005; Deshpande, 2008; Miletta, 2021; Marino, 2022). Similarly, relevant literature is observed in practitioner and government documents with a primary focus on active shooter and terrorism response (FDNY, 2012; H.M., 2013; FEMA, 2016). However, no study has been observed that aims to develop a theoretical analysis of structure fire response under active threat conditions to inform policy and practice. Therefore, this study addresses the need for scholarly research specific to structure fire response under an active threat.

This study's research question is:

"What strategies are needed by Incident Commanders to support safe and effective structure fire response while under active threat?"

CHAPTER III

METHODOLOGY

Research Philosophy

The ontology and epistemology of the researcher are critical to the research process as they form the philosophical underpinnings of the study (Bell et al., 2018). Ontology is a concept that refers to the nature of being or the researcher's views regarding reality (Bell et al., 2018). At the same time, epistemology refers to the researcher's perspective regarding the best methods to inquire about the nature of reality (Bell et al., 2018). Ultimately, the ontology and epistemology of the researcher guide the research design (Bell et al., 2018).

The ontological research philosophy for this study is social constructionism (Heath & Crowley, 2004; Charmaz, 2006, 2014). Social constructionism regards reality as socially constructed, meaning reality is continually influenced by the perspectives of humans and their interactions; reality is, therefore, subjective (Bell et al., 2018; Charmaz, 2006, 2014). This opposes the positivist view of reality, which views reality as objective (Bell et al., 2018). Furthermore, the constructivist ontology for this study apprises the epistemological considerations (Bell et al., 2018).

As a result, the epistemology for this study is interpretivism. Interpretivism recognizes the difference between the objects of natural scientific study and people, thus requiring the interpretation of the subjective meaning of social interaction (Bell et al., 2018; McEntire, 2014).

The underpinnings of social constructionism and interpretivism inform the research design for this study (Bell et al., 2018). Therefore, consistent with the philosophical assumptions, this study employs the constructivist form of grounded theory developed by Charmaz (2006, 2014). Moreover, the study of this topic is inductive with a qualitative research strategy. Inductive studies are intended to build theory instead of testing existing theory (Shields & Rangarajan, 2013; Bell et al., 2018). Qualitative research is a strategy that emphasizes words over numbers and is closely linked to inductive studies (Bell et al., 2018; Creswell, 2013). Phillips (1997) argues that qualitative research has proven to be an effective strategy for disaster sciences.

Grounded theory

Grounded theory is consistent with the underpinnings of social constructionism, interpretivism, qualitative strategies, and inductive design (Glaser & Strauss, 1967; Strauss & Corbin, 1990; Charmaz, 2006, 2014; Bell et al., 2018). Therefore, grounded theory was deployed as the framework for this study. According to Bell et al. (2018), grounded theory is the most common framework for collecting and analyzing qualitative data. Moreover, grounded theory is observed as a systematic approach to assessing the effectiveness of fire service response. Significant fire service response research utilizing grounded theory related methodologies are observed in studies by Bigley & Roberts (2001), Buck et al. (2006), Arganoff (2006), and Trainor (2018).

Several versions of grounded theory exist (Charmaz, 2014; Bell et al., 2018). Glaser and Strauss (1967) developed the original version of grounded theory during their study of patients in the dying process. The framework was designed to analyze qualitative data systematically and combine aspects of positivism with symbolic interactionism (Glaser & Strauss, 1967; Aldiabat &

Navenec, 2011). However, the original grounded theory has been criticized for its rigid structure and attempt to negate the previous knowledge of the researcher by delaying the literature review (Charmaz, 2014).

Over time, Glaser and Strauss diverged and evolved their versions of grounded theory (Charmaz, 2014). These differences emerged due to competing philosophical assumptions, as Glaser comes from a positivist background, and Strauss finds knowledge in symbolic interactionism (Aldiabat & Navenec, 2011). One difference between the two versions is their coding preferences (Charmaz, 2014). Most notably, Strauss recommends selective coding begin from the start of data collection to build categories (Corbin & Strauss, 1990). In contrast, Glaser (1992) argues that selective coding should occur after developing core categories. Also, Strauss and Corbin (1990) believe the literature's timing is the researcher's decision.

Since the late 1990s, a new form of grounded theory has emerged, known as the constructivist grounded theory (Charmaz, 2006, 2014). The constructivist grounded theory, developed by Charmaz (2006), provides a framework that views research as constructed and thus enables flexibility within the process. Moreover, as opposed to earlier versions of grounded theory, previous information concerning the topic of study, including the literature review, is valued in a way that does not create a bias (Charmaz, 2014). Therefore, consistent with the philosophical assumptions, this study uses the constructivist grounded theory developed by Charmaz (2014).

The constructivist grounded theory framework acknowledges that the researcher cannot be entirely unbiased during interpretation (Charmaz, 2017). Thus, the constructivist grounded theory emphasizes an approach that recognizes the position of the researcher and the potential biases that may occur during the research process (Charmaz, 2014). This acknowledgment places scrutiny on the researcher to remain aware of biases and take steps to avoid them by continually assessing pre-established assumptions (Shah, 2019). The process enhances internal validity by

ensuring the researcher maintains an open mind and thus accounts for an authentic and honest study (Charmaz, 2014).

Data Collection

A thorough review of emergency and disaster-based literature revealed that research is needed regarding fire service response to structure fire events involving an active threat. The information provided in existing literature gives a limited view of the topic. However, relevant response-based literature identified four concepts that would likely apply to developing response strategies to structure fire under active threat events. Therefore, based on existing response-based literature, the researcher expected the concepts of Risk, Interoperability, Resource Management, and the Incident Command System (ICS) to be ingrained in the topic.

This inductive study aims to capture the perspectives of fire service response experts to construct strategic methods for fire service response to structure fire events with a combined active threat. Due to their position in the typical emergency response model, fire service Incident Commanders were identified as the critical information source for data collection. However, the literature also highlights that events involving an active threat will likely require an expanded Incident Command System framework. Such expansion commonly involves the emergency management paradigm. Therefore, emergency management-based Incident Commanders and coordinators were recognized as providing value to the study, and their perspectives were included.

This study used purposive sampling to obtain participants for data collection. Purposive sampling is a non-probability sampling, meaning participants were not randomly selected (Bell et al., 2018; Babbie, 2014). Instead, participants were selected based on relevance to the research question (Bell et al., 2018). Therefore, experienced Incident Commanders with advanced ICS certifications and active shooter, civil unrest, and mass causality response training were sought. Also, with grounded theory, purposive sampling is operationalized as theoretical sampling

(Glaser & Strauss, 1967; Bell et al., 2018). Theoretical sampling is a vital part of the interactive and sequential process of discovering categories and their relationships, which is the goal of grounded theory (Glaser & Strauss, 1967; Bell et al., 2018).

Grounded theory involves developing concepts, categories, and themes to form a new theory (Glaser & Strauss, 1967; Bell et al., 2018). Sampling and analyzing data are iterative, meaning data collection and analysis are intertwined (Glaser & Strauss, 1967; Bell et al., 2018). In other words, the researcher analyzes the data after each interview to isolate and build on concepts for the following interview (Glaser & Strauss, 1967; Bell et al., 2018). This process of constant comparative analysis continues until each category reaches theoretical saturation, meaning no new information is being discovered for each category (Glaser & Strauss, 1967; Bell et al., 2018). Therefore, pre-establishing a sample size for grounded theory studies is inappropriate (Glaser & Strauss, 1967; Charmaz, 2009; Bell et al., 2018; Babbie, 2014). However, similar response-based grounded theory studies can be a helpful reference for estimating sample size. For example, Bigley and Roberts (2001) grounded theory study on the perspectives of fire service personnel on the Incident Command System found theoretical saturation at 25 participants.

This study included 31 semi-structured interviews and three focus groups. The first and second focus groups had six participants, and the final focus group had four. The combination of semi-structured interviews and focus group participants totals a sample size of 47.

Table 2

Study Participants

Semi-structure Interviews	Focus Group One	Focus Group Two	Focus Group Three	Total Participants
31	6	6	4	47

Participant Selection

Study participants were selected from the fire service and emergency management disciplines. The Federal Emergency Management Agency (2016, 2019) identifies these organizations as essential contributors to a fire-based active threat response. In addition, several participants had dual roles in law enforcement and academia.

The fire service participants were selected from a large urban-based professional fire department in South Texas. The department has over 1,800 employees making it one of the more robust municipal fire departments in the United States. In addition, the department has 54 fire stations that cover an expansive geographic area of over 500 square miles (SAFDCRASOC, 2017). Also, as the largest all-hazards department in the region, they provide mutual aid to 26 neighboring jurisdictions, and 13 surrounding counties, including several industrial complexes and military bases (AACOG, 2022; SAFDCRASOC, 2017).

As a sizeable municipal fire department, significant resources and response capabilities are provided. Response-based capabilities include fire suppression, emergency medical services, medical special operations unit, technical rescue, hazardous materials, wildland, and aircraft firefighting, as well as arson, fusion, and terrorism (SAFDCRASOC, 2017). Additionally, the department has its own dispatchers and is closely tied to the local Emergency Operations Center. Also, the department is highly accredited with the top Issuance Service Office (ISO) rating and the Center for Public Safety Excellence (CPSE) certification.

Perhaps most importantly, the department resides near many high-profile active shooter events and mass-causality incidents and has sent personnel to assist on each occasion. Specifically, since 2017, the department has responded to two prominent active shooter events, resulting in mass causalities, both ranking in the top ten of worst mass shootings in United States history (Carissimo, 2017; Despart, 2020). In addition, the department responded to civil unrest in 2020

and several recent human smuggling incidents, including the deadliest in United States history (Garcia & Buch, 2022)

Moreover, a 2017 community risk assessment conducted by Haystax Technology's Risk Analysis Center (RAC) concluded that the jurisdiction is vulnerable to terrorism due to its dense urban population, history of hosting large high profile events, abundant military installations, and proximity to the border (SAFDCRASOC, 2017). As a result, the department's administration has developed a robust active threat response program, exemplified by being one of only two known fire departments in the United States with an armored vehicle for tactical response operations. Since previous active threat training is a criterion for inclusion in this study, participants who have received training in the departments active threat programs were selected.

A key requirement for inclusion in this study was the duty of Incident Commander. Therefore, all sampled fire service participants were certified Blue Card Incident Commanders. Blue Card Incident Commanders have completed third-party training and certification to command operations in hazardous incidents, and National Incident Management System (NIMS) type four and type five events (Brunacini, 2022). The Blue Card Incident Commander certification is supported by numerous public safety organizations, including the International Association of Fire Chiefs (IAFC), Center for Public Safety Excellence (CPSE), International Society of Fire Service Instructors (ISFSI), Fire Department Safety Officers Association (FDSOA), and Texas Fire Chiefs Association (TFCA).

The NIMS incident rating system classifies events based on resource demands from type five to type one, with the lower number meaning more resource demand (FEMA, 2019). The NIMS type four and five ratings focus on the initial response to emergencies (FEMA, 2019). Most emergencies reside within NIMS types five and four (FEMA, 2019). However, as initial emergencies escalate beyond type four, local Incident Commanders require support from outside

their organization (FEMA, 2019). In the case of this study group, the support comes from two emergency management-based entities: All-Hazards Incident Management Teams (AHIMT) and emergency management coordinators (FEMA, 2019, 2022).

AHIMTs and emergency management coordinators are typically represented at the regional Emergency Operational Center (EOC) and have the resource capabilities to respond to NIMS Types two and three events (FEMA, 2019). Therefore, to capture the perceptions of type two and three certified Incident Commanders, members of two South Texas All-Hazards Incident Management Teams were interviewed; one local and one regional.

Table 3

NIMS Classification System

Type	Description
Five	One or two resources with up to six emergency personnel; expected to last a short period (FEMA, 2019).
Four	Several response resources will be required; expected to last one operational period (FEMA, 2019).
Three	Resources demands exceed the initial response; multiple operational periods are likely (FEMA, 2019).
Two	Regional, State, or National resources will be needed, and most of the ICS general staff positions will be filled. Multiple operational periods will occur (FEMA, 2019).
One	Requires National resources, with extended operational periods, and all ICS and general staff positions filled, with additional branches (FEMA, 2019).

According to NIMS (2019), "*IMTs are rostered groups of ICS-qualified personnel, consisting of an Incident Commander, other incident leadership, and personnel qualified for other key ICS positions."* Also, All-hazards Incident Management Teams are type based, meaning their

members are certified to manage incidents according to their level of certification. Similar to the NIMS incident rating, AHIMTs are designated type one through five, with the lower number meaning higher qualifications (FEMA, 2019, 2022). As such, AHIMTs types four and five are considered local (FEMA, 2019). Type three AHIMTs expand their reach to the State level (FEMA, 2019). Finally, types one and two provide national support (FEMA, 2019).

Table 4

All-hazards Incident Management Team Types

Type	Description
Five	Manages Local, Village, and Township events (FEMA, 2019).
Four	Manges City, County, and Fire District events (FEMA, 2019).
Three	Manges State, Territory, Tribal, and significant Metropolitan events (FEMA, 2019).
Two	Manges State level events and deploys to the National level (FEMA, 2019).
One	Manages National Level NIMS type one events (FEMA, 2019).

The Texas All-Hazard Incident Management Team participants for this study were type three certified. Meaning, they manage significant local and regional events in Texas (TAMU, 2022). In Texas, the AHIMT system falls under the direction of Texas A&M University and the Texas Department of Emergency Management (TDEM) and includes oversight by the Texas Forestry Service (TAMU, 2022). Like the fire department study participants, AHIMT participants had experience managing several high-profile active shooter and mass-causality events.

In order to gain a broader emergency management perspective, local and regional emergency management coordinators were included. Emergency management coordinators are a limited position; therefore, four were included in this study, three local and one regional. As with the fire

service and AHIMT participants, the emergency management coordinators had experience with the same prominent active shooter and mass-causality events.

This study's fire service and emergency management participants were responsible for emergency and disaster response for an expansive area. The primary jurisdiction for the fire service participants was a sizeable South Texas city with a population nearing 1.5 million (SAFDCRASOC, 2017). In addition, the department has mutual aid agreements with surrounding jurisdictions and counties and therefore responds to a large geographical area (AACOG, 2022; SAFDCRASOC, 2017). The departments mutual aid responsibilities are part of an area council of governments and includes 26 jurisdictions and 13 counties, as well as several industrial complexes and military installations (AACOG, 2022; SAFDCRASOC, 2017).

The emergency management participants provide support for much of South Texas (TDEM, 2022; TAMU, 2022). The primary jurisdiction for local emergency management participants includes the 13 counties encompassed by the area council of governments (TAMU, 2022; AACOG, 2022). However, the regional emergency management participants have jurisdiction over an extended geographical area in South Texas including 44 counties (TDEM, 2022; TAMU, 2022). It should be noted that several study participants indicted that they have responded to disasters outside of their designated jurisdictions to include mass shootings, wildfires, and hurricanes throughout Texas and other states as part of the state and federal mutual aid system.

The focus of this research is fire service based; however, the unique combination of study participants was necessary to develop a comprehensive study. Moreover, sampling from multiple relevant organizations enhances validity through triangulation (Creswell, 2000; Yin, 2007). The triangulation of data sources helps overcome potential biases that may reside with one data source (Creswell, 2000; Yin, 2007).

Semi-structured Interviews

Due to their flexibility, semi-structured interviews are frequently used with qualitative inquiry and, therefore, were deployed for this study (Bell et al., 2018, Babbie, 2014). Such flexibility was necessary for the researcher to understand the view of the participants and develop in-depth and rich data that is synonymous with qualitative strategies (Bell et al., 2018). In addition, Bell et al. (2018) say participant expressions and body language are essential for the qualitative interview process. Therefore, all interviews occurred in person to enhance the interpretation of meaning (Bell et al., 2018).

The use of scenarios during inquiry increases the reflectiveness of participants (Bell et al., 2018). Therefore, during data collection, study participants were presented with two structure fire with active threat scenarios. Scenario one included photos and dispatch information describing an active shooter inside a hotel fire with victims trapped by the fire. Scenario two had pictures of civil unrest, with a dense and sweeping crowd surrounding a structure that was on fire. As with the first scenario, the added dimension of victims trapped inside the structure by the fire was provided. The scenarios were used to spur discussion about the overall strategic philosophy of structure fire response when an active threat is present.

One pilot interview was conducted on August 15, 2022. The purpose of the pilot interview was to inform the primary investigator (PI) of issues that may reside in the interview's conceptual process. The PI viewed the results of the pilot interview as successful, as the conversation spurred from the process was relevant to the research question. Also, the pilot interview allowed the PI to practice with the transcription software, allowing future data collection to be conducted more smoothly.

Data collection for this study began on August 17, 2020, and concluded on November 3, 2020. Interviews averaged 47 minutes, ranging from 26 minutes to 103 minutes. Since all interviews

were in-person, the face-to-face environment allowed the PI to better understand the study participants' perceptions, allowing for rich empirical data collection (Bell et al., 2018). In addition, consistent with qualitative inquiry, memos were used to enhance data collection by making notes of non-verbal communication (Bell et al., 2018).

All interviews were recorded to ensure accurate transcription during data analysis (Bell et al., 2018). Transcription was supported by artificial intelligence-based transcription software. According to Bell et al. (2018), transcriptions software enhances data organization and reduces the time-consuming nature of manual transcription. For this study, the transcription software Otter.ai was used. Otter.ai has import capabilities allowing transcription of the recorded in-person interviews (Dement, 2022).

Fire service interview participants were identified through the department's personnel database, known as Telestaff. The database used tags to display each individual's duties, certifications, and experience level. For this study, the criteria for participants was the duty of Incident Commander. All personnel ranking from Officer to Chief was certified to command incidents for this department. However, preference was given to Incident Commanders of higher rank and experience.

Participants who met the criteria of Incident Commander were contacted based on availability to be interviewed. For the most part, participants were contacted via phone call. However, some were also contacted through email. All interviews were contacted in private and at various fire department facilities. The majority of interviews took place at fire stations. However, interviews were also conducted at the public safety headquarters, the fire training academy, and the public safety answering point (PSAP). Before the interviews, participants were provided with the IRB consent form, and the purpose of the study was discussed. Once consent was given, the

transcription software was turned on, and the scenarios were provided. Ultimately, 25 fire service Incident Commanders participated in the semi-structured interviews.

In order to locate emergency management-based participants, the regional Emergency Operation Center (EOC) coordinator was contacted. First, the coordinator provided information about All-Hazard Incident Management Team (AHIMT) Incident Commanders and fellow emergency management coordinators, with Incident Commander training. Next, AHIMT Incident Commanders were contacted by phone, and in-person interviews were scheduled. Five AHIMT interviews were conducted; three local and two regional. Also, one regional emergency management coordinator was interviewed.

Table 5

Semi-structured Interview Participants

Fire Service	Emergency Management	Total Interviews
25	6	31

Focus Groups

Focus groups are a standard tool for qualitative inquiry and involve interviewing a small group of people with similar expertise (Bell et al., 2018). Compared to individual interviews, focus groups provide the added perspectives that come with group interaction (Bell et al., 2018; Morgan, 1997). During focus group data collection, the researcher is the moderator by supplying questions to initiate group interaction (Morgan, 1997).

The core component of focus groups is the in-depth and insightful interactions between group members (Morgan, 1997). According to Lambert and Loiselle (2008), the combination of semi-structured interviews with focus groups enhances understanding and increases the trustworthiness

of interpreting the studied phenomenon. Therefore, focus groups were used to supplement the individual interviews.

Three focus groups were conducted. The focus groups lasted an average length of 58 minutes, with the shortest being 51 minutes and the most extended 106 minutes. As with semi-structured interviews, all focus groups were conducted in person, allowing the PI to record the rich details of group interactions. Also, the same scenario-based interview guide was used.

The fire department being studied frequently conducts Incident Command training. At the time of this study, an opportunity emerged to capture multiple Incident Commanders in one location due to ongoing training. Therefore, on two occasions, Incident Commanders who were gathered for training agreed to meet for focus group studies after completing their training. As such, both fire service focus groups took place at the departments Command Simulator.

Each fire service focus group consisted of six Incident Commanders. One emergency management-based focus group occurred at the regional Emergency Operation Center (EOC). The group consisted of three emergency management coordinators, with one type-three AHIMT participant. The overall composition of each focus group is displayed in table six.

Table 6

Focus Group Participants

One (Fire Service)	Two (Fire Service)	Three (EM)	Total Participants
6	6	4	16

Data Analysis

The goal of grounded theory is to generate a theoretical perspective derived from the systematic gathering and analysis of data (Glaser & Strauss, 1967; Strauss & Corbin, 1990; Charmaz, 2017; Bell et al., 2018). Thus, data analysis involves a constant comparative process whereby data

collection and analysis are closely related (Glaser & Strauss, 1967; Bell et al., 2018). The continuous comparative process allows the researcher to form the concepts underpinning the new theoretical perspective (Glaser & Strauss, 1967; Bell et al., 2018).

Charmaz (2014) says the core component of grounded theory studies is the constant comparative process of collecting and analyzing data. Therefore, consistent with grounded theory, an iterative process of analyzing data was used to build upon information provided in each interview and focus group. As a result, the initial interview guide became expansive, with new ideas and concepts introduced in each subsequent interview.

Data analysis was accomplished through coding (Glaser & Strauss, 1967; Bell et al., 2018). Miles and Huberman (1994) state, *"The coding process represents a mixture of inductive and deductive analysis—new codes can be added as suggested by the data, and the interpretation of the code can be modified in accompanying memos."* Consistent with grounded theory, coding for this study involved three forms: open, axial, and selective. First, open coding was used to examine all data. Charmaz (2014) recommends coding all data during open coding to allow the maximum number of concepts to emerge. Next, open coding was followed by axial coding, where relationships among concepts were identified and merged into categories (Bell et al., 2018). Finally, selective coding was used to establish the core categories and their broader themes. The theoretical analysis was developed during the coding process (Bell et al., 2018).

According to Bell et al. (2018), qualitative data coding is enhanced using qualitative software. The software assists in organizing data from interviews and focus groups by supporting the coding process (Bell et al., 2018). Therefore, this study used the qualitative software platform Atlas.ti to organize and code data. With Atlas.ti, the coding procedures were accomplished by marking passages from the interview and focus group transcriptions. The marking and organization of passages are how codes appeared (Bell et al., 2018). Codes were refined into

categories from this process, and categories became themes. Ultimately, the themes that emerge from the coding of data form the theoretical building blocks (Charmaz, 2014)

The collection and coding of data continued until no new concepts were discovered. The PI recognized saturation when no new patterns emerged when comparing new data to previously analyzed data (Charmaz, 2014). At this point, the categories and resulting themes became conceptually dense. Essentially, the constant comparative process resulted in increasingly robust categories with numerous concepts, leaving little room for new concepts to emerge (Charmaz, 2014). Therefore, formulating new ideas for each category stagnated, and saturation was achieved (Charmaz, 2014).

Regarding theoretical saturation, Charmaz (2014) says that the determination of saturation resides in the judgement of the researcher. However, some grounded theorist have debated the idea of theoretical saturation, arguing that the researcher may overlook data in their initial coding, therefore leaving out potential concepts (Dey, 1999; Charmaz, 2014). To address this issue, Charmaz says, “When you get stuck, go back and recode earlier data and see if you define new leads”. Consistent with Charmaz’s (2014) recommendation, the PI in this study reviewed initial quotes and codes to ensure saturation.

Data Validity

Validity in qualitative research has been a source of scholarly debate (Maxwell, 1992, 2002, 2017). Therefore, qualitative studies must take steps to ensure validity (Maxwell, 2002). Maxwell (1992) argues that the term validity in qualitative studies is better conceptualized as "understanding." Meaning, is the phenomenon being studied, understood, and interpreted accurately (Maxwell, 1992). In addition to the triangulation of data sources and the utilization of constructivist grounded theory, the validity of this study was enhanced by utilizing Maxwell's

(1992) strategies for qualitative validity. The strategies used for this study support descriptive, interpretive, and theoretical validity.

Descriptive and interpretive validity was supported by the PI's understanding of the studied phenomenon (Maxwell, 1992). This was enhanced by comparing information in the literature to the descriptions provided by the participants (Maxwell, 1992; Bell et al., 2018). Furthermore, the flexibility of semi-structured interviews allowed for inquiry into participant answers, which enhanced understanding and increased descriptive and interpretive validity (Maxwell, 1992; Bell et al., 2018). Also, the data coding process supported the accurate interpretation of data, which is displayed in Chapter IV, linking the findings to concepts, categories, and themes (Glaser & Strauss, 1967 Charmaz, 2014). Moreover, theoretical validity was supported by the accurate representation of the results by linking the concepts, categories, and themes, allowing the data to author the findings.

Organizational document analysis was used to further enhance data validity (Yin, 2007; Bell et al., 2018). Specifically, administrative Standard Operating Procedures (SOPs), departmental guidelines, and training documents were collected via organizational document repositories. Ultimately, interview and focus group data was enhanced by analyzing organizational policies and guidelines on active shooter, civil unrest, mass causality, search and rescue, severe threat, and high-rise structure response. In addition, organizational information was verified through government documents related to community risk assessments and standards of coverage, and the Texas All-hazards Incident Management Team master policy (SAFDCRASOC, 2017; COSA, 2022; AACOG, 2022; TAMU, 2022; TDEM, 2022).

Ethical Considerations

This research was approved by the Institutional Review Board (IRB) and conformed to all relevant standards and protocols designated by the Oklahoma State University IRB. Likewise,

this study strictly adhered to all ethical standards required for social science research dealing with human subjects (OSU IRB, 2012; Bell et al., 2018). In all cases, the core principles of informed consent, confidentiality, prevention of deception, and avoiding harm were ensured (Bell et al., 2018).

In order to achieve informed consent and the prevention of deception, each participant was presented with a document explaining the research focus and objective (Bell et al., 2018). Furthermore, informed consent was assured in writing and verbally before each interview (OSU IRB, 2012). Also, participants were advised of their right to withdraw at any point.

Avoidance of harm was further maintained through anonymity (Bell et al., 2018). In addition, participant coding strategies were deployed to ensure anonymity (Saunders et al., 2008). Also, data collected during this project was secured. Finally, participants' privacy was maintained, as participant names were only known by the researcher and not included in the final report (Bell et al., 2018).

CHAPTER IV

FINDINGS AND DISCUSSION

This chapter describes the findings from this study. Also, the description of the findings are merged with discussion. The discussion is designed to interpret the findings as they relate to the data and literature (Taherdoost, 2022). Ultimately, the combination of the findings and discussion are intended to enhance clarity (Bem, 2004).

The transcribed data from semi-structured interviews and focus groups were used to construct the findings. Also, relevant organizational documents were analyzed to enhance clarity and confirm the applicability of the collected data. The collected data was initially coded to allow the formation of all possible concepts. As concepts emerged, the data was analyzed against the literature to confirm relevance to the topic. Data coding continued to the axial coding phase, where concepts were linked, and categories were identified. The final coding stage was focused coding, which merged related categories into broader themes. The final themes were again assessed for relevance to the literature. Ultimately, the findings were developed from the overall coding and analysis process.

All sampled fire service participants came from a large fire department in South Texas and were certified Blue Card Incident Commanders. Blue Card Incident Commanders have completed third-party training and certification to command operations in hazardous incidents, and National Incident Management System (NIMS) types five and four events (Brunacini, 2022). Most emergencies reside within NIMS types five and four (FEMA, 2019). However, as initial emergencies escalate beyond type four, local Incident Commanders (ICs) require support from outside their organization (FEMA, 2019). In the case of this study group, the support comes from two emergency management-based entities; Texas All-Hazards Incident Management Teams (AHIMT) and emergency management coordinators.

According to the participants, AHIMTs and emergency management coordinators are typically represented at the regional Emergency Operational Center (EOC) and have the resource capabilities to respond to NIMS types two and three events. Therefore, to capture the perceptions of type two and three certified Incident Commanders, members of two South Texas All-Hazards Incident Management Teams were interviewed; one local and one regional. Also, to gain a broader emergency management perspective, local and regional emergency management coordinators were interviewed.

Theoretical Analysis

Coding is a core component of data analysis in grounded theory (Charmaz, 2014). Specifically, the coding for this project took three forms, initial, axial, and focused. Using initial, axial, and focused coding strategies is standard grounded theory practice (Glaser & Strauss, 1967; Bell et al., 2018). To begin the coding process, Otter.ai transcription software was used to transcribe the data. Next, Otter.ai transcriptions of semi-structured interviews and focus group interactions were entered into the qualitative coding software Atlas.ti. Finally, Atlas.ti was used to code and analyze the collected data.

Charmaz (2014) recommends coding all data in the initial stages of collection to allow the maximum number of concepts to emerge. Therefore, once the data was cleaned for accuracy, the primary investigator (PI) assigned codes to every piece of data. Ultimately, the three-phased coding of the entire data set revealed 901 quotes and 103 codes, expressed as concepts, and represented in 15 categories. The 15 categories are encompassed in five themes. The final concepts, categories, and themes were constructed following theoretical saturation. Data saturation was reached after 31 interviews and three focus groups. The focus groups included two, six person groups and one, four person group. Ultimately, there were a total of 47 participants for this study.

The PI recognized saturation when no new patterns were emerging when comparing new data to previously analyzed data. At this point, the categories and resulting themes became conceptually dense. Essentially, the constant comparative process data revealed increasingly robust categories with concepts, leaving little room for new concepts to emerge. Therefore, formulating new ideas for each category stagnated, and saturation was achieved.

During focused coding, related categories were further combined to create broader themes. The themes constructed from the data are Interoperability Needs, Incident Command System Components, Risk-based Strategies, Resource Management, and Support Functions. The five themes with supporting categories are discussed herein. Also, examples of relevant interview and focus group quotes are included to provide support and enhance clarity.

During data collection, study participants were presented with two structure fire with active threat scenarios. Scenario one included photos and dispatch information describing an active shooter inside a hotel fire with victims trapped by the fire. Scenario two had pictures of civil unrest, with a dense and sweeping crowd surrounding a structure that was on fire. As with the first scenario, the added dimension of victims trapped inside the structure by the fire was provided. The

scenarios were used to spur discussion about the overall strategic philosophy of structure fire response when an active threat is present. Similar strategies were described for both scenarios; however, strategic nuances emerged regarding civil unrest and are described in theme three.

All interviews and focus groups were conducted in person. The face-to-face environment allowed the PI to understand better the perceptions the study participants portrayed, allowing for rich empirical data collection (Charmaz, 2014; Bell et al., 2018). Consistent with qualitive inquiry, memos were used to enhance data collection by making notes of non-verbal communication (Bell et al., 2018).

Memos revealed that the scenarios caused participants to display physical and verbal uneasiness about how they would handle the responses. On several occasions, participants showed physical characteristics consistent with anxiousness by shifting in their chairs and touching their heads and faces. Long pauses while participants contemplated their responses were common. A quote from an experienced fire service IC exemplifies the difficulty in forming an initial strategy to the first scenario,

"I don't know. I sure as hell don't want to send anybody to their death. Yes, do I care about the property, of course, eventually, but I care more about the lives that are in that building and my personnel that are going into this building."

The challenge with forming an initial strategy to structure fire with active threat events is further explained by a fire service IC with 23 years of experience,

"You cannot kill multiple firefighters to go try to save people. That's like when you're in battle; you have to have winnable situations. You have to have winnable equations or solutions."

Similarly, a fire service IC and incident command instructor with 19 years of experience said,

"It's just tremendous peril. It's a tremendous life safety risk. The personal ramifications of incorrect moves, you know, ruining the reputation of yourself, the fire department, and the fire service in general. I mean, it's just this is a powder keg of problems on every single level."

Theme One – Interoperability Needs

Interoperability refers to the capacity of responding organizations to collaborate in order to provide efficient and effective emergency response (Pollock, 2013, 2017; H.M, 2020; McAleavy, 2021). Generally, the more efficiently response organizations can interact, the more effective the response (Cole, 2010; DHS, 2018; McAleavy, 2021). Therefore, initiatives to enhance interoperability before an incident should be included in a successful response plan (Marino et al., 2015; DHS 2018). According to Marino et al. (2015), an effective response to any structure fire accompanied by an active threat will necessitate interagency cooperation to handle the risks. Numerous study participants expressed the need for effective interoperability for structure fire response involving an active threat. As stated by one high-ranking Chief with over 21 years of experience,

"One reason why these types of incidents are so hard is you got a human factor, a shooter; that's law enforcement's hazard. Then you have the fire; that's the fire service's hazard. So, you have two different organizations trying to operate together with different hazards, different risk philosophies, different understandings. So obviously interagency training is important for these things."

The theme, Interoperability Needs, is supported by the categories of Interagency Training and Previous Collaboration. The category, Interagency Training, is supported by six concepts. The category, Previous Collaboration, is supported by five concepts.

Table 7

Theme One - Interoperability Needs

Concept	Category	Theme
Fire, Police, EMS	Interagency Training	**Interoperability Needs**
Interagency Familiarity		
Interagency Trust		
Interagency Communication		
Interagency Risk		
Strategic Understanding		
Resource Sharing	Previous Collaboration	
Intelligence Sharing		
Active Shooter Protocol		
Civil Unrest Protocol		
Unified Command Setup		

Interagency Training

Conceptually, interagency training is a function of the preparedness phase of emergency management (Buck et al., 2006; Bissell, 2013). However, Neal (1997) argues that the four-phase approach of emergency management; preparedness, response, recovery, and mitigation are not uniform, meaning the phases merge. In addition, emergency management phases are inaccurate heuristic devices that lack conceptual clarity (Neal, 1997). Therefore, though interagency training may be classified as a preparedness activity, the results of such training on on-scene interoperability make it a response-related activity (UFF, 2014; FDNY, 2012).

Regarding interagency training, initial interoperability between law enforcement, the fire service, and EMS is a primary objective for most study participants. Specifically, the fire service participants consistently expressed the need for effective interoperability with law enforcement to control their risk and effectively meet the demands of the response. The reliance on law enforcement to enable fire crews to operate within their organizational risk profile was articulated by a fire service Chief and former active shooter training coordinator,

"The biggest problem is they (law enforcement) don't need us to do their job, but we need them to do our jobs, right? The most important thing that they have is to engage the threat, and they do not need fire or EMS to engage the threat. They don't need us to do their job. But for us to do our job, we're entirely dependent on them."

Fire service ICs were adamant that for fire, EMS, and law enforcement to operate together in a structure fire combined active threat event, prior interagency training is essential. The critical demand for previous training and its benefit to interoperability between law enforcement and fire service personnel is exemplified by the following quote from an experienced Battalion Chief,

"Interoperability is a big deal! Like if we were trained in this sort of scenario prior to it, we might have a better shot because we are going to rely a lot on law enforcement just to keep us safe."

According to several fire service ICs, law enforcement, EMS, and the fire service have interoperability-guided responses for active shooter and civil unrest and have conducted interagency training on several occasions. However, many fire service commanders expressed the need for more training, as they have not experienced the exercise carried out in real-world events; therefore, their trust in real-world success is limited.

"Interagency trainings are paramount with this sort of situation because you know we don't do it frequently enough, then there's no trust. There's no trust."

Trust that law enforcement will provide timely and accurate information, sufficiently protect fire crews, and be influential in the Unified Command Post are paramount concerns for fire service Incident Commanders. These views were not provided without context, as many fire service participants voiced trust issues based on prior interoperability experience with law enforcement. In speaking about a previous incident involving a shooting, one fire service IC with experience as a Safety Officer described his concern,

"I've been called in on scenes that we were told (by law enforcement) were secure, and when we got on-scene, they were not secure. They (law enforcement) had no idea where the shooter was. They had no idea! One scene, we went to where they were fighting with a person on the ground, and they told me to help them out with the person that was shot on the ground, and that ended up being the shooter! And so, it makes me nervous from what I've experienced."

Emergency response literature supports the critical need for interagency trust when using ICS. For example, Buck et al. (2006) argue that emergency response is successful when specific contingencies are achieved. Therefore, interagency training, which produces interagency familiarity and facilitates trust, is essential to effective interoperability (Buck et al., 2006). Likewise, Moynihan (2009) says that interoperability is developed with familiarity, and such interagency familiarity is critical to the successful application of the ICS.

Many participants believe improved interagency training will help organizations communicate better in real-world events. Also, interagency training helps bring clarity to understanding the level of risk that is acceptable for partnering response agencies. The knowledge of each agencies risk acceptance helps clarify strategic understanding. Regarding interagency risk, one fire service IC and Command Simulator project manager said,

"Yeah, so for situations that require law enforcement and fire, they will have to train similar to active shooter events in a way that law enforcement and fire departments understand each other's risk."

An understanding of risk acceptance of partnering response agencies is supported by the literature. According to Marino et al. (2015), response agencies must have a firm grasp of the acceptable risk for other organizations during multi-hazard events. Additionally, understanding organizational risk acceptance allows a greater understanding of proper unified strategies (Newman, 2011; Atwater, 2012).

Previous Collaboration

Study participants expressed the need for interagency operational experience when speaking about interoperability. Specifically, the fire service and law enforcement must increase interagency collaboration on minor real-world incidents to improve interoperability for more complex operations. Many fire service ICs described the need for consistent application of interoperability response protocols. One study participant with dual fire service and law enforcement credentials described real-world opportunities that can enhance interoperability,

"Just look at these shooting calls that are coming in; they're not an active shooter scene, so to speak, by definition, because there's not four or more victims; regardless, what if we started doing this today? What if a shooting comes in for a business? Three or more victims? You're rolling on it; the station going on it? Why doesn't the Battalion Chief start rolling on these types of calls and linking up with the law enforcement supervisors? Now we are indoctrinating, and we're getting training for that big one, sort of with a real call."

Having past experience enables each agency to have a greater understanding of resources available from collaborating agencies and enhances information sharing through established relationships (Buck et al., 2006). Fire service ICs frequently referenced incidents where previously practiced Active Shooter and Civil Unrest drills were put into real-world action. The feeling was these real-world events, though relatively minor, enhanced interoperability for future events, particularly in initiating the Unified Command mode. One fire service IC described the value of a previous events where an active shooter was reported, and law enforcement needed assistance with setting up the initial command post,

"I was the first on-scene fire unit, and I had to be very aggressive with the law enforcement Incident Command on trying to get the ball rolling and the pieces together. That was actually one of the biggest takeaways I had from that was they were pretty lost in how to kind of piece this all

together. So, I had to be very aggressive. It's putting the command puzzle pieces together for that person."

Theme Two – Incident Command System Components

Fire service and emergency management Incident Commanders uniformly described the need for the Incident Command System as the operating model for any event involving a structure fire combined with an active threat. All participants displayed confidence in the Incident Command System as a means to organize responding personnel. A Battalion Chief and experienced Incident Commander simply stated,

"That command piece is so important. And with these types of events, we have to establish it early."

Response-based literature supports that ICS is the primary model for emergency response. According to Moynihan (2009), multi-hazard events demand the response of several agencies, causing the lead agency to be unclear; therefore, to clarify multi-agency response, the Incident Command System should be used as the structure for organization and communication between agencies. Specifically, the Unified Command mode should be practiced among all potential response agencies to enhance interoperability (FEMA, 2016). Many study participants expressed the need for Unified Command as a means to set up an initial strategy.

"As law enforcement waves come in, get hold of some upper-ranking law enforcement officer to get a Unified Command going so you can get information because this is information-intensive, you know, we can't do a lot until we get information."

The theme, Incident Command System Components, is supported by three categories, Incident Commander Duties, Assumption of Command, Unified Command Mode, and Expanded ICS. Each category is underpinned by supporting concepts, as displayed in table eight.

Table 8

Theme Two – Incident Command System Components

Concept	Category	Theme
Operations	Incident Commander Duties	**Incident Command System Components**
Planning		
Logistics		
Administrative		
Responder Safety		
Interagency Liaison		
Public Information		
First Unit On-scene	Assumption of Command	
Initial Command Post		
Initial Decision Making		
Responder Discipline		
Initial Strategy		
Strategic Agility		
Unified Dispatch		
Resource Determination		
Time Demands		
Unified Command Post	Unified Command Mode	
Fire Service IC		
Law Enforcement ICs		
EMS IC		
Support Organizations		
Adaptability		
Incident Complex	Expanded ICS	
Area Command Mode		
IMT Support		

Incident Commander Duties

ICS literature points to four primary responsibilities of the Incident Commander: Operations, Planning, Logistics, and Administration (FEMA, 2018). Operations is where strategic and tactical decisions are made and executed (FEMA, 2018). Therefore, Operations will be used at every scene (Brunacini, 2002; Coleman, 2008; O'Neill, 2008). Likewise, Planning, which is the ability to predict and adapt to future needs, is frequently employed by the Incident Commander

(FEMA, 2018). Participants in the study regularly emphasized the urgency of establishing these two functions early in the event. One emergency management-based IC said,

"You got it all, Operations, Planning, Logistics. You got Operations most of the time. But, yeah, Planning is for sure too."

From a single responder to a vast array of interagency resources, the Incident Commander must account for the resources required; this is the function of Logistics (FEMA, 2018). Logistics relates to resource management (FEMA, 2018). According to study participants, a structure fire combined with an active threat response will require abundant resources. Managing the resources was a shared concern for study participants.

"Logistics, that's a big part. Because Logistics is a lot of tracking all the resources, you know. So, you got all that, and then there's different branches that fall under Logistics."

The Administration function is often deployed in significant incidents and manages the financial and organizational cost of the response. Interview participants from the emergency management field were concerned with the administrative function. A local emergency management coordinator spoke about the administrative component of the response required for a structure fire combined active threat event,

"Somebody's taking care of the time, regarding overtime, or any time is spent there. Yeah, paperwork has to be filled out. And you need a finance branch if you got to buy something."

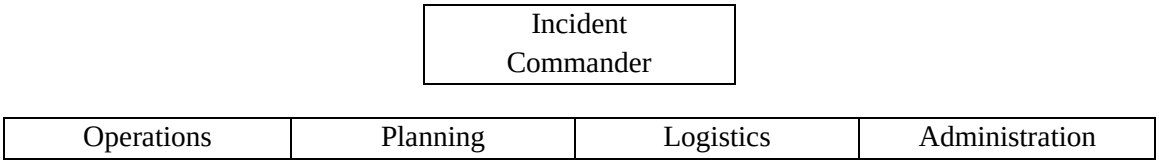
Ultimately, the Incident Commander must account for each responsibility, as the incident demands (Brunacini, 2002; Coleman, 2008). For NIMS type four and five incidents, the Incident Commander can primarily handle each function (FEMA, 2019). However, as the incident expands, the Incident Commander must delegate responsibilities to maintain an effective span of control (Brunacini, 2002; Coleman, 2008). Typically, delegation occurs by assigning branch or

sector supervisors, who assume the needed function and report back to the Incident Commander (FEMA, 2019). Fire service interview participants frequently expressed delegation of IC functions to maintain their span of control. A fire service Battalion Chief described his thoughts,

"I would always want to maintain my span of control and maintain that accountability, up and down. I want to be able to communicate. I'm going to give them a unique designation; give them a supervisor."

Figure 1

Conceptualization of the basic ICS structure



The Incident Commander's ultimate responsibility is the safety of all responders (Brunacini, 2002; Coleman, 2008; O'Neill, 2008; FEMA, 2019;). Study participants, particularly the fire service ICs, acknowledged direct concern for their ability to keep responders safe. Essentially, all strategic decisions are influenced by the capacity to protect their responders effectively. This view was expressed by multiple fire service ICs, and is exemplified by the following quote by a fire service IC with 24 years of experience,

"We have to prioritize the safety of our responders. First, this is a law enforcement-led incident with a firefighting component to it. So, we're going to have to construct a plan on how we want to approach the fire and if we can put water on it early as possible, but we're going to have to get the area secured as best possible. There will be an element of higher risk."

The Incident Commander must communicate with other response organizations and provide information to the public (FEMA, 2019). The ICS literature refers to these positions as Liaison

and Public Information Officer (PIO) (FEMA, 2019). According to study participants, as with the other responsibilities of the Incident Commander, these duties will need to be delegated as the incident expands. One emergency management coordinator described a recent event where the Incident Commander was overwhelmed, and the Liaison function was not effectively commissioned to provide direction to arriving response agencies,

"So, everybody responded, right, and communication broke down. I only know this because we did the after-action review here. I wasn't there, but we were watching it as it was happening and deciding whether or not it would be an EOC-supported event. It happened too quickly, but what we learned from that was no one was really communicating; there were separate command posts."

Assumption of Command

Fire service-based Incident Command literature highlights the need to initialize the Incident Command System (Brunacini, 2002). According to Brunacini (2002), ICS is initiated when the first arriving fire department member, typically an officer, transmits a radio report in which the Incident Commander position is assumed. At that point, the Incident Command System becomes the model for response (Brunacini, 2002). And the Incident Commander's responsibilities will remain with the first member unless IC duties are passed to a different member (FEMA, 2019). Fire service participants described the same process for the scenarios presented. Referring to the initial assumption of Command, a fire service IC with experience in special operations said,

"I would assume Command. I'm going to need a wealth of information for the early goings. I'm the Incident Commander of the fire, but I'm going to be part of a Unified Command with law enforcement as the lead."

Since the event involves an active threat, law enforcement will arrive in conjunction with the fire service. Several fire service participants explained the need for the initial arriving fire service officer to assume Command and quickly connect with law enforcement.

"I'm trying to get law enforcement on board and assigning our people to coordinate with them and just try to keep the command system structure as intact as possible. I think once all those other entities start showing up, it's going to get chaotic."

Unified Command Mode

A common theme for most participants was focusing on establishing a Unified Command Post early. In the case of both scenarios, the Unified Command Mode needed to be aggressively sought out by the initial fire service Incident Commander. Fire service study participants voiced the need for Unified Command with law enforcement to be able to determine victim rescue and fire suppression strategies. The sentiment was described by a Battalion Chief,

"So, with ICS, Unified Command is pretty much necessary. We're going to have to get law enforcement on board."

Another fire service IC with 15 years of experience said,

"Yeah, I was going to say I think Unified Command is probably the most important part of the situation, and you know, the Incident Command System in a modeled like that. We're going to have to be working really closely with law enforcement to clear corridors and make sure that areas that we're operating in are safe. So, working closely with law enforcement and the Unified Command System, I think, is probably the most important aspect of the Incident Command System in an incident like that."

A common theme during the interviews was a lack of trust by fire service participants in the willingness of law enforcement to seek out Unified Command. Several fire service participants

believed that law enforcement personnel do not consistently use ICS, instead placing priority on the initial engagement of the threat as opposed to the organization of the response through ICS.

The delay in forming the ICS structure, particularly the Unified Command Model, was viewed as a source of potential stress for fire service Incident Commanders. However, in the scenarios provided, most participants agreed that the first wave of law enforcement needs to engage the threat directly and that the fire services' need for Unified Command should not impede the law enforcement response. A fire service IC explained the perspective,

"That initial wave, right? Those are the guys that are first getting out of the boat on D-Day. I don't see a ton of value added by injecting a lot of fire personnel or any fire suppression capacity into that group. I think it might take away from their mission."

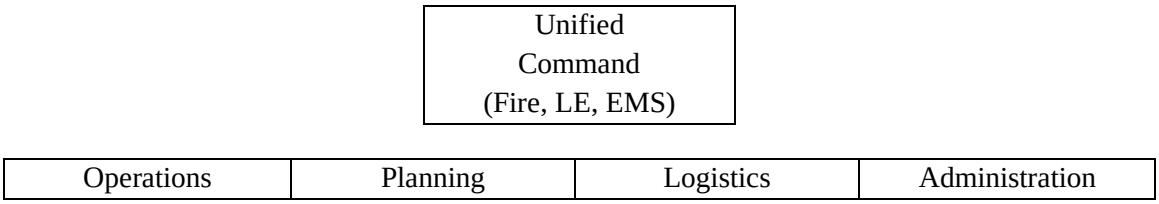
Therefore, fire service Incident Commanders should seek to link up with a law enforcement supervisor who is not directly involved in the initial advance towards the threat.

"So, the initial wave comes in; you're there, law enforcements there. They're going to go in there and try to engage that shooter; that's what they do. And we don't want to interrupt that because that's important. So, the initial wave, they go after the shooter, maybe that next wave of police we grab."

ICS literature supports the need for a Unified Command Post during an active threat involving fire event. According to FEMA (2016), events of this magnitude, even when confined to a single jurisdiction, will require a Unified Command Post where all entities involved in response are represented. In addition, according to study participants, other entities are likely to be needed at the Unified Command Post, including the fire service, all responding law enforcement agencies, EMS, and any support organizations, such as building supervisors who understand the layout, safety, and fire suppression features of the structure.

Figure 2

Conceptualization of the Unified Command Model



While ICS is advocated to gain initial control, many participants were concerned with creating a mechanical structure for a dynamic and unusual response. Therefore, most advocated for the ability to adjust standard response protocols based on the situation. For example, establishing the typical initial command post set-up without first understanding the location of the hot zone could expose the initial units to the active threat. One fire service IC with 23 years of experience described the need for adaptability in structure fire combined with active threat events,

"What's weird about these situations is, in a lot of ways, we have to be very flexible in our tactics and strategies. But we have to be very disciplined in our control."

Another fire service IC with experience in technical rescue said,

"I think with our Command system you see this hesitancy; it's too mechanical. Though before, we also had people doing stuff without an assignment, which is also bad. Yeah, so man, there's a balance there; a good commander knows that sweet spot."

The ICS literature supports the need for a combination of control and flexibility in emergency response. For example, Harrald (2006) describes the need to balance the mechanical nature of ICS with the ability to adapt to rapidly changing environments. Therefore, ICS as a response model is best deployed by combining aspects of agility and discipline so that the most appropriate strategies can be used based on the situation (Harrald, 2006). Harrald's (2006) description of

agility and discipline are closely related to mechanical and organic systems, as Chang (2017) described.

Expanded ICS

Many fire service and emergency management participants quickly identified the potential for active threat situations involving fire to expand beyond the capabilities of initial response organizations. Particularly in a terrorist attack, especially a complex coordinated attack (CCA). These events will form characteristics of an expanding Incident Complex, a form of ICS where several incidents occur in one geographical area (FEMA, 2016). One emergency management IC described the potential for ICS expansion during a terrorist attack,

"They're setting up their initial Command, Unified Command. Then hey, man, this thing's getting big! Maybe it's a complex coordinated attack or something. So now we're activating the EOC, and the IMT comes in there."

A fire service IC with 24 years of experience also referenced the need to consider an Incident Complex,

"I'm trying to remember those definitions, but it might be a complex; that's the one that this kind of thing would fall into. Multiple incident locations and possibly a single resource pool to fill both those incidents, an Incident Complex."

Emergency management participants focused on an expanded view of operations and saw the need for initiating an Area Command to support the initial Unified Command. The idea is consistent with the literature. According to FEMA (2016), an Area Command will likely manage the overall strategic response during a significant event in a single jurisdiction. One regional AHIMT Incident Commander described the need for Area Command during a structure fire with active threat response,

"How complex is it going get, and then how long is it going to go? You can run it as basically as an Area Command. That's what you're starting to get into. It's going to take a lot of resources and redeploying everything else, and you are going to need strike teams of ambulances somewhere. You're looking at all those emergency services functions."

According to emergency management participants, the Area Command mode would be formed by a local or regional All-Hazards Incident Management Team members. The team would deploy personnel trained in each particular function: Operations, Planning, Logistics, and Administration. A local emergency management coordinator, who is also an AHIMT coordinator and has fire service IC experience, said,

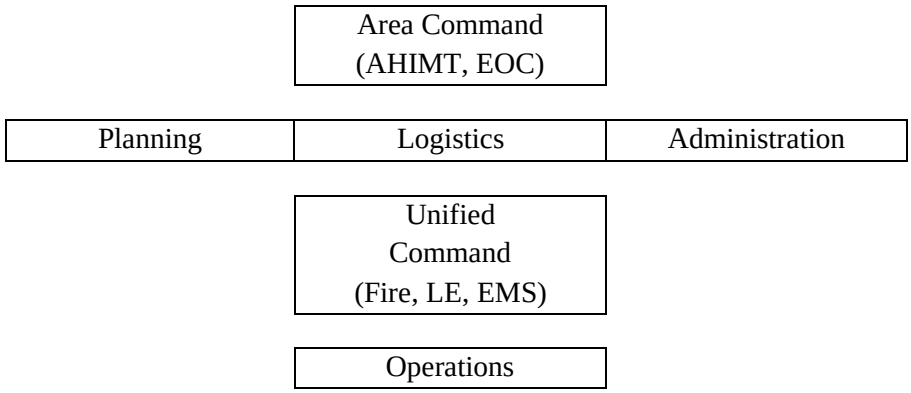
"The EOC piece is the resource coordination. The IMT is the Operations, Logistics, Planning, you know, and Admin piece, in order to support that on scene Incident Commander."

According to emergency management study participants, the AHIMT would likely assemble at the local EOC or in a Command Bus remote from the hazard zone. Emergency management literature supports the view that the AHIMT serves the on-scene Unified Commanders and provides resource support (FEMA, 2018). In this way, the Area Command supports the response's Planning, Logistics, and Administration components, allowing the on-scene Unified Commanders to focus on Operations. According to one regional AHIMT Incident Commander,

"There's no way one person or even Unified Command can handle this. You've got a lot of logistical issues, a lot of planning issues, resource issues, tracking the people out of sight. So, I say it's going to be a comprehensive incident management approach, allowing your on-scene Command to focus on tactical operations."

Figure 3

Conceptualization of the Area Command framework



Theme Three – Risk-based Strategies

When discussing structure fire combined active threat strategies, many participants described their strategy as determined by the level of perceived risk. The fire service Incident Commanders were heavily focused on the risk of their crews being injured or killed by the active threat. However, the risk to crews created by the fire was not expressed as a concern. When one Incident Commander was asked if the fire service risk philosophy would be a factor in determining a strategy, he said,

"Oh, definitely, without a doubt; I mean a risk management profile, of course. You keep going through that in your mind. And, of course, I don't want to send anybody into harm's way until I get law enforcement to clear it. But if they can't clear because of the fire, then we have a whole new situation that we've really never dealt with."

The difference between risk perceptions is influenced by familiarity with each hazard. Fire service ICs were comfortable operating within the appropriate risk profile to suppress the fire but did not feel the same about their ability to work within their risk profile concerning the active threat.

"I think there's always an inherent risk to firefighting and entering a building where there's another human trying to destroy you. But I think if we have each group with their specialty or their strengths set up in a position to mitigate it. In those instances, I feel in my position more comfortable dealing with the fire threat because it's physics as opposed to an unpredictable human. I'm sure that the police officers feel they'd much rather deal with a human than fire; to them, it's a force of nature; they'd rather deal with the human. So, we've both kind of got our own things that we probably feel comfortable with."

Fire service Incident Commanders emphasized two components required to determine if they could operate with the appropriate risk. First, all fire service participants voiced the need for timely and accurate information about the active threat's location. Second, most participants needed to know whether the threat was isolated or suppressed. Both pieces of information are necessary for fire service Incident Commanders to initiate their victim rescue and fire suppression strategies. Referring to the hotel fire combined active threat scenario, a fire service IC said,

"It all depends on the information I get. I need to get latched on to that police officer; Lieutenant. Hey, what are you doing? Where is this guy? I mean, trying to get as much information as we can so we can hopefully start putting water on the fire or getting to where we can put out the fire, right? Until I know it's safe, I can't just send them in there with an active shooter. You can't send them in to be shot."

Adding to the need to control the risk to the firefighters through law enforcement, one fire service IC who has experience in law enforcement said,

"The law enforcement side of it is to isolate, distract, and neutralize. If that shooter is one of those three, then how do I section off this incident as best I can where, you know, I look at an RTF strategy. How do I isolate them to one part of that building, and I do rescues over here."

Therefore, for the fire service to initiate appropriate operational strategies at structure fire combined active threat events, they require the knowledge of their risk level as influenced by the active threat. Most importantly, the information required by fire service Incident Commanders must come from law enforcement. The data collected from Incident Commander interviews regarding the fire service risk paradigm is consistent with the literature. For example, according to the United States Fire Service Administration (2018), the modern fire service in the United States makes operational decisions based on a risk-to-benefit analysis, and the working risk philosophy is consistent across most professional fire departments.

Firefighters will risk their lives in a calculated or calibrated manner to save people who can be saved (USFA, 2018). To standardize the fire service risk philosophy, the International Association of Fire Chiefs (IAFC) maintains an 11-item scale for firefighter survival. These "rules of engagement" are effective for addressing the traditional hazards of the fire service and state that firefighters should *"extend vigilant and measured risk to protect and rescue savable lives"* (IAFC, 2020). The same philosophy was echoed by most fire service study participants and is best explained by one fire service IC with over 21 years of experience,

"Obviously, if there's just a fire and no savable victims, then we are defensive; this is not a big deal. But if there's victims, known victims, the theory is that we would try to save them."

The fire service risk philosophy was developed for traditional responses to common structure fires (USFA, 2018; IAFC, 2022). For example, firefighters are expected to search for victims during a standard structure fire response if there is survivable space (IAFC, 2022). If there is no chance for survival, firefighters will not risk their lives for those who have already perished (IAFC, 2022). The philosophy acts as a heuristics device that helps firefighters determine the appropriate strategy based on victim survivability. A fire service participant and Command instructor explained his concern with the fire service risk paradigm,

"We sometimes talk about risking a little. I've always been very wary of this middle gear, where we do a little, you know, let's just send a couple of folks in. If only a handful of people die as opposed to 20, is that risk a little because those three people risked everything. That's my problem with that paradigm is if I go inside of this high rise with a fire and a shooter, the people that I take with me, we risk everything, right, and so it's either worth risking everything, or it's not."

Several study participants discussed a school-based scenario where an active shooter also sets fire to the school. For most interviewees, the desire to partially abandon their risk philosophy to save children was evident. Many described the feeling as based on emotion and the need to help those who could not help themselves, even if it meant increased risk to their personal safety.

"With kids, you might push yourself further than with adults in the hotel or whatever. I think that as the Incident Commander, even if you wanted to pull the reins, it'd be tough to do."

As discussions around the emotional response to these incidents emerged, many fire service ICs advocated for a response plan to control risk. A Battalion Chief explained,

"As the risk level goes up, your willingness to put yourself in harm's way will change. For me, it would be difficult to fight that battle from the Incident Command Post. I wouldn't want to be in charge of a scenario like that because what I want to do and what I have to do, are two different things."

Tversky and Kahneman's (1974) explanation of cognitive heuristics highlights the need for shortcuts in decision-making. The shortcuts enable people to make quick decisions (Tversky & Kahneman, 1974). Critical components of quick decision-making involve the concepts of availability, representativeness, and retrievability (Tversky & Kahneman, 1974). These concepts relate to experience, as availability, representativeness, and retrievability are influenced by the decision-makers access to previous information (Tversky & Kahneman, 1974).

The ability to retrieve information is limited based on experience with previous situations that represent similar responses (Tversky & Kahneman, 1974). Previous experience will likely be limited in the case of structure fire response under an active threat. Therefore, there may be little information to retrieve for decision-making purposes. Many study participants expressed a lack of retrievability. When discussing a possible strategy for the hotel fire involving an active threat scenario, one fire service IC said,

"You know, I'm going through, in my mind, the RTF policy, I'm going through the high-rise stuff that we're doing for training and other training we're doing, and it's different. Yeah, it's just completely different."

Moreover, during a structure fire with active threat response, the fire service risk level depends on law enforcement. Marino et al. (2015) discuss interagency risk concerns, as not all agencies operate under the same guide. Therefore, response agencies must have a firm understanding of the risk philosophy of the other responding organizations (Newman, 2011; Marino et al., 2015). Specifically, law enforcement must know and support the risk philosophy of the on-scene firefighters to provide adequate protection to firefighters. One high-ranking fire service Chief expressed the notion,

"They're not waiting to protect the firefighters; that's not on their mind. Yeah, so law enforcement and fire will have to train similar to active shooter events in a way that law enforcement and fire department understand each other's risk."

Most fire service participants believe that when an active threat is involved, they must adjust and weigh their risk of injury or death to their ability to rescue victims. The nature of today's emergency response environment requires firefighters to operate with hazards that exceed traditional response (Sheppard, 2017). The literature describes terrorism as one of the responses

the fire service must be ready to address and was expressed as a concern by several study participants. Specifically, several study participants were worried about the potential for ambush.

"A shooter from an elevated position that is going to be able to, if they're strategically minded enough, allow some of the fire crews to become complacent. We'd have a lot of people that are exposed, and then they initiate fire upon them right there. We're going to have a lot of people in positions that they probably wouldn't be able to recover from. And so, best case scenario, they would start shooting at the first-in company because now we'd know. But if they were clever enough to allow people to set up and see where they're at. And then I could potentially have two dozen people in exposed positions. So yeah, it'd be really concerned about secondary threats and ambushes."

Modern-day terrorism demands the fire service to operate in the terrorism hot zone (Roman, 2014). For many, the response to terrorism, particularly Complex Coordinated Attacks, creates a war-like environment (Moody, 2010). Many participants believe the current fire service risk statement must be adjusted to clarify strategies in these war-like events. When asked about the risks that come with active threat response, a fire service IC said,

"It's within the realm of things that I expect when I put this uniform on and come to work. I mean, I could definitely understand or be sympathetic to people making a different argument, but that's for them. When I came to work today, if I were asked to do that, I would find it very reasonable. You can't do this job without risk."

The theme, Risk-based Strategies, is supported by four categories, Initial Strategy, Defensive Exterior Strategy, Offensive Interior Strategy, and Offensive Exterior Strategy. The concepts described for the Offensive Exterior Strategy are specific to Civil Unrest events. Together, these strategies form the core components for structure fire response during active threat situations.

Table 9

Theme three - Risk-based Strategies

Concept	Category	Theme
Information Needs	Initial Strategy	**Risk-based Strategies**
Situational Awareness		
Hazard Zone Identification		
Initial Command		
Unified Command Post		
Resource Needs		
Active Shooter Setup		
Civil Unrest Setup		
LE Perimeter		
Strategic Staging	Defensive Exterior Strategy	
Geographic Divisions		
Reconnaissance /Intelligence		
Exterior Targeted Rescues		
Exterior Fire Control		
Victim Communication		
Building System Support		
Threat Isolation/Suppression	Offensive Interior Strategy	
Active Shooter Extension		
Forward Command Post		
Force Protection		
IDLH Force Protection		
Tactical Firefighting Branch		
Tactical Lobby		
Firefighting/Rescue Corridor		
Targeted Search		
Firefighting Tactics		
Causality Collection Point		
Ambulance Exchange Point		
Firefighter Rehab		
Threat Distraction	Offensive Exterior Strategy (Civil Unrest)	
Crowd Communication		
Weak-point Approach		
Overwhelming Resources		
Specialty Vehicles		
LE Perimeter		
Protected Corridor		
Targeted Search		
Exit Strategy		
Other Tactics		

Initial strategy

The initial strategic approach to emergency response is a crucial indicator of successful outcomes (Coleman, 2008). The first responders initially arriving at the scene are tasked with establishing the strategy (Brunacini, 2002). To execute an effective strategy, the initial responders must acquire timely and accurate information regarding the hazard and threat (Coleman, 2008). In the case of a combined structure fire active threat event, the task becomes increasingly difficult (Sheppard, 2017). For example, participants were presented with a scenario involving an active shooter inside a hotel on fire. When tasked with creating an initial strategy for such a scenario, Incident Commanders, regardless of experience level, expressed great concern for the safety of their fire crews. The concerns centered around the need for information about the active threat, as stated by a fire service IC,

"Not knowing where this guy is, I wouldn't be going in; I mean, he could easily be anywhere and just take us out. I don't want to make that call to kill my personnel, right."

Numerous fire service ICs voiced the need for information on the active threat to implement an initial strategy. According to most fire service participants, determining an initial strategy relies on accurate and timely information. The initial information will come from victims and callers at the location. The information will then be processed by dispatch and sent to the fire companies for response. The preliminary communication from dispatch to the responding units will form the perception of the most appropriate strategy. Therefore, the information provided to the initial responders is critical, as conveyed by a current dispatch Chief,

"My initial thought is you need to stage on it until you get more information. So, you got to kind of get an idea of where the shooter is, you know. I'd be working with dispatch to try to get realistic information and resources rolling."

A Battalion Chief with 22 years of experience said,

"We're going to stage and stay safe. And even when I get there, you have to let it play out where law enforcement is doing what they're supposed to be doing to go in there and try to get the active shooter. My thing is I'm going to wait, and I'm going to use my dispatch for information."

Study participants frequently stated their concern for vigilant situational awareness in structure fire response that involves an active threat. For most, such an event signals planning and the potential for terrorism or ambush. Therefore, situational awareness is a prime concern, as described by one fire service participant,

"We have an active shooter, but is there another? Is there another shooter? Does he have an accomplice? Are there other people, or is there secondary devices set up to harm people? Are rooms or areas booby-trapped?"

Most fire service study participants believe the responding Battalion Chief must repeat dispatch information to responding crews to enhance vigilance by in-coming units, as stated by one fire service IC,

"I'd definitely get on the radio and tell everybody what the situation is, how dangerous it is."

According to several fire service participants, the information provided by dispatch and law enforcement and the on-scene observations of initial arriving crews are crucial to determining the hazard zone. For most, the hot zone is anywhere the active threat can harm responders. For example, that area was identified as the structure's interior in the hotel fire scenario. However, several fire service ICs were worried about the threat's ability to shoot from windows or rooftops. With the civil unrest scenario, the hot zone was identified as anywhere within reach of the crowd. In both scenarios, the human threat was identified as the hazard. However, the fire threat was less problematic.

"I don't think this fire piece is a whole lot different. It's going to be more labor-intensive, right? But it's going to be something where if the incident changes, I can't just pick up a hose line and leave; if things change, you know, warm zone goes to the hot zone."

An accurate understanding of the hazard zone perimeters is essential to controlling fire service risk and forming an appropriate strategy (USFA, 2013). According to fire service literature, during an active threat event, on-scene fire service operations are conducted in warm and cold zones, focusing on patient care and fire suppression in relatively safe areas (FEMA, 2016; Johnson, 2014). Therefore, identifying the hazard zones is critical for Incident Commanders to feel they are operating within the appropriate risk. An understanding of the location of the hot zone is the crucial starting point for operational decisions. A fire service IC with technical rescue experience explained the need for hot zone identification,

"It would be crucial to have the police counterpart in a unified command post where I can communicate, where they can communicate where the hot zone is, and where I could theoretically safely operate for victim removal and fire control."

Communication with law enforcement will likely provide the information that accurately identifies the hot zone. Utilizing the Incident Command System creates an organizational structure where information can be exchanged (Bigley and Roberts, 2001). Specifically, Unified Command is essential, where responding entities unite to communicate information and strategy (FEMA, 2018). Therefore, participants expressed the need for the initial fire service Incident Commander to rapidly seek out law enforcement to establish a Unified Command Post, as explained by a fire service Division Chief,

"We need to liaise with law enforcement and make sure we got a Unified Command structure set up so that we can get as much up-to-date information as possible."

A fire service IC with emergency management experience also described the need to establish a Unified Command post quickly,

"Right off the bat, obviously, I would establish command and then a unified command."

The resource demands of a structure fire with an active threat event will be substantial. Numerous fire service Incident Commanders explained that the fire would likely require a third alarm response, which is a significant drain on jurisdictional resources. The added component of an active threat will require even more resources. Therefore, fire service and emergency management participants frequently voiced concerns over an escalating event that overwhelms resources. One fire service IC with 24 years of experience explained his worry,

"Well, we don't know yet. We just know that there's an active shooter who set fire to a building, and we should be ready for any escalation of that. It's going to be a resource-intensive type of situation. You know, we have an entire city we need to still protect."

Most fire service Incident Commanders agree for response to a structure fire with an active threat scenario, the predetermined interagency active shooter protocol plan must be deployed. The active shooter response protocol was described as a guiding principle to the overall strategy. The active shooter protocol has many components; however, in the initial stages of the incident, when the active threat's location is still unknown, fire service participants focused on executing the initial active shooter response setup.

"It's going to be an operational nightmare setting up our initial response to the incident. Even though it's a fire, even though there's rescues to be made, it's still an active shooter. If we

address our response as an active shooter first, and we stage units right away, then we don't approach the scene until the Forward Command Post is set up by law enforcement."

The active shooter response setup includes establishing a Forward Command Post that reports to the Unified Command Post. Fire service interviewees described the Forward Command Post as a location where law enforcement, fire service, and EMS supervisors collaborate to deploy crews to extract wounded victims directly. These crews are known as Rescue Task Forces (RTF). According to the fire service participants, the RTF consists of fire and EMS personnel, who wear ballistic protection and are further protected by law enforcement personnel. Their goal is to retrieve and treat patients who are wounded and in the warm zone. A study participant with dual fire service and law enforcement roles said,

"So, similar to what we do with an active shooter. Yeah, it's the same thing. I mean, this is an RTF response all day long, right? Again, they just added another element to handle. We're going to be able to get to it. It's just a matter of managing the resources, managing the information that's coming in, and then setting up a strong Forward Command."

Another fire service IC explained the need for the active shooter setup,

"Since there's an active shooter, then I'm looking at it from a standpoint that hopefully, a law enforcement supervisor has set up a Forward Command Post as you would with an RTF situation."

Regarding the civil unrest scenario, study participants also referenced a civil unrest protocol. Like the active shooter protocol, the civil unrest protocol requires fire crews to integrate with law enforcement, setting up unified and forward command posts. The initial setup for civil unrest was less clear to study participants. However, the general belief was that resources would be grouped in strike teams so that no apparatus was alone. And arriving fire crews would stay away

from the crowd while building resources strategically. A fire service IC who helped command civil unrest response in 2020 outlined the strategy,

"It's essentially what we did here, where we split into strike teams on both sides of the city, on the East side and the West Side. We never really utilize them, but they were there for that purpose."

Several study participants pointed out the need for a law enforcement perimeter to be established early in the incident. An essential part of overall scene safety is a vigorous law enforcement-led perimeter. The perimeter is critical for separating fire and EMS crews from potential hazards.

"Set a perimeter, maybe try to go to a side of the building where there's the least amount of people and have law enforcement set a perimeter; create some sort of corridor to get in and out."

Defensive Exterior Strategy

The early stages of an active threat combined structure fire event are dynamic (FEMA, 2018). According to the data, the initial strategy will be gathering information and unifying law enforcement and the fire service response. Once the initial strategy forms, the next evolution involves the physical execution of rescues. As long as the threat is active or unidentified, the fire service will initiate an active shooter response protocol as its core strategy.

Simultaneously, as the active shooter strategic response is forming, Incident Commanders must address the fire and its victims from the warm zone. Most fire service participants agree that if the active threat hot zone is believed to be isolated from the exterior of the building, fire operations can begin to occur. The exterior strategies described by the participants include strategic staging, the geographic division of the scene, reconnaissance and intelligence gathering, victim rescues, and fire suppression strategies, as well as building system support and victim communication.

The staging of incoming resources was expressed as a critical factor for control of on-scene safety. Many fire service participants discussed the need for a modified form of staging different from their standard protocol. The potential for mass response and possible terrorist activity led most Incident Commanders to advocate for staging in a cold zone location with easy ingress and egress. Participants wore torn on whether staging should occur in one secure area or spread into several strategic locations based on the threat. For example, many Incident Commanders advocated for one staging location protected by law enforcement during the high-rise scenario.

"If we created that coordinated staging area where it's like, hey, the first crews go in there and figure out what we got, but for everybody from there on goes to that coordinate stage area, and we create waves of resources. And it's coordinated and efficient and effective to where we're making it where we are sending in units that we know we're sending in."

However, others advocated for several satellite staging locations during civil unrest or a known terrorist event. A fire service Chief with technical rescue experience thinks the staging protocol for civil unrest or terrorist attack events should be similar to the departments staging during flash-flooding events,

"We see similarities in that when the city has anything that has a wide geographical footprint, like Swiftwater, and you have apparatus pulling off calls, and everybody's monitoring the radio because the CAD is unable to keep up, and they're kind of managing themselves that way. If you're closer to a call than another apparatus, then you can peel off and pick up something closer."

According to several fire service participants, the Incident Commander will need to divide the scene geographically to gain an accurate understanding of the entire event. The division of the scene will require the Incident Commander to assign geographical areas to supervisors who will

report back to the Unified Command Post. A fire service IC described the strategy of geographically dividing the scene,

"I need to make sure that I have basically the four sides of the building covered, so I have eyes and ears on each side, and then coordinate. I have enough personnel that I trust, so I know I can make them group supervisors or division supervisors because I want all sides covered. Then I can basically create a hot, warm, and cold zone, right, but make sure my guys are coordinating not only with each other but with me, so I have the best picture possible for safety purposes."

Referring to the benefit of dividing the scene geographically, a Battalion Chief with 24 years of experience said,

"For one, I can't see the entire building, right? So, how am I supposed to give orders if something on the Charlie side gets worse? You know, a flashover or a collapse if someone's on that side, they can do something right then."

As exterior operations begin, it will be essential to continue to gain information about the active threat. Several study participants expressed the need for establishing an intelligence branch that would relay active threat information to the Unified Command Post. The intelligence branch was described as a combination of a hot zone law enforcement supervisor, fusion center intel, building cameras, helicopters, and drone surveillance. A fire service IC described the advantages of drones and the need for the fire service to invest in drone technology for use in these types of events,

"I don't know when I will see it, but I know the technology will be there. I mean, I would think that this incident occurring ten years in the future; the first Battalion Chief has a drone mounted on the top of their vehicle when they put it in park. That drone automatically launches, and it's got a camera feed, and it's just doing continual 360s of this structure. I would imagine that technology is going to be allowing 360s instantly while also providing technology for tracking the

firefighters in the building. It exists right now if we are talking about the military. I mean, the operators running that mission will be able to 3d map, and they will know what floor they're on and what corner of the building; for everyone working inside that building. But it hasn't come to that point, as far as cost efficiency in the fire service."

Once the initial response structure is established, most IC's felt fire-based exterior operations could begin. A commonly expressed view is the willingness to take a calculated risk to rescue victims presenting from exterior windows. With the information that the active threat is remote from the victim location, most Incident Commanders would send crews to rescue victims from windows under law enforcement protection.

"If your intelligence gathering states that law enforcement has engaged the suspect and they are on Alpha-Bravo corner. Well, Charlie-Delta should be far enough away that we can make grabs if anyone's hanging out of those windows. Ideally, right, I would consider that same tactic if we have good intelligence to the entire building,"

A similar strategy was discussed by a fire service IC who described how he would attempt rescues in a school fire with an active shooter event,

"Yeah, again, I think if you have if you have viable patients, I think, you know, like Columbine, and especially after Uvalde, I don't think we want that on their conscience. We can't sit from outside, waiting for it to be completely safe to make entry. I think you have to use all of your alternatives, all your apparatus types, in order to effectively reach those people that are savable."

In addition to rescuing victims presenting themselves in windows, the exterior crews can begin fire suppression activities using master streams from guarded locations. Master streams are large-diameter, high-pressure hose streams designed to extinguish significant amounts of fire from long distances. Study participants referenced aerial-mounted master streams and master streams

mounted on rooftops where applicable. In most cases, the master stream should be unmanned, as having a firefighter operate a master stream in the open was viewed as unnecessarily exposing them to the active threat. The exterior fire suppression strategy was described by one fire service IC and terrorism response instructor,

"This will be like master stream kind of stuff. Can I get some kind of water on there? Just slowing it down just enough to make it tenable. And then how do we get that message out to shelter in place as best folks can?"

A supporting strategy expressed by several study participants was to communicate with those victims who could save themselves or shelter in place. Numerous fire service and emergency management participants voiced the ability to use a reverse 911 calling to give directions to trapped victims. Also advocated was the use of loudspeakers to communicate with trapped victims, as well the building intercom, if available. Though some participants were concerned with using the building intercom and external loudspeaker as the active threat would likely hear the directions as well. Still, any communication that could help victims save themselves was deemed essential, as explained by a Battalion Chief,

"I would try to use the internal communication system to tell these people to shelter in place, first of all, because I'd rather people not get themselves in trouble by running into harm's way."

Another fire service participant with over 20 years of experience said,

"For those that are effectively sheltering in place, I think the overriding message is to stay concealed, okay, kind of a protect in-place approach to those that are safely taking cover."

Several study participants found value in supporting the building's fire suppression systems. Multiple Incident Commanders indicated that if deemed safe enough, fire crews could pump to the building's sprinkler systems to assist with fire suppression. The goal would be to keep the fire

in check using the buildings fire suppression system. However, this was viewed as a potential strategy only applicable to buildings with specific fire suppression capabilities.

"If this is a hotel, I would probably start looking at what kind of fire prevention aspects does the hotel have? Do they have sprinkler systems? Do the doors automatically close?"

Another fire service IC provided a parallel view,

"Yeah, so sprinklers are something to consider. Because it's a newer hotel, it should have them, and they should be working."

Offensive Interior Strategy

Most study participants agree that during an active threat event, where the active threat is inside the structure, the structure's interior is presumed to be the hot zone. However, most fire service Incident Commanders believe that the interior moves from hot to warm if the active threat is isolated or neutralized. Therefore, a more aggressive strategy should be initiated. When one fire service IC was asked if he would begin an interior offensive strategy if given information that the threat was isolated but not neutralized, he said,

"If he's isolated to one part of the building, then we could, you know, access a different part of the building, and start trying to evacuate from that separate part of the building. So, you know, I would feel comfortable sending crews in as long as we had a law enforcement presence to help protect the crews and as long as we're focused on a separate area of the building."

A fire service IC, with law enforcement experience added,

"I mean, if you know, with good intelligence, the shooter is isolated to one section of the building, then that puts the game on."

As such, upon communication from law enforcement that the threat is isolated, Incident Commanders voiced that they would initiate an offensive interior strategy. The offensive strategy requires fire service personnel to enter the warm zone created by the active threat and the hot zone created by the fire. The offensive strategy's primary objective is rescuing victims trapped by the fire.

The description provided by most fire service participants was that the interior firefighting component of the response should be an extension of the active shooter protocol. Essentially, the Forward Command Post created during the active shooter response setup will need to add a firefighting branch. Like the other supervisors at the Forward Command Post, the firefighting branch supervisor will report to the Unified Command Post.

The Forward Command Post will anchor the response activities as crews enter and exit the hot zone. During an active shooter event, the rescue of victims is conducted by Rescue Task Force (RTF) teams. These teams consist of two law enforcement personnel and two fire service or medical personnel. The RTF responsibility of law enforcement is to provide force protection for firefighters or medics treating the victims. The RTF force protection concept was described by one fire service IC,

"I would definitely be treating this as an active shooter incident utilizing the Rescue Task Force Concept for our department, utilizing police combined with fire department resources to have force protection as they make entry."

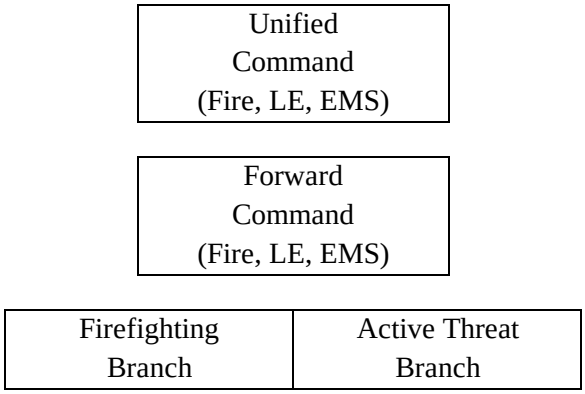
Knowledge of the RTF method led many participants to the judgment that a similar task force should be created to address the fire. Numerous study participants supported that firefighters protected by law enforcement should deploy from the Forward Command Post to address the fire. The initial active shooter branch stays focused on rescuing victims from the damage caused by

the active threat. The dual approach was described as an extension of the existing active shooter evolution, as explained by a Battalion Chief with 23 years of experience,

"So, in addition to needing to suppress the shooter, you've also got to worry about smoke, ventilation, fire control, and primary searches. So, I think, first and foremost, it's going to be the police's responsibility to subdue the shooter. And then I would probably treat this as like a two-pronged approach, where I have some of my companies working on fire control in full bunker gear, while other companies would be working on removal and location of victims in the warm zones and may even have to consider putting police officers in some type of SCBA."

Figure 4

Conceptualization of Offensive Interior Operations



Several fire service Incident Commanders identified unique concepts to address the interior fire attack. These concepts seem to mirror the department's active shooter protocol. Most commonly, fire service participants described the deployment of interior firefighters as teams that combined firefighters with law enforcement. Essentially, the firefighters advance their hose lines into the fire environment, with law enforcement protecting their ingress and egress. The law enforcement personnel would remain outside the fire environment for two reasons. First, many fire service participants believe that law enforcement is not sufficiently trained to operate within the fire-induced IDLH atmosphere. Second, the active threat is unlikely to be in the fire environment as

they would not be able to survive the IDLH atmosphere. Therefore, most fire service participants viewed the IDLH environment as safe from the active threat.

Even with law enforcement located outside of the IDLH atmosphere, many study participants remained concerned with law enforcement exposure to the fire, citing the potential for fire conditions to change rapidly. Therefore, the concept of having IDLH-trained law enforcement to provide force protection close to the IDLH environment was discussed. Two recommendations were given for this assignment. First, many identified the local law enforcements Special Weapons and Tactics (SWAT) team as having SCBAs that they could use on the edge of the IDLH environment. Second, some felt that Arson personnel trained in fire suppression and law enforcement techniques are best equipped to handle the assignment. Referring to the dual capabilities of local Arson personnel, one fire service IC said,

"The biggest thing that jumps out is their ability to carry a weapon. So, they could be force protection. They also have had training and experience of wearing bunker gear, so I think their value in being able to make entry on something like this would be extremely crucial."

One Battalion Chief explained that Arson personnel have the enhanced ability to bridge communication between law enforcement and fire service responders,

"They know who they're going to talk to as far as the law enforcement sergeants or lieutenants. And they know the fireside the chain of command is going to be the Battalion Chief. So, they know our side of it, and they know the law enforcement side of it. So, it makes every bit of sense to have them in a tactical position to be able to meet that portion."

Other participants referenced SWAT as the preferred personnel for force protection near the IDLH environment. A fire service IC with law enforcement experience explained why SWAT is a good option,

"When I was at Fusion and Arson, this last go-round, we had SWAT go out in bunker gear, and body armor on top of the bunker gear, including SCBAs, and they were shooting. They did all those things at the range. So, they can still be in that IDLH with us, you know, as our cover. You know, just for guys near the fire, not for guys looking for fire and necessarily."

However, according to another fire service IC with a law enforcement background, SWAT is a small group that would likely be dedicated to going after the shooter, making them unavailable for the IDLH-based firefighter force protection role,

"Our SWAT guys here are trained to don SCBAs. But in this type of environment, that tactical element is going to be dedicated to the shooter, the operations on the law enforcement side. So, I don't see that they're not going to be available, right; they are a limited resource."

Many participants identified the offensive fire attack during an active threat event as akin to fighting fire during a warlike atmosphere. The term tactical firefighting was applied several times and will be used to identify firefighting in an active threat situation. Discussion on tactical firefighting revolved around several key ideas. A common notion was for fire departments to form a group of firefighters trained in tactical firefighting, similar to those qualified for the departments Medical Special Operations Unit (MSOU) and Rescue Task Force (RTF) teams.

"You can get great firefighters that want to be certified as tactical firefighters, and you give them the proper training. Yeah, and put them in the right scenario where they will flourish at doing what we should be able to do; to take care of ourselves and take care of people."

Several fire service participants indicated that many of the ideas for the offensive interior strategy stem from approaches used during high-rise firefighting. A critical approach is establishing a Lobby division during a high-rise structure fire. The Lobby division is tasked with capturing control of the building systems, including the elevators, building keys, and alarm systems. Similarly, Incident Commanders advocated for establishing a Lobby division in an active threat

with fire situation. A primary goal of the Lobby division in the active threat scenario is securing the elevator to prevent its potential use by the threat. According to study participants, the Lobby division supervisor would seek to use the buildings surveillance and fire control systems to relay information to the Unified Command Post.

"They have a lot of closed circuit TVs in there if you could get into the maintenance room or wherever they monitor that stuff. You know, we could get somebody in there to get a better feel of where the fire is and what the fire is doing. Again, look at the fire panel, if we could have access to the panel because all that stuff should be on the first floor; it's almost used like a Lobby division. It's hard, but maybe we can get more information on the fire itself and where the shooter is."

According to many fire service participants, a goal of the interior strategy is to create safe corridors for fire crews to enter and exit. These corridors are maintained by force protection of law enforcement personnel. For example, in a multi-story building, once control of the elevators is accomplished, many fire service Incident Commanders believe law enforcement can be used to secure the building's stairwells and prevent the vertical travel of the active threat, as described by one fire service IC,

"Okay, protecting the stairwells. I mean, usually, in high rises, the only way to other floors is through elevators and stairwells. You could theoretically, if you knew that the fire was on one of the floors, and you knew that the shooter was on a different floor, then law enforcement officers should be able to isolate the stairwells for fire crews, and then that shooter can't move up. Especially if you control the elevator and if there's a fire, the elevators should be controlled already, right? So, control the elevators and control the stairwells, and then you can control the shooter."

In a multi-story structure, capturing control of the elevators and stairwells will allow the fire crews to use the stairways to move past the active threat with minimum risk. For example, suppose the active threat is isolated on the third floor of a six-floor building; by securing control of the elevators and stairs, firefighters can operate on all floors, but the third, with minimal risk of being exposed to the active threat. Similarly, if law enforcement communicates that the threat is isolated to a section of the structure, or barricaded in a room, most fire service participants were comfortable with an offensive interior strategy, as stated by a command simulation instructor during a fire service-based focus group discussion,

"If law enforcement can get in there quick and potentially get him to where he's a barricaded subject instead of an active roving shooter, now you've created a hot zone and warm zones; we are allowed to go into warm zones. So, if law enforcement can potentially corral him into a certain area where we can create our warm zone areas, we can potentially deploy."

According to most Incident Commanders, once inside the IDLH atmosphere created by the fire, fire tactics will involve standard department protocol for the structure type. In other words, if the fire is in a high-rise structure, the department's high-rise procedure will guide the victim rescue and fire suppression strategy.

"We'd like to complete a primary search, and so if I had law enforcement isolating the threat to a side of a building or a floor, then I would feel comfortable with them doing that. I would send a truck crew to the second floor with an engine there for protection as a backup line, and I would send law enforcement there as a backup in case something spills out to that floor. And really, the concepts are not too dissimilar as far as how I normally operate."

Interior offensive strategies were described in terms of the priority being victim rescue through the targeted search of survivable space, in combination with a fire attack, as explained by a Battalion Chief,

"But if they can go in there, do a quick kind of search, and then let our guys go in there and cut off the fire, then I'm killing two birds with one stone."

Another fire service IC explained the importance of a targeted search strategy,

"You know, if we could just save one person more than what we would have before, then we've done good. So, if you could break the building up into areas where you know there are people and just target those areas, it's a safer way as opposed to, hey, we're going to search all over on floors one or two or three or whatever, not knowing where the shooter is exactly. But maybe, you know, you got a good shot at saving people on some floor, and it's worth that opportunity."

The potential for large numbers of victims will require organization and triage. Study participants described the formation of an area to bring victims where they can be assessed. The idea mirrors the active shooter protocols causality collection point. Also, once victims are triaged, they need sufficient access to EMS transport. Again, fire service participants defined the need to establish a corridor for ambulances to arrive and leave with patients. The concept is similar to the active shooter version of victim transfer and is known as the ambulance exchange point. A fire service IC with EMS experience explained the strategy,

"It's an ambulance corridor or if it's an evacuation corridor, and then coordinating like, okay, do we have patients, first of all, are people shot or deceased in the interior? And if I get word, boom, that's like, alright, notify the hospitals. So, yeah, let the hospitals know this is what we got going on. We're going to have multiple patients coming in here, and let's start coordinating with the medical branch."

The demands on crews operating in the hot zone will require extreme physical stress. Therefore, Incident Commanders voiced the need for many units to place "on deck" to swap out as crews become physically taxed. Moreover, the crew members who perform the hot zone function,

particularly victim rescues and fire suppression activities, will require physical rehab before returning to service.

Offensive Exterior Strategy (Civil Unrest)

The two scenarios presented in this study had the shared characteristic of a structure fire with an active threat component. The difference between the two scenarios is in the number and location of the threat. Concerning civil unrest, a hostile exterior crowd is considered the active threat. Since the threat is crowd-based and exterior to the structure, defining the hazard zones and approaching the fire building was challenging for participants. The concern for the hazard zone created by the crowd is consistent with the literature (Donohue, 2019; NFPA, 2015, 2018). However, when there are savable lives inside a structure set on fire during civil unrest, fire service participants agree that firefighters must find a way to save the victims while protecting themselves. For fire service participants, the department risk philosophy, which says that they will risk a lot in a calculated manner to save savable lives, is a driving force behind their decision to act.

"The risk philosophy is still on, I think. We just have to adjust because our training for this philosophy is for natural physical things, like fire and weather, and now you have the human element integrated into it, but it's still the same thing."

Numerous fire service participants voiced concern about their ability to access the building due to the crowd. The perceived dangers of making an offensive approach without law enforcements protection were deemed too risky, as voiced by one fire service IC,

"My first concern would not even be what I do with the building, but how would I even access the building? So, as I'm looking at this, if I can't find a way to get to the building, then there's nothing I can do. You can't drive a fire truck through the crowd. You can't move a hose line through the crowd. You can't run the risk of running someone over. The fire truck that I'm in

today doesn't have door locks; some of them do, but this one I have doesn't. They lit these buildings on fire for a reason. And I am the rolling physical personification of extinguishment, which would appear the opposite motive of what this entire group of people has going for this day. So, despite the fact that people are trapped inside, to me, this entire thing is a fire department no-go."

The crowd component of civil unrest was the primary concern for study participants. For the most part, fire service Incident Commanders viewed the crowd as unpredictable, making determining the hot zone difficult. Therefore, for most, any location where the crowd could quickly move was considered the hot zone. A fire service IC with law enforcement experience described the issue,

"Things change, you know; the warm zone goes to the hot zone. There are probably guys in bunker gear now dropping lines and running away. You know because our hot zone has changed."

Initiating an offensive strategy to save trapped occupants proved challenging for most participants. Several Incident Commanders voiced the need for creative approaches to navigate the crowd and initiate structure fire response tactics. Uniformly, the fire service participants viewed the civil unrest scenario as law enforcement-led, meaning the ability of the fire service to rescue fire victims depends upon law enforcement's ability to protect them from the crowd. A Battalion Chief with 21 years of experience stated,

"So, we would definitely need a big enough response from law enforcement to be able to cordon off the area and block it off before our units can go in there and effect a rescue."

Another fire service IC stated that the fire service does not have crowd control capabilities,

"You can look at that crowd. You're not equipped to deal with it."

Numerous fire service Incident Commanders expressed hesitation to commit to any particular strategy, instead suggesting several methods that can be used individually or in conjunction to try and navigate the event. Most approaches center around the ability to control the threat posed by the crowd. One fire service IC explained how reading the crowd may be the first step in determining an appropriate strategy,

"We're not trying to escalate the crowd. We're trying to save the people. So, some sort of force may move them out the way, and then there's like a read-the-crowd type thought like if the crowd is being really aggressive, that's one thing, but if the crowd starts to back away, then you could be more aggressive yourself."

Common civil unrest-based strategies discussed by study participants included distracting the crowd, communicating with the crowd, finding the crowds weak points, responding to overwhelm, establishing a law enforcement perimeter with protected corridors, and targeted victim search with a rapid exit strategy.

To address the crowd, some fire service Incident Commanders felt a distraction might help weaken the crowd's perimeter on the opposite side of the distraction. For example, if fire apparatus and police vehicles with lights and sirens create a distraction on one side of the structure, the crowd may shift its attention to that side, leaving the opposite less occupied. A fire service IC who has specific training in firefighter safety and survivability said,

"A thought on this is to have a distraction. Okay, set up like where the main group is, with sirens, you know, air horns, all that kind of stuff. And then have crews come from the opposite side and rescue the occupants."

Some fire ICs believed combining the idea of distraction with communicating with the crowd using speakers to convey the intent to rescue fire victims may help disperse some of the group. The belief was that most protesters are not violent and do not want to be part of someone's death

in the fire. A high ranking Chief with 21 years of experience explained the potential benefit of communicating with the crowd,

"There's only probably a few bad actors in the crowd, and most don't want somebody to die inside; see how they react to that information."

With distractions and communication occurring, many study participants see an opportunity to advance on the building on the opposite side or other identified weak points. Accordingly, the advancement should include massive numbers of resources that are intended to overwhelm. The passage should be law enforcement-led, with fire service advancing as law enforcement clears a safety corridor. For one IC, the need for an overwhelming response is viewed as a factor in reducing responder risk,

"I think you are doing your best to overwhelm the incident with lots of staffing. I mean, a lot of people on our side would help mitigate the risk."

The common thought among Incident Commanders was the advancement on the weak point should be done without lights and sirens, as the distraction on the opposite side was a necessary component to their success. Also, the use of lights and sirens were viewed as possible crowd escalators, and from a fire service perspective, the ability of crews to rescue trapped occupants is enhanced by the de-escalation of the crowd, as simply stated by one fire service IC,

"*We're not trying to escalate the crowd. We're trying to save the people."*

Several study participants discussed using a tactical firefighting vehicle known as a Med Cat for civil unrest response. The Med Cat is an armored vehicle that has been converted to have fire suppression capabilities. Those who discussed the Med Cat suggested it be the lead vehicle in the fire suppression response. The Med Cat's capabilities during civil unrest were discussed during a focus group interaction.

"We have the Med Cat. That's the only thing we can use that's bombproof, bulletproof, and mobile, that we can connect to a pump and let that sucker get as close as we possibly can. And that's about all we're going to be able to do because we can't put people out there, right?"

However, the focus groups discussion turned to the limitations of the Med Cat due to its need to hook to a fire hydrant, leaving the supply line vulnerable to the crowd. As a whole, most fire service participants see the supply line as a weak point. Therefore, other unique apparatus types were discussed as options. The most common was the use of the department's Brush Trucks and Aircraft Firefighting (ARFF) vehicles, which can carry water, and have the ability to "pump and role".

According to several fire service Incident Commanders, all fire suppression apparatus should follow the safety corridor to the structure, where crews will initiate a rapid fire attack and search for victims. However, due to the possibility of the crowd overwhelming law enforcement, fire service personnel must be ready to exit rapidly. One fire service Battalion Chief described the firefighting strategies as a "get in, get out scenario." With this in mind, some fire service ICs identified the need for an exit strategy that leads the fire crews out of the hot zone and to the cold zone.

"Whatever it takes to get that crew out. And then once that crew is out of the hot zone, I will drop it all, and we're leaving. Yes, this is over."

Overall, most study participants voiced the need for creative strategies to successfully navigate a structure fire with people needing rescue, surrounded by a hostile crowd. Other suggested tactics included using helicopters to dump water on the building to suppress the fire. However, some interviewees felt the time delay of such a tactic was not ideal. Referring to the use of helicopters to help with fire suppression by using a "Bambi-bucket" for water drops, one Battalion Chief said,

"It's certainly a possibility. I mean, it kind of would be an unorthodox solution, but if the building was difficult enough to access, then of course. There's going to be a lot of wait time or spin-up time to get a bird in the air with the bucket, and then you'll have to grab water."

Also, reverse 911 calls were suggested to try and instruct trapped victims on how to self-rescue. Again, the legitimacy of the tactic was questioned. Also, the potential of setting up master streams from elevated locations to attack the fire was suggested. However, the strategy was viewed as dependent upon the structure's location to the surrounding environment. Ultimately, most fie service participants believe all of these strategies should be considered as potential solutions to the overall goal of victim rescue.

Theme Four - Resource Management

Numerous fire service and emergency management study participants voiced that response to a structure fire involving an active threat will require an abundance of resources. The resource demand of the incident is likely to increase in relationship to the time it takes to resolve the situation. According to several Incident Commanders, the time delay in acquiring the active threat information, combined with the postponement of resource dispatch and arrival, are an obstacle to effective response; as one Battalion Chief stated,

"The fire does not wait for us to get the all-clear to go in; it continues to grow."

The literature supports the resource demands of multi-hazard events (FEMA, 2016, 2019). According to FEMA (2016), active threat events, particularly coordinated attacks, can strain local response resources. Therefore, resource management is a priority (FEMA, 2016; Sheppard, 2017). The theme, Resource Management, is supported by the categories, Local Resources, and Regional Resources.

Table 10

Theme Four – Resource Management

Concept	Category	Theme
Initial Dispatch	Local Resources	**Resource Management**
Unified Dispatch		
Control Over-response		
Control Self-deployment		
Domain Awareness		
Jurisdictional Needs		
Resource Relocation		
Strategic Mapping		
Mutual-Aid Agreements	Regional Resources	
AHIMT-EOC Support		
Regional Medical		
Regional Law Enforcement		
Regional Fire Service		
Other Regional Resources		
MAC Group		
Resource Base Staging		

Local Resources

According to most interviewees, the resource management process starts with the initial dispatch. The dispatcher serves as the anchor point for determining the initial resource deployment. The information relayed from callers is crucial to situational awareness. Therefore, dispatchers must be aware of the information provided to separate dispatchers by separate callers. For example, if fire service dispatchers are receiving calls from residents who see the fire, and police dispatchers are receiving calls from those reporting a shooter, the dispatchers must be able to recognize the relationship and share information. A Battalion Chief with dispatch experience described the issue,

"If you can tap into dispatch, you know, how often do we dispatch or sit by law enforcement and see if they can pass us some information so we can find out where this person is and get it out so Command can act sooner rather than later."

The quick recognition of the severity of the incident will enhance initial resource deployment and reduce time delays. A fire service IC explained the need for timely resource deployment,

"Yeah, I think we would just have to work with dispatch to send our current resources, you know, a heavy response to the current problem and be prepared. Obviously, we're going to have staging in a couple of different areas. So, you know, each company has a come in and stage, and then we'd have to have somebody coordinating with dispatch, bringing in extra units as needed, releasing units if dispatch runs out of units."

One fire service participant described the importance of sending the necessary level of resources early in the incident,

"We're going to need lots of fire units, lots of medic units, and law enforcement; SWAT on the law enforcement side. I imagine we're going to need to use some of the lesser used parts of the Incident Command System, you know, so we'll need some of the more resources."

Dispatch protocol is likely to vary based on jurisdiction. However, the participants in this study described their dispatchers as fire and EMS-based and law enforcement as separate—separating dispatchers by agency results in poor information exchange. Regarding a structure fire involving an active threat, response information from law enforcement and fire service dispatchers must be shared. Information sharing will allow for accurate communication and prevent the delayed deployment of the necessary response agencies and resources. Study participants described such coordination as unified dispatch. Essentially, unified dispatch mirrors the Unified Command Model, whereby the agencies involved in response sit together to share essential information. One fire service Chief with experience as a dispatch supervisor said,

"What you can do and what I would do would be to prompt our dispatch supervisor to go and sit next to law enforcement dispatch and tell me what's going on from each side. So, there is this

central area, so to speak, right? They could be talking behind the scenes and doing all their stuff. And they can sit there and listen and give you information. So, just like a unified dispatch."

According to Boin (2007), the overconvergence of resources to the initial event can leave the jurisdiction vulnerable to other attacks. Therefore, the potential over-convergence of response resources must be recognized and avoided (Wenger et al., 1990; FEMA, 2016). According to the study participants, fire service and law enforcement dispatchers are likely to recognize over-convergence as units self-assign to the incident. Several emergency management interviewees voiced concern about the self-deployment of law enforcement entities. Self-assigning and overconvergence can create disorganization in the response structure, which inhibits resource accountability, possibly leaving the remainder of the jurisdiction without adequate service.

One fire service IC with law enforcement experience described a recent event with overconvergence by law enforcement entities during a school lock-down situation,

"It's going to be a larger response. It's going to be more disorganized, right, if you will. So that in itself is going to create a challenge. Just look at how law enforcement responded just to the school lockdown last week. All you have to do now is start paying attention to see what the law enforcement response is going to look like, not just here but across the country, right? So, we're going to have to contend with that. But again, to me, it just all goes back to if we can set up that initial Command and the sharing of information, it will at least help us better organize some sort of control."

Emergency management participants focused on ensuring response capabilities for the remainder of the jurisdiction. The need requires an awareness of the level of resources necessary to respond to the structure fire with an active shooter event versus the resources necessary to maintain response capabilities for the remainder of the public. Included in the assessment is the potential for an incident to evolve into a terrorist attack. A concept referred to as situational domain

awareness (FEMA, 2016). One high-ranking fire service Chief, who has training in Complex Coordinated Attack (CCA) response, described his experience with a tabletop exercise that challenged his domain awareness,

"It was really eye-opening. The scenario started with a bomb at the airport. The IC was requesting tons of resources. Then a mass shooting came in at the convention center, and that IC started requesting tons of resources. Then there was a fire at a downtown hotel. It wasn't long before I started having to withhold resources. It became clear that this could be a CCA, and I started having to deny resource requests. The IC would call for five ambulances, and I would say you're getting three; make it work."

A regional emergency management coordinator gave his perspective on the function of domain awareness,

"So, I'll have a small team in place to work with the locals to figure out requirements right now, probably through dispatch. I need the domain coverage time for that jurisdiction so they don't have undue stress. For mass casualty, do we need more doctors and nurses? Do we need to bring in ambulance strike teams? So, these are the type of questions that I'm gathering information for."

When discussing the demands of mass-causality incidents on the local EMS system, one fire service IC said,

"I know what it's also going to take, you're going to be getting all these EMS units, but you know, soon you're running out of EMS units, so you can only do what you can. So that's why I'm saying you have to be efficient to be effective; you have to have a strategy in place, and then resource placement is the big thing."

Situational domain awareness plays a crucial role in the early recognition of active threat situations and the need to dispatch resources efficiently (FEMA, 2016). For emergency service organizations, domain awareness is critical because it emphasizes maintaining response capabilities to meet the community's overall needs (FEMA, 2016). Awareness sources discussed by participants include dispatchers, local and regional EOC personnel, and the South Texas Fusion Center. Fusion centers are geographically dispersed throughout the United States and are designed to be a coordinated hub of information gathering to detect threats. A fire service IC who has experience in law enforcement described the value of fusion centers for active threat responses,

"You would make sure that somebody's got comms with somebody from the fusion side because they're going to be running a lot of the Intel. You're going to get the initial reporting from what the patrol officers are saying, but then you're going to have fusion that's already spun up. They're going to be dedicated, and then also our dispatchers are going to play a role in this as well because the calls are probably going to still be coming in from inside the building, right? You are looking to validate something that was missed. "

Another fire service IC with 21 years of experience described another benefit of the fusion center,

"Well, I think fusion would be an asset to tap into all the different cameras around the area that gives you some footage."

According to study participants, a critical component of resource management is redistributing response resources so service can continue for the remainder of the jurisdiction. Therefore, local dispatchers must remain vigilant to response needs and relocate resources to locations that enable adequate response capabilities.

Moreover, local dispatchers must proactively initiate mutual aid agreements if resource demands outweigh response capabilities. The fire service participants for this study reside in a large

municipal fire department that typically provides mutual aid for surrounding smaller fire departments. However, requesting assistance for themselves is rarely needed due to their large resource pool. Therefore, in the case of an escalating structure fire combined active threat event, dispatchers must be ready to request mutual aid, even though it's not a common practice. A fire service IC with mutual aid experience referenced the potential issue,

"I never thought about it because we provide mutual aid for other people. You can also have mutual aid from departments right up the road. There are a ton of a lot of little fire departments around."

Regarding the relocation of resources, some study participants referenced the benefits of pre-designated resource staging locations throughout their jurisdiction. Currently, their department is mapping locations at schools, where they can stage units in optimal positions in the event of an active shooter response. The same strategic mapping concept was discussed on a larger scale, whereby fire departments can predetermine staging locations throughout their jurisdictions, creating known places where resources can relocate to be better positioned for rapid deployment in the case of mass civil unrest or a terrorist attack.

Regional Resources

According to FEMA (2016, 2018), mass casualty events require intense resource demands. For example, during a terrorist attack, such as a CCA, local fire service resources are likely to become overwhelmed (FEMA, 2016). Resource allocation outside the affected jurisdiction is usually accomplished through mutual aid agreements with regional agencies (FEMA, 2018). Therefore, plans for effective resource allocation, including mutual aid agreements, should be established as part of the overall response plan (FEMA, 2016). According to Perry (2003), emergency management personnel are essential for supporting the resource demands of disaster response.

The topic of regional mutual aid support was common with emergency management interviewees. According to study participants, local dispatchers will initiate local mutual aid agreements, and emergency management personnel will activate regional support. According to one AHIMT Incident Commander, emergency management personnel will likely assemble at the regional EOC and start activating resources requested by the Area Command. The Area Command activation at the EOC was described by an AHIMT Incident Commander,

"IMTs role is to report to the EOC and have command of the whole area. Okay, regarding getting all the players together that have involvement."

Emergency management participants referenced several regional support agencies that are likely to be allocated. Multiple emergency management interviewees expressed the need for regional medical support. Specifically, an organization known as the Southwest Texas Regional Advisory Council (STRAC) would be a primary resource for medical help. Numerous study participants referenced prior response experience with STRAC and were confident in their abilities to provide support in the form of mobile medical units, which are designed to reduce transport time. A fire service IC and high-ranking medical supervisor with regional medical deployment experience explained the use of mobile medical units,

"I forget what the term is, but it's almost like MASH from the medical perspective. Instead of having ambulances have to transport all the way to the hospitals, we have some sort of setup mobile unit; STRAC does that. The big trailer and something like emergency medical tents. So, the mobile hospital, right? A couple of rounds of mobile hospitals."

During a structure fire with an active threat event, law enforcement from various agencies are likely to respond. According to study participants, these agencies will include county, state, and federal law enforcement, who will arrive to assist local law enforcement. When speaking about the response of multiple regional law enforcement agencies, the need for coordination and

accountability was a frequent topic. According to a regional emergency management coordinator, in a structure fire combined active shooter event, besides local law enforcement, state and federal law enforcement will also respond,

"The Texas Rangers are very good during mass casualty, helping local jurisdictions if you want them. You're still probably going to have to work with the FBI, the ATF, the Sheriffs, and Homeland Security. They need to send somebody over to the EOC as well as work with the IC, but if you're still in response, they shouldn't be going to the incident; they shouldn't be responding to the scene automatically. You don't want an overresponse, right? They are showing up and mucking it up."

The fire department participants for this study came from a large, well-staffed, full-time professional department. However, in the case of a CCA or mass civil unrest, some fire service Incident Commanders referenced the need for mutual aid by smaller regional fire departments, including neighboring cities and emergency services districts. These departments would likely assist the rest of the jurisdiction while local resources focus on the event.

In addition to regional resources, some study participants described the potential for recalling off-duty firefighters to assist. Other mentioned resources included a county organization that supports firefighter rehab and volunteer organizations that provide food for extended operations. A regional emergency management coordinator described his role in acquiring regional resources,

"Any jurisdiction will call me, and I send an email or call and say this is needed; I need to start the wheels rolling now. Based on the information, I'll call the local elected officials to see what's needed, and hopefully, those local elected officials are in contact with the EOC. Hopefully, the EOC is prioritizing what they need. Typically, we're going to prioritize resources for life safety and incident stabilization; we're going to follow them."

Numerous emergency management participants described the need for politicians and high-level agency administrators to be involved in decision-making regarding acquiring and deploying regional resources. Several emergency management coordinators and AHIMT Incident Commanders advocated using a pre-designated group of administrators called the Multiagency Coordinating Group (MAC). Recent emergency management literature supports the use of MAC Groups for the coordination of cross-jurisdictional resources (FEMA, 2019).

When discussing resource management, particularly from mutual aid and regional support, fire service participants expressed the need for resource control through a staging base. To avoid over-convergence and freelancing, fire service Incident Commanders desire all non-committed resources to collect at a predetermined staging location. The location should be in the cold zone, in an area that allows for easy ingress and egress. Also, the staging manager should supervise the coordination of staging units. According to several study participants, the base staging manager should be the officer of the first unit to arrive at the base, and the base staging location will likely need to be determined by the local dispatcher.

Theme Five – Support Functions

Study participants commonly cited a variety of functions necessary to support the response to a structure fire with active threat event. The auxiliary aspects required to support response activities are intended to aid those affected by the event. The need for communication with emergent groups and the public was discussed in numerous interviews. Also, those directly involved in the incident, both victims and responders, will have needs beyond those required during response. The theme, Support Functions, is supported by three categories, Public Messaging, Family and Victim Support, and Organizational Support.

Table 11

Theme Five – Support Functions

Concept	Category	Theme
Unified Messaging (JIC)	Public Messaging	**Support Functions**
Public Information		
Emergent Groups		
Volunteer Management		
Family Reunification	Family and Victim Support	
Witness Management		
Occupant Services		
Sheltering		
Leadership Support	Organizational Support	
Fire Service Expectation		
Public Expectations		
Responder Mental Health		

Public Messaging

Study participants expressed concern about controlling people arriving at the scene to try and help or because someone they know was affected. A key component to maintaining the perimeter of the scene is public messaging. Emergency management participants described the need for consistent and unified public messaging by all response organizations. The unified messaging provides direction to the public, emergent groups, and volunteer organizations. Therefore, representatives from all response agencies should form a Joint Information Center (JIC). One AHIMT Incident Commander described the purpose of the JIC,

"JIC stands for a Joint Information Center. That's where all of the PIOs locate to send out a coordinated and timely message. If people are getting different messages from different scenes or different places, then you know, there's confusion. Oh, yeah, and this has happened. We had a hurricane shelter operation going, and we were sitting in here ready. And we turn the TV on, and this guy is talking about some other sheltering; nobody knew who he was."

Previous response-based research has described the critical need to incorporate emergent groups and volunteer organizations into the ICS structure (Jensen & Thompson, 2016). These organizations provide value to the overall response; however, their positions in the response need to be defined. One purpose of the JIC is communicating with emergent groups and volunteer agencies to provide direction on integrating into the scene. A fire service IC with a dual law enforcement role described the need to communicate with all groups,

"So, from a resource management perspective, you better have a strong relationship with the PIO. You better be doing some training with your PIO, and the people from all these different agencies should be training together."

Family and Victim Support

According to FEMA (2018), organizing family reunification is typically an EOC function. Emergency management participants frequently conveyed the need for establishing a family reunification center to manage the victims' families. According to several participants, the jurisdiction has predesignated locations where family reunification can be organized and controlled. A family reunification location is essential during mass-casualty incidents (FEMA, 2018). One AHIMT Incident Commander explained the process,

"That reunification center, it's run by the EOC, and we'll have the guys out there. We have certain pre-designated spots. Family reunification is important because that's where we get a lot of their information. So yeah, they get everybody out there."

A fire service IC with emergency management experience explained the importance of setting up family reunification centers to keep people from coming to the scene,

"I know these are not immediate, but things like family reunification centers, you feel like they're good things to help people and to keep people out the scene."

Several emergency management interviewees expressed the need for witness management. Since a structure fire involving an active threat involves criminal activity, witnesses must be secured and statements provided. Therefore, witness management is needed. For many emergency management participants, witness management should occur at the family reunification center.

"You need to take people off-site. So, you've got some family reunification that's going on with some large-scale witness management, and you got an off-site sheltering of the people that are at the hotel. You have a massive traffic control problem. You've got a lot of pieces that are going overwhelm; you got to divide and conquer."

An emergency management coordinator described the witness management process,

"Everybody goes through the witness collection point. What did you see? You saw something, okay; I need your phone number so we can talk to you later. Did you take any pictures? I need to take your phone for a little bit and download those pictures. Yeah, so that happens, then they can go into reunification."

While emergency management participants focused on family reunification, many fire service participants described the need to support people who were displaced by the event. Most study participants referred to the function as occupant services. For fire service Incident Commanders, it was essential to provide shelter and support to everyone affected by the event. Occupant services were described as a joint function of their department's structure fire response and applicable to the scenarios.

Organizational Support

Numerous fire service participants described the need for timely support from their administration. The typically expressed view was that a structure fire response involving an active threat, with victims needing rescue, challenges the typical decision-making model.

Therefore, several fire service Incident Commanders voiced concern about their liability for making the wrong decision. Fire service participants frequently communicated the need for a higher-ranking administrator, commonly referencing their Shift Commander, to assist with strategic decisions at the command post. Recent research by Huntsman et al. (2022) supports the notion that leadership support during complex events enhances adaptive performance in the fire service. One fire service Battalion Chief with dispatch experience referenced the need to get the Shift Commander to the scene early by sending them with the initial dispatch package,

"It's just the tier one response would just be the Shift Commander and these three Battalion Chiefs. So, send the Battalion Chiefs and the Shift Commander first so they can get there quicker."

When discussing the need for leadership support, one high ranking Chief said,

"I have always thought I was like, operationally, whatever my Battalion Chiefs are doing, they know they got my support. My job is to think of everything else that could possibly happen. And let them keep doing the strategy it takes to put out the fire or whatever they're doing; let them control that. Let me try to take everything else off their shoulders."

Several fire service Incident Commanders expressed difficulty determining the appropriate risk for their crews. The specific direction from the fire service is to risk a lot to save people who can be saved. However, many fire service participants questioned that active threat events do not apply as the philosophy intended. Therefore, a few fire service interviewees indicated the need for the fire service, as a whole, to acknowledge the unique dangers of active threat events and update their risk paradigms accordingly. The belief is that an official statement from the greater fire service regarding the evolving hazards would bring clarity to their risk acceptance. The sentiment was stated by a Battalion Chief with 24 years of experience,

"After Uvalde, I think fire service-wide, there needs to be statements made and expectations that there's going to be certain calls where much is expected."

Many study participants voiced concern with the political climate surrounding recent events in the area where public safety agencies failed to meet public expectations. The result of the political environment in the area of the study caused many participants to reflect on their ability to meet public expectations. Referring to the potential perception of ineffective response, one fire service IC said,

"What we know is doing nothing is unacceptable; that's perfectly clear. We must do something."

A fire service IC, when discussing the politics surrounding civil-unrest events and the perceptions of the crowd control techniques likely needed to rescue people trapped in a structure fire said,

"My stance is I'm not there to worry about politics or the optics or how we look or how they might portray us in the news. Our job is to save people, keep our people safe, a quick fire attack, and get in and get out. We take care of the community long-term with whatever is going on. People are going to have to get out of our way so we can do our job, and that's what we're there for."

According to Boin (2007), public officials and organizational leaders are often scrutinized in the media and the legal system when an emergency response does not meet public expectations. When response failures occur, the public demands accountability, and the media often seek to place blame without a full investigation of the challenges of the incident (Boin, 2007). Therefore, fire service administrators must expect to be held accountable for their decisions during the response to a structure fire with an active threat.

Post-Traumatic Stress (PTSD) is an emerging concern for the fire service. A study by Del Ben et al. (2006) estimates as much as 37% of firefighters may suffer from PTSD. In addition, the

mental health stress caused by a response to traumatic incidents, both where victims are present and where personnel safety is threatened, are known precursors to PTSD (Greco et al., 2021).

Some interviewees expressed concern for the mental health of the firefighters who respond to a structure fire combined active threat event that produces mass casualties. History has demonstrated that structure fires combined with active threat events have the potential to cause mass causalities (McDaniel & Ellis, 2009; Rabasa et al., 2009; Pfeifer, 2013; FEMA, 2016). Therefore, fire service interviewees indicated a desire for mental health support after the event. Referring to the difficulties of living with the experience of an active threat response resulting in mass causalities, one fire service IC said,

"So, for example, going into a school where there's a shooter and a fire, the immediate risk is possibly tremendous, but I know also for sure that there's going to be serious risk if I do nothing, Because the next day when I shave, I'm going to have to look myself in the mirror, and I'm going to have to deal with the consequences of my inactivity for the rest of my life. A bullet wound may or may not heal, but I have to be able to be cognizant that I'm not only going to have to answer to the authorities and answer to the parents but also answer to my own code of ethics. That I was in this situation, and I either am happy or unhappy with my effect on the outcome. And that's just as real and tangible to me as all the other risks of physical damage, maybe worse and more insidious because I don't know how to treat it."

Summary of Findings

Interoperability between the fire service and law enforcement was expressed as a critical factor for successful response to any structure fire event that also involves an active threat. Moreover, fire service Incident Commanders voiced concern for their ability to initiate an effective strategy without coordination with law enforcement. Therefore, interagency training for active threat events was viewed as necessary. Also, study participants frequently conveyed the need for law

enforcement, EMS, and the fire service to collaborate on more minor real-world incidents to increase trust and familiarity.

The Incident Command System, in the form of a Unified Command Model, was uniformly considered essential to organizing a strategic response to a structure fire with an active threat event. For all study participants, the Unified Command Model, consisting of Incident Commanders from the fire service, law enforcement, and EMS, was essential. The Unified Command model was said to provide the communication and coordination necessary for fire service Incident Commanders to properly evaluate operational risks.

Fire service Incident Commanders will initiate victim rescue and fire suppression strategies directly relating to a risk-benefit analysis. All fire service participants agree that if there are no victims to rescue, no risk will be taken. However, if victims can be saved, the fire service will take a strategic approach to rescue victims while protecting firefighters. The strategies used to execute victim rescues and fire suppression depend on the proximity of the victims to the active threat. Ultimately, fire service Incident Commanders are willing to take a measured risk to rescue people in savable locations. However, the decision to initiate a defensive or offensive strategy depends on law enforcement's ability to protect firefighters.

Emergency management participants emphasized resource management and the functions needed to support the on-scene Unified Command Post. Situational awareness by emergency management ICs was critical to providing timely and accurate support to the response while maintaining emergency services to the remainder of the jurisdiction. As the incident expanded, the allocation and management of regional resources were a primary concern.

The outcomes of a structure fire combined with active threat event will require assistance from several support functions. Study participants described public messaging as crucial for controlling convergence of emergent crowds and groups. Survivor support was viewed as a

necessary component to helping victims and their families. Also, organizational support, in the form of strong leadership to help navigate critical decisions and manage public expectations was expressed by several Incident Commanders. Finally, the mental health of the firefighters and other responder who respond to a structure fire with active threat event was a critical concern.

Table 12

Summary of Findings

Concept	Category	Theme
Fire, Police, EMS	Interagency Training	**Interoperability Needs**
Interagency Familiarity		
Interagency Trust		
Interagency Communication		
Interagency Risk		
Strategic Understanding		
Resource Sharing	Previous Collaboration	
Intelligence Sharing		
Active Shooter Protocol		
Civil Unrest Protocol		
Unified Command Setup		

Concept	Category	Theme
Operations	Incident Commander Duties	**Incident Command System Components**
Planning		
Logistics		
Administrative		
Responder Safety		
Interagency Liaison		
Public Information		
First Unit On-scene	Assumption of Command	
Initial Command Post		
Initial Decision Making		
Responder Discipline		
Initial Strategy		
Strategic Agility		
Unified Dispatch		
Resource Determination		
Time Demands		
Unified Command Post	Unified Command Mode	
Fire Service IC		
Law Enforcement ICs		
EMS IC		
Support Organizations		
Adaptability		
Incident Complex	Expanded ICS	
Area Command Mode		
IMT Support		

Concept	Category	Theme
Information Needs	Initial Strategy	**Risk-based Strategies**
Situational Awareness		
Hazard Zone Identification		
Initial Command		
Unified Command Post		
Resource Needs		
Active Shooter Setup		
Civil Unrest Setup		
LE Perimeter		
Strategic Staging	Defensive Exterior Strategy	
Geographic Divisions		
Reconnaissance /Intelligence		
Exterior Targeted Rescues		
Exterior Fire Control		
Victim Communication		
Building System Support		
Threat Isolation/Suppression	Offensive Interior Strategy	
Active Shooter Extension		
Forward Command Post		
Force Protection		
IDLH Force Protection		
Tactical Firefighting Branch		
Tactical Lobby		
Firefighting/Rescue Corridor		
Targeted Search		
Firefighting Tactics		
Causality Collection Point		
Ambulance Exchange Point		
Firefighter Rehab		
Threat Distraction	Offensive Exterior Strategy (Civil Unrest)	
Crowd Communication		
Weak-point Approach		
Overwhelming Resources		
Specialty Vehicles		
LE Perimeter		
Protected Corridor		
Targeted Search		
Exit Strategy		
Other Tactics		

Concept	Category	Theme
Initial Dispatch	Local Resources	**Resource Management**
Unified Dispatch		
Control Over-response		
Control Self-deployment		
Domain Awareness		
Jurisdictional Needs		
Resource Relocation		
Strategic Mapping		
Mutual-Aid Agreements	Regional Resources	
AHIMT-EOC Support		
Regional Medical		
Regional Law Enforcement		
Regional Fire Service		
Other Regional Resources		
MAC Group		
Resource Base Staging		

Concept	Category	Theme
Unified Messaging (JIC)	Public Messaging	**Support Functions**
Public Information		
Emergent Groups		
Volunteer Management		
Family Reunification	Family and Victim Support	
Witness Management		
Occupant Services		
Sheltering		
Leadership Support	Organizational Support	
Fire Service Expectation		
Public Expectations		
Responder Mental Health		

CHAPTER V

RECOMMENDATIONS

The purpose of this chapter is to provide recommendations based on the findings. Consistent with the aim of this study, the theoretical analysis underpins the recommendations (Charmaz, 2014). Ultimately, the recommendation are intended to inform policy and practice in order to improve fire service strategies for structure fire under active threat response (Charmaz, 2014).

The findings from this study produced five themes, captured in 15 categories and 103 concepts. The themes and supporting categories are used to provide recommendations. The five themes constructed from the data are Interoperability Needs, Incident Command System Components, Risk-based Strategies, Resource Management, and Support Functions. These themes are discussed within the context of this study's research question to provide 15 recommendations based on each supporting category.

This study's research question is:

"What strategies are needed by Incident Commanders to support safe and effective structure fire response while under active threat?"

Interoperability Needs

Overwhelmingly, fire service and emergency management participants voiced the need for effective interoperability during structure fire with active threat events. The sentiment is consistent with emergency and disaster response literature (Cole, 2010; Newman, 2011; Atwater, 2012; FDNY, 2012; Marion et al., 2015; Pollock, 2013, 2017; DHS, 2018; H.M, 2020; McAleavy, 2021). For example, Marion et al. (2015) say that hostile events that require interagency response rely on effective interoperability. Consistent with the data, two recommendations to support and enhance interoperability are discussed in this section.

1. To enhance interoperability, fire service Incident Commanders and response personnel should conduct frequent interagency training with law enforcement and emergency medical services for structure fire under active threat events.

The data show that the fire service, law enforcement, and the emergency medical service must interact during a structure fire under active threat response. Study participants were clear that interoperability training is a precursor to real-world success. Accordingly, interoperability training was described as enhancing familiarity, trust, and communication among agencies. Also, interagency training was believed to be essential for the mutual understanding of each organization's risk acceptance and ultimate strategic philosophy. As a result of these positive attributes, interagency training among the fire service, law enforcement, and the emergency medical service is highly recommended.

2. To enhance interoperability, fire service Incident Commanders and response personnel should take advantage of real-world opportunities to interact with law enforcement by responding to incidents that promote collaboration.

Real-world collaboration, prior to a structure fire combined active threat event, was viewed as enhancing interoperability. Specifically, participants pointed to instances where collaboration

failed on small events and described the instances as critical lessons for future responses. Also, many study participants described missed opportunities to respond to minor incidents, primarily shootings, where opportunities to interact with law enforcement would be valuable. Therefore, administrators should seek to respond and interact with law enforcement whenever possible to further enhance interoperability between the fire service and law enforcement.

Incident Command System Components

Data analysis produced strong evidence for using the Incident Command System as the core response organizational framework. The data are consistent with emergency and disaster response-based literature (Bigley & Roberts, 2001; Buck et al., 2006; Moynihan, 2009; McAleavy, 2016, 2020; O'Neill, 2008). Also, the Incident Command System is mandated by Homeland Security Presidential Directive 5 (HSPD-5) as the primary response framework in the United States. Therefore, the use of the Incident Command System for structure fire response under active threat events is essential.

3. To effectively lead a structure fire under active threat response, fire service Incident Commanders must be capable of managing the complete scope of Incident Commander duties.

The Incident Commander of a structure fire under active threat event must be able to effectively manage the four primary duties of the Incident Commander, as well as account for responder safety, interagency communication, and public messaging. As described by the ICS literature, the four duties of the Incident Commander are operations, planning, logistics, and administration (FEMA, 2019, 2016).

For the most part, fire service Incident Commanders frequently manage incidents requiring local resources, typically defined as NIMS type five and four events (FEMA, 2019). According to fire service participants, Incident Commander duties for smaller events tend to focus on operations and planning, as well as logistics at the local level. Logistical needs that reside outside of local-

level response and the administrative duties of the incident are rarely required to be addressed by fire service Incident Commanders. However, during an active threat incident involving fire, the potential for the incident to expand beyond the local level is likely (FEMA, 2016). Therefore, fire service Incident Commanders must be prepared to manage all of the duties of the Incident Commander, including the transition of necessary components to All-Hazards Incident Management Teams (AHIMTs) and the emergency management realm.

4. During a structure fire under active threat response, the initial fire service Incident Commander must establish a strong Incident Command structure designed to balance responder discipline with strategic agility.

Fire service study participants believe the decisions made by the initial Incident Commander will be critical to the overall success of the incident. Therefore, the initial Incident Commander must establish a strong command presence to control incoming units (Brunacini, 2002; Coleman, 2008). This is done by announcing via radio that the Incident Command position and command post has been established (Brunacini, 2002; Coleman, 2008).

The initial Incident Commander must evaluate the incident and make an early determination of the initial strategy and the resources needed to navigate the event. The decisions by the initial Incident Commander will likely be determined with limited information and, therefore, will require the Incident Commander to remain fluid as new information emerges. According to most study participants, the initial ICS set-up is critical as the time demands of the advancing fire will require the necessary resources to be acquired quickly.

5. During the initial stage of a structure fire under active threat response, the fire service Incident Commander must aggressively seek to form a Unified Command Post with law enforcement and emergency medical services.

Incident Command System literature and data from this study revealed that a Unified Command approach is essential to manage the response to structure fire with combined active threat events. Moreover, most fire service participants voiced that the fire service Incident Commander must be proactive in establishing Unified Command by actively seeking out law enforcement and emergency medical service supervisors. While the fire service, law enforcement, and emergency medical services will make up the core of the Unified Command Post, other support organizations will likely be required. These support organizations, including law enforcement from outside jurisdictions, should be also represented at the Unified Command Post.

6. During a structure fire under active threat event, the Incident Commander must be prepared to manage an expansive Incident Command System framework that may require emergency management support.

Data from emergency management study participants revealed that structure fire under active threat events would likely require an expanded Incident Command System framework. The ability of the ICS to expand as needed is well established in the literature (Brunacini, 2002; Buck et al., 2006; Coleman, 2008). However, fire service Incident Commanders must be able to recognize the need to develop the system to broader levels, such as the Incident Complex and Area Command modes. Additionally, fire service Incident Commanders must know how to delegate expanded duties, such as administrative functions and regional logistics, to All-hazard Incident Management Teams and emergency management coordinators.

Risk-based Strategies

The American fire service makes its strategic decisions based on risk (USFA, 2018; IAFC. 2022). In other words, the mode of operation is determined by the perceived ability to save lives and property while accounting for firefighter safety (USFA, 2018; IAFC. 2022). Therefore, the

perception of risk determines the overall strategy; moreover, as the risk changes, the strategy changes (Brunacini, 2002; Coleman, 2008).

Fire service strategies are primarily defined as offensive or defensive (Brunacini, 2002; Coleman, 2008; Alison, 2017). Offensive strategies are executed when the Incident Commander has determined that the risk to firefighter safety is worth the benefit of saving lives or property, with a higher value placed on lives (USFA, 2018; IAFC, 2022). Typically, firefighters will be in an offensive strategy when there are lives to be saved, and risks are manageable (Brunacini, 2002; Coleman, 2008; IAFC, 2022). The defensive strategy is indicated with the Incident Commander determines that an offensive strategy does not warrant the safety risks to firefighters (Brunacini, 2002; Coleman, 2008; IAFC, 2022). Typically, firefighters are defensive when there are no lives to be saved and risks are high.

7. During a structure fire under active threat event, the Incident Commander's initial strategy should be based on all available information with previously established active shooter protocols guiding initial actions.

Fire service study participants believe that the initial strategy for structure fire with active threat events will be determined by available information. Therefore, the Incident Commander must actively seek information to enhance situational awareness and establish accurate hazard zones. The data from this study revealed that the primary information source regarding the active threat will be law enforcement. Therefore, the Unified Command Post will be essential for information gathering. Once the Unified Command Post is established, overall strategy and resource needs can more accurately be determined based on information sharing.

The process of establishing a Unified Command Post to gather and exchange information effectively will likely create a time delay. As a result, the fire service Incident Commander may need to organize a strategy before the formation of the Unified Command Post. In those cases,

fire service study participants pointed to utilizing the department's active shooter or civil unrest protocol to guide the initial strategic set-up. In other words, while the initial Incident Commander works to establish a Unified Command Post, an order can be given for on-scene crews to set up their pre-established protocols.

8. During a structure fire under active threat event, if the active threat is in the structure's interior, the Incident Commander should conduct defensive exterior operations in a protected and calculated manner to save people trapped by the fire.

Data from this study shows that the active threat is considered the primary concern for fire service responders. For most study participants, the hot zone created by the active threat is a no-go location for firefighters. Therefore, if the active threat is on the interior of the structure, then the interior is considered the hot zone. As such, firefighters must operate from exterior positions protected from the threat.

According to study participants, as law enforcement works to suppress the active threat, the fire service Incident Commander should begin to divide the incident into geographic divisions so that information can be gathered from the entirety of the scene. In the meantime, the priority should be to begin victim rescues in locations where the risks can be navigated. For example, if possible, victims presenting in windows or other accessible areas should be rescued. However, the Incident Commander must know that the hot zone can rapidly change, exposing firefighters to the active threat. Therefore, firefighters conducting exterior rescues must be protected by law enforcement. Also, if available, wearing ballistic protection and using shields or other ballistic barriers are advised.

In addition to conducting protected exterior rescues, the Incident Commanders should initiate fire extinguishment with master streams from aerial apparatus or elevated positions such as adjoining rooftops; in all cases, the streams should be unmanned. Also, if the building has fire suppression

capabilities, such as sprinklers, the exterior crews should support those systems. Finally, communication with victims on how to self-rescue or shelter in place should be given if possible.

9. During a structure fire under active threat event, If the active threat is suppressed or isolated, the Incident Commander should conduct an offensive interior strategy in a protected and calculated manner to save people trapped by the fire.

During a structure fire under active threat event, the primary concern for fire service responders is the hazard created by the active threat. The hot zone created by the active threat is, for the most part, a no-go location for firefighters. Therefore, the Incident Commanders' ability to initiate rescues of victims trapped by the fire is limited as long as the threat is active. However, consistent with the data from this study, if the active threat is confirmed to be isolated or suppressed by law enforcement, the Incident Commanders should begin an aggressive, offensive strategy designed to rescue people trapped by fire.

The offensive strategy should be an extension of the department's active shooter protocol whereby tactical firefighters are deployed from a forward command post, under force protection, using a protected corridor established by law enforcement. The interior firefighting component should be enhanced by gaining control of the building fire suppression function. The specific firefighting tactics should be consistent with department strategies for the structure involved; however, priority should begin with targeted searches in known victim locations. Victims should be brought to a causality collection point for evaluation and moved to the ambulance exchange point for transport as necessary. Also, the Incident Commander must maintain a large pool of firefighters for the rotation of crews, as the firefighting and rescue tasks are likely to cause severe exhaustion.

10. During a structure fire involving civil unrest, where the active threat is the crowd, the Incident Commander should conduct an offensive exterior strategy designed to gain access to the fire building in a protected and calculated manner to save people trapped by the fire.

According to the data from this study, the success of the fire service response to a structure fire with a crowd-based threat is highly dependent on law enforcement's ability to protect fire crews. The goal should be to gain access to the fire building, conduct quick searches to rescue trapped victims, and then evacuate the location as quickly as possible. Therefore, establishing and maintaining a corridor to the fire building should be a primary objective of the Incident Commander.

Gaining protected access to the fire building will be situational and likely require strategic agility by the Incident Commander. Some tactics that emerged from the data in this study include distracting the crowd on one side of the building while overwhelming the weak point or least occupied side of the building with responding units led by law enforcement. The firefighting strategy should be viewed as the rapid, targeted rescue of victims, followed by a quick exit from the crowd's reach once the strategic objective is accomplished.

Resource Management

Numerous fire service and emergency management study participants voiced that response to a structure fire involving an active threat will require an abundance of resources. The resource demand of the incident is likely to increase in relationship to the time it takes to resolve the situation. Ultimately, the needs of the fire, combined with the active threat, will likely require resources beyond the capabilities of the local jurisdiction. Therefore, resource management at the local and regional levels is critical.

11. To successfully manage a structure fire under active threat response, Incident Commanders and dispatch personnel must effectively allocate and manage local resources.

A structure fire under active threat event is likely to require a large amount of fire service and other support resources. The emergency dispatchers for law enforcement and the fire service will likely be the first to gather and disseminate information. Recognizing the event's severity and predicting the resources needed will be crucial to the overall success of the response. Therefore, upon realizing a structure fire with a combined active threat situation, fire service and law enforcement dispatchers should form a unified dispatch component designed to share and disseminate information.

Resource management at the local level will likely require the proactive dispatching of many resources and control of the resources. This should be done by controlling self-deployment and establishing strategic staging locations for incoming units. Also, the overall jurisdictional needs will still have to be addressed by relocating resources and recognizing an appropriate trigger point for regional assistance.

12. To successfully manage a structure fire under active threat response, Incident Commanders and emergency management personnel must allocate and manage regional resources effectively.

A structure fire under active threat event will likely require resource needs beyond the capabilities of the local jurisdiction. Therefore, mutual aid agreements must be operationalized to provide the needed support. Regional resources that support the response will likely come from area law enforcement, fire departments, and emergency medical services. Other resources may come from non-government organizations, volunteers, heavy equipment, and subject matter experts.

A key component of regional resource management resides in the emergency management realm. Specifically, the local and regional All-hazards Incident Management Teams (AHIMT) and emergency management coordinators will be involved in regional resource management to support the affected jurisdiction. Additionally, the emergency management component of the

response will likely be deployed to the area Emergency Operations Center (EOC), where other emergency management components will form to support the response.

Support Functions

This study's findings revealed various functions necessary to support the response to structure fire with active threat events. The support needs of the response are essential to account for the needs of all who may be affected. As such, most study participants viewed accurate and timely communication with emergent groups and the public as a necessity. Also, those directly involved in the incident, both victims and responders, will have needs beyond those required during response.

13. During a structure fire under active threat event, timely, consistent, and accurate public messaging will be essential to maintain perimeter control.

Media attention will be great during significant events, such as a structure fire under active threat. As a result, the public may converge on the scene to get information, particularly those with family and friends affected by the event. Such convergence can overwhelm the incident's location and weaken the scene's perimeter. Therefore, it is crucial for the responding organizations to communicate accurate, timely, and unified messaging to the media and the public. Accordingly, the messaging should include all pertinent information and be designed to prevent people from coming to the scene. In addition, included in the messaging should be a location for families to gather and directions for volunteers and emergent groups.

14. During a structure fire under active threat event, family and victim support functions should be initiated by the Incident Commander and emergency management personnel.

Auxiliary functions of the response include the responsibility to address the needs of victims and their families. Therefore, a family reunification component should be set up. The family

reunification location should be communicated through unified public messaging. The initiation of family reunification is typically done by emergency management personnel. Also, people affected or displaced by the event will need to be supported. For displaced people, the Incident Commander may need to create a group to provide occupant services, including sheltering those with limited resources. Finally, since a structure fire with an active threat event is criminal, witnesses will need to be gathered. Witness management typically occurs alongside family reunification and is a law enforcement-led function.

15. During and following a structure fire under active threat event, fire service administrators and organizational leaders must support the Incident Commander and responding personnel.

The decisions made during a structure fire under active threat response are acutely stressful and have long-term consequences for each responder and the organizations they represent. Therefore, fire service leaders must take prominent roles during and following a structure fire with an active threat event. The duties of department leaders should be to help support critical decision-making. Also, department administrators should understand the public's expectations and ensure that their organization is meeting the needs of the response in a manner that the public will support. Ultimately, a structure fire under active threat events will potentially create long-term trauma to responders' mental health. Therefore, fire service leaders should initiate critical stress debriefings, combined will long-term support for those who responded.

Summary of Recommendations

A valuable outcome of grounded theory studies is the application of the findings to real-world functions. To that point, Charmaz (2014) says, "We aim to develop theoretical analyses, and value grounded theory studies for informing policy and practice." (p.14). Therefore, the recommendations from this study may be viewed as best practices to inform fire service and emergency management organizations with similar attributes as the sample defined in this study.

The concepts, categories, and themes are directly linked to the underlying data, and underpin the provided recommendations (Charmaz, 2014, 2006). Therefore, the recommendations are tied to the strategies developed from the overall theoretical analysis. Ultimately, the 15 recommendations are grounded in each supporting category, and are summarized in the table below.

Table 13

Summary of Recommendations

Theme	Recommendations
Interoperability Needs	1. To enhance interoperability, fire service Incident Commanders and response personnel should conduct frequent interagency training with law enforcement and emergency medical services for structure fire under active threat events. 2. To enhance interoperability, fire service Incident Commanders and response personnel should take advantage of real-world opportunities to interact with law enforcement by responding to incidents that promote collaboration.
Incident Command System Components	3. To effectively lead a structure fire under active threat response, fire service Incident Commanders must be capable of managing the complete scope of Incident Commander duties. 4. During a structure fire under active threat response, the initial fire service Incident Commander must establish a strong Incident Command structure designed to balance responder discipline with strategic agility. 5. During the initial stage of a structure fire under active threat response, the fire service Incident Commander must aggressively seek to form a Unified Command Post with law enforcement and emergency medical services. 6. During a structure fire under active threat event, the Incident Commander must be prepared to manage an expansive Incident Command System framework that may require emergency management support.

Table 13 (continued)

Risk-based Strategies	7. During a structure fire under active threat event, the Incident Commander's initial strategy should be based on all available information with previously established active shooter protocols guiding initial actions. 8. During a structure fire under active threat event, if the active threat is on the structure's interior, the Incident Commander should conduct defensive exterior operations in a calculated and protected manner to save people trapped by the fire. 9. During a structure fire under active threat event, If the active threat is suppressed or isolated, the Incident Commander should conduct an offensive interior strategy in a protected and calculated manner to save people trapped by the fire. 10. During a structure fire involving civil unrest, where the active threat is the crowd, the Incident Commander should conduct an offensive exterior strategy designed to gain access to the fire building in a protected and calculated manner to save people trapped by the fire.
Resource Management	11. To successfully manage a structure fire under active threat response, Incident Commanders and dispatch personnel must effectively allocate and manage local resources. 12. To successfully manage a structure fire under active threat response, Incident Commanders and emergency management personnel must allocate and manage regional resources effectively.
Support Functions	13. During a structure fire under active threat event, timely, consistent, and accurate public messaging will be essential to maintain perimeter control. 14. During a structure fire under active threat event, family and victim support functions should be initiated by the Incident Commander and emergency management personnel. 15. During and following a structure fire under active threat event, fire service administrators and organizational leaders must support the Incident Commander and responding personnel.

CHAPTER VI

CONCLUSION

This study aimed to develop a theoretical analysis of structure fire response under active threat conditions, as no such analysis currently exists. Therefore, the objectives of this study were designed to provide a comprehensive account of the phenomenon and answer the research question. Moreover, an empirical study using constructivist grounded theory was deployed to create the theoretical base needed to inform future structure fire response under active threat. Finally, the findings were provided and tied to the recommendations to inform policy and practice, and future academic study.

Semi-structured interviews and focus group interactions consisting of 47 fire service and All-Hazards Incident Management Team (AHIMT) Incident Commanders and emergency management coordinators in South Texas were conducted and analyzed. Data analysis revealed several fire service response strategies to structure fire under active threat events. The findings include five themes embedded with 15 categories and 101 codes. The 15 categories and supporting codes were used to provide recommendations for fire service professionals regarding

structure fire under active threat response.

Key Findings

The key findings for this study are associated with the five themes constructed by the data and discussed herein.

Effective interoperability between the fire service, law enforcement, and emergency medical service is paramount to a successful response.

Interoperability is the capacity for organizations to operate together in an efficient manner (Pollock, 2013, 2017; H.M., 2020; McAleavy, 2021). Emergency response to a structure fire under an active threat event will require effective interoperability among responding organizations (Newman, 2011; Atwater, 2012; FDNY, 2012; Marion et al., 2015). The primary response organizations identified in this study are the fire service, law enforcement, and emergency medical services. These organizations must take a synergistic approach to manage the response as each relies on the other to navigate the hazards.

Data from this study revealed that effective interoperability during a structure fire with an active threat event requires prior training and collaboration amongst those responding. Specifically, interoperability training was described as enhancing familiarity, trust, and communication among agencies. Also, interagency training was believed to be essential for the mutual understanding of each organization's risk acceptance and ultimate strategic philosophy.

In addition, previous real-world collaboration was expressed as a necessary component of enchaining interoperability. In other words, a high-risk event, such as a structure fire with an active threat, should not be the first time organizations work together. Therefore, the fire service, law enforcement, and emergency medical services must take steps to practice and improve interoperability.

The Incident Command System will be the core framework for organizing the response and must be mastered by all responding organizations.

Emergency and disaster response literature highlights the need for the Incident Command System as the framework for all response-related activities (Bigley & Roberts, 2001; Buck et al., 2006; Moynihan, 2009; McAleavy, 2016, 2020; O'Neill, 2008). This study confirmed the same view amongst practitioners, as all study participants described the response as centered around the ICS model. While fire service Incident Commanders expressed confidence in their ability to operate within the ICS, they expressed a lack of confidence in law enforcement's ability to do the same.

The initial Incident Commander will need to make decisions with limited information. As a result, the Incident Commander of a structure fire under active threat event will need to be strategically flexible. The need for flexibility in the ICS is supported by Harrald (2006), who argues for a level of agility in the ICS model. Ultimately, establishing a Unified Command Post with law enforcement will be necessary to acquire more accurate and timely information. Therefore, the initial fire service Incident Commander may need to aggressively seek out a law enforcement supervisor to form a Unified Command Post.

Moreover, the Incident Commander for a structure fire under an active threat event must be capable of managing the scope of the duties of the Incident Commander. These duties include operations, planning, logistics, and administration (Brunacini, 2002). However, fire service Incident Commanders do not typically manage incidents that require the full scope of duties to be filled. Therefore, the transition of some responsibilities to incident support components, such as All-hazards Incident Management Teams (AHIMT) and emergency management coordinators, may be required.

Fire service strategies will be dictated by law enforcement's ability to manage the risk posed by the active threat.

According to fire service study participants, the hazard zone created by the active threat is considered a no-go location. In other words, the risk associated with entering an active threat hot zone does not match the fire services risk acceptance profile, as they do not have the capabilities to defend themselves against the active threat. Therefore, fire service Incident Commanders are unlikely to initiate rescues or fire suppression activities until the active threat is suppressed or isolated by law enforcement.

Fire service Incident Commanders expressed the desire to conduct rescues and fire suppression from the active threat warm zone with the protection of law enforcement. Therefore, law enforcement must provide force protection to fire service personnel operating in the warm zone. Notwithstanding, fire service Incident Commanders were comfortable initiating an aggressive, offensive strategy once the active threat was suppressed or isolated. Ultimately, the data from this study shows that the fire service depends on law enforcement to suppress or isolate the active threat and provide force protection to front-line firefighters to initiate rescues and fire suppression.

Effective resource management will be necessary to support the event and the jurisdiction's needs.

Fire service and emergency management study participants believe a structure fire under active threat event has the potential to exhaust the response resources of the affected jurisdiction. Therefore, resource management is essential and will likely require resource needs beyond the capabilities of the local jurisdiction. Emergency dispatchers from the fire service and law enforcement may be the first to recognize the scope of the event and should take action to ensure resource allocation and deployments are managed appropriately.

Moreover, if resources are required beyond the capabilities of the local jurisdiction, mutual aid agreements will need to be operationalized. According to study participants, a key consideration

in initiating mutual aid is the ability of the local jurisdiction to maintain response capabilities to the remainder of their community, as regional resources may need to be allocated to maintain services. According to emergency management study participants, regional resource management is often the responsibility of the emergency management realm. Therefore, All-hazards Incident Management Teams and emergency management coordinators are vital contributors to overall resource management.

The response will require support functions designed to inform the public and assist those affected by the event.

Data from this study revealed that a structure fire with a combined active threat event would require support beyond the initial response. According to emergency management participants, public messaging will be essential to controlling the scene's perimeter and directing family and friends of potential victims to locations away from the scene. Therefore, a family renunciation center should be established to gather families and reunite victims with loved ones, as well as capture witness statements. Also, supporting the needs of people displaced by the event was a concern for fire service Incident Commanders and emergency management participants. As such, shelters for displaced occupants should be considered. Finally, the potential stresses of responding to a structure fire under an active threat event will require organizational and administrative support from fire service leaders, including on-scene support to the Incident Commander and mental health support for the firefighters involved.

Contribution to Knowledge

Scholarly and practitioner literature on fire service response strategies during structure fires combined with an active threat is limited. Therefore, a goal of this study is to fill the knowledge gap by providing research-based recommendations grounded in the data collection and analysis of the perceptions of subject matter experts. Though the study is limited to South Texas, the

findings from this study can inform fire service organizations with similar capabilities. Ultimately, this study provides contributions regarding theory, policy, and practice.

According to Charmaz (2014), grounded theorists, "aim to develop theoretical analyses, and value grounded theory studies for informing policy and practice." (p.14). The aim of this study is consistent with Charmaz (2014) and thus develops a theoretical analysis on which to inform policy and practice. The theoretical contribution resides in the analytical linking of concepts, categories, and themes to form strategies for fire service response to structure fire under active threat conditions. Therefore, setting the stage for new research into the topic and adding to the academic literature.

Grounded theory findings are valuable for informing real-world functions (Charmaz, 2014). The findings from this study are used to develop the 15 recommendations. The recommendations are intended to improve fire service response to structure fire under active threat events. Since the recommendations are constructed by data obtained from subject matter experts, the recommendations can be viewed as best practices. Therefore, the recommendations can inform policy regarding structure fire under active threat response. Moreover, the policy, underpinned by the theoretical analysis, can guide the real-world response of fire service professionals. Ultimately, the findings developed by this study provides a research-based framework to inform future structure fire under active threat response strategies in policy and practice.

Limitations

The limitations of this study are consistent with qualitative strategies (Bell et al., 2018). For example, external generalizability is not the purpose of most qualitative research and, therefore, is not the goal of this study (Maxwell, 1992, 2002). However, the results offer limited generalizability, particularly to fire departments with similar attributes as the one described in this study. Similarly, the sample for this study is limited to a large fire department and emergency

management region in South Texas. The resources and capabilities specific to the sample in this study may not apply to other fire departments. Therefore, the findings are not generalizable to the broader fire service community. Also, as opposed to quantitative studies, qualitative studies seek replicability in methodology rather than findings. Therefore, the replicability of qualitative data is not a goal (Maxwell, 1992; Bell et al., 2018). In other words, a similar study in a different location may produce other findings. However, replicability is found in the methods used for this study (Maxwell, 2002).

Ideally, a sample of participants with real-world experience in structure fire under active threat events would be optimal. However, this study addresses a novel and emerging phenomenon, so locating participants with ample real-world experience is limited. Instead, this study sample focuses on the perceptions of Incident Commanders who have commanded similar responses and are trained on the risks and strategies required for all response types. Finally, though several study participants had a dual law enforcement and fire service background, a sample that captures a more robust law-enforcement perspective may enhance the findings.

Notwithstanding, this study aimed to capture the fire service perspective on a response type that is novel but has critical significance in contemporary and future fire service response. Therefore, the perceived limitations of this qualitative study should not overshadow the rich and valuable data it has produced (Strauss & Corbin, 1990; Charmaz, 2014). Ultimately, though the findings are not wholly generalizable, the data can be used for limited generalizability to inform fire departments and emergency management jurisdictions with similar attributes (Maxwell, 2002)

Future Research

This study lays the groundwork for future research. Future studies can include using quantitative analysis to measure the perceptions of a larger sample of firefighters concerning the applicability of the findings developed here. In addition, the findings can be tested in fire service training

scenarios using various experimental designs, including simulations, table-tops, and training ground exercises. Moreover, the findings and recommendations can be advanced through real-world application in pertinent events and the analysis of successes and failures.

Data analysis shows that the risk paradigm instituted by the fire service in the United States appears challenged when a structure fire and active threat merge. Factors that appear to challenge participant risk perceptions and acceptance include emotional connections and moral obligations, as well as fear of political ramifications and public scrutiny. Moreover, to enhance safety, the varying risk philosophies of responding agency may need to be combined into one overarching system. These issues should be considered in future research on firefighter risk decision-making.

Future research into the link between interoperability and the Incident Command System can also benefit from the results of this study. Precisely, research questions that focus on the critical nature of interoperability between law enforcement and the fire service in contemporary and future response. Also, research from the law enforcement perspective can be integrated with the findings from this study to form a more comprehensive analysis.

This study highlights the critical role of All-Hazards Incident Management Teams (AHIMT). Thus far, the corpus of AHIMT literature appears limited, and the findings from this study regarding the role of AHIMT as a support function for disasters and large emergencies can be used as a basis for AHIMT research. Similarly, future research that focuses on the support provided to local responders by emergency management practitioners will benefit from the findings of this study. Finally, future grounded theory research designs aimed at developing theoretical analysis on novel and emerging phenomena in the emergency and disaster response field will benefit from the framework used in this study.

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REFERENCES

9/11 Commission (2004), The 9/11 Commission Report: Final Report of the National Commission on the Terrorist Attacks upon the United States, National Commission on Terrorist Attacks Upon the United States, Washington, DC.

Agranoff, Robert. (2007). Managing within networks: Adding value to public organizations. *Washington D.C.: Georgetown University Press.*

Ahern, Jennifer et al. "Television Images and Psychological Symptoms after the September 11 Terrorist Attacks." *Psychiatry (Washington, D.C.)* 65.4 (2002): 289–300. Web.

Albores, Pavel, Shaw, Duncan (2007). Government preparedness: Using simulation to prepare for a terrorist attack. *Computers & Operations Research, 35, 1924-1943.*

Aldiabat, K. M., & Le Navenec, C. (2011). Philosophical roots of classical grounded theory: Its foundations in symbolic interactionism. *The Qualitative Report, 16*(4), 1063-1080.

. Alison, Laurence (2017). Offence or defence? Approach and avoid goals in the multi-agency emergency response to a simulated terrorist attack. *Journal of Occupational and Organizational Psychology, 90,* 51-57.

Atwater, Paul A. (2012). Force protection for fire fighters: Warm zone operations at paramilitary style active shooter incidents in a multi-hazard environment as a fire service core competency. *Naval Postgraduate School, Monterey, California.*

Babbie, E. (2014). *The practice of social research*. Cengage Learning Custom Publishing.

Baird, Arthur (2005). Pyro-terrorism - The threat of arson- induced forest fires as a future terrorist weapon of mass destruction. *Studies in Conflict and Terrorism 29, 415-428.*

Bakker, Edwin (2012). Forecasting the unpredictable: A review of forecasts on terrorism 2000-2012. *International Centre for Counter Terrorism.*

Bell E, Bryman A & Harley B (2018) Business Research Methods, 5th Ed, *Oxford University Press, Oxford, UK.*

Bem, D. J. (2004). Writing the empirical journal article. In J. M. Darley, M. P. Zanna, & H. L. Roediger III (Eds.), *The compleat academic: A career guide* (pp. 185–219). American Psychological Association

Bendle, M. F. (2009). Australia's nightmare: Bushfire jihad and pyroterrorism. *National Observer,* 79, 8–22.

Bernstein, P. L. (n.d.). Against the Gods: The Remarkable Story of Risk.

Bigley, G. A., & Roberts, K. H. (2001). The Incident Command System: High-reliability organising for complex and volatile task environments. *Academy of Management Journal, 44*(6), 1281–1299.

Bjelopera, Jerome P. (2017). Domestic terrorism: An overview. *Congressional Research Service.*

Bissell, R. (2013), Preparedness and Response for Catastrophic Disasters, CRC Press, Boca Raton, FLA.

Bloom, Mia. 2005. *Dying to Kill*: *The Allure of Suicide Terror*. New York: Columbia University Press.

Boin, A., & Hart, P. T. (2007). The crisis approach. *Handbook of Disaster Research*, 42–54.

Browne, K.E., & Peek, L. (2013). Beyond the IRB: An ethical toolkit for long-term disaster research.

Brunacini, Alan V. (2002). *Fire Command: The Essentials of Local IMS.* NFPA.

Buck, D. A., Trainor, J. E., & Aguirre, B. E. (2006). A critical evaluation of the Incident Command System and NIMS command system and NIMS. *Journal of Homeland Security and Emergency Management*, *3*(3).

Bureau of Alcohol, Tobacco, Firearms and Explosives (2022). ATF.gov

Burns, T. & Stalker, G. M. (1994), Mechanistic and organic systems of management, the management of innovation. *Oxford University Press, Oxford, UK,* 96-121.

Carden, George (2021). "East Sussex Fire and Rescue Service specialist equipment after 9/11". *The Argus*. Brighton.

Center for the Protection of National Infrastructure (2022). *Fire as a Weapon: Guidance on the Mitigation of the Risk Associated with Terrorist Use of Fire.* CPNI.

Charmaz, K. (2006). Constructing Grounded Theory: A Practical Guide through Qualitative Analysis London: Sage Publications.

Charmaz, K. (2009) Shifting the grounds: Constructivist grounded theory methods. *Developing grounded theory: The second generation, (ed. J.M Morse) New York: Routledge*

Charmaz, K. (2014). *Constructing Grounded Theory*. Los Angeles: Sage.

Charmaz, K. (2017). The power of constructivist grounded theory for critical inquiry. *Qualitative Inquiry*, *23*(1), 34–45.

Carissimo, Justin (November 6, 2017). *"26 dead in shooting at church in Sutherland Springs, Texas".* CBS News. Retrieved November 6, 2017.

Chang, H.-H. (2017). A literature review and analysis of the incident command system.

Cole D. (2000) The Incident Command System: A 25 year evaluation by California practitioners.

Cole, J. (2010), Interoperability in a Crisis 2: Human Factors and Organisational Processes, Royal United Services Institute, Whitehall, and London.

Coleman, John F. (2008). Incident Management for the Street-Smart Fire Officer, 2nd Edition.

Corbin, J.M., Strauss, A. Grounded theory research: Procedures, canons, and evaluative criteria. *Qual Sociol* 13, 3–21 (1990).

Creswell, John W. (2013) Qualitative inquiry, and research design: Choosing among five approaches. *Sage.*

Creswell, John W., and Dana L. Miller. "Determining validity in qualitative inquiry." *Theory into practice* 39.3 (2000): 124-130.

Cybersecurity and Infrastructure Security Agency (2021). *Fire as a Weapon.*

Daft, R.L. and A. Amstrong (2009). Organizations theory and design. *Nelson.*

Dement, Carl E. (2022). To stay or to go? A critical evaluation of carceral operations in slow-onset disasters. *Oklahoma State University, Stillwater, Oklahoma.*

Department for Communities and Local Government *"Introduction to the New Dimension project".*

Department of Homeland Security (2012). *Terrorist Interest in Using Fire as a Weapon.*

Department of Homeland Security (2018). *Fire as a Weapon: Security Awareness for Soft Targets and Crowded Places.*

Department of Homeland Security (2018), "Interoperability continuum: a tool for improving emergency response communications and interoperability", DHS, Washington, DC, available at: https://www.hsdl.org/?view&did5769874

Department of Homeland Security (2019). *Fusion Centers*. https://www.dhs.gov/fusion-centers

Despart, Zach (2020) "Systemic failures" in Uvalde shooting went far beyond local police, Texas House report details. The Texas Tribune.

Dey, I. (1999). Grounding grounded theory: Guidelines for qualitative inquiry. San Diego: Academic Press

Doherty, Vincent J. (2004). Metrics for success: Using metrics in exercises to assess the preparedness of the fire service in homeland security. *Naval Postgraduate School, Monterey, California.*

Donohue, D. (2019). *Preparing for civil unrest.* U.S. Fire Administration. https://nfa.usfa.fema.gov/pdf/efop/efo248668.pdf

De Cauwer, Harald, et al. (2016). Hospitals: Soft targets for terrorism? *Prehospital and Disaster Medicine, (32)*1, 94-99.

Deshpande, Nick (2008). Pyro-terrorism: Recent cases and the potential for proliferation. *Studies in Conflict and Terrorism, 32,* 36-44.

Donner, & J. E. Trainor (Eds.), *Handbook of Disaster Research* (pp. 3–22). Springer International Publishing.

Doss, & Shepherd, C. D. (2015). Active shooter: preparing for and responding to a growing threat (1st edition). Elsevier.

Drabek, T. (2003) Strategies for coordinating disaster responses. *Institute of Behavioral Science, University of Colorado at Boulder, Boulder, CO.*

Duyvesteyn, Isabelle (2004) How new Is the new terrorism? *Studies in Conflict & Terrorism, 27 (5),* 439-454.

Ellis, P. (1998). Chaos in the underground: Spontaneous collapse in a tightly-coupled system. *Journal of Contingencies and Crisis Management*, *6*(3), 137–152.

Emergency Management Institute (2018), "E/L/G 0300 intermediate incident command system for expanding incidents", EMI, Emmitsburg, MD.

FDNY Center for Terrorism and Disaster Preparedness (2012). Interagency tactical response model: Integrating fire and ems with law enforcement to mitigate mumbai-style terrorist attacks. *New York City, NY.*

Federal Bureau of Investigation (2022). *Definition of Terrorism*. Retrieved from: https://www.fbi.gov/investigate/terrorism

Federal Emergency Management Agency (2012). Funding Alternatives for Emergency Medical and Fire Service.

Federal Emergency Management Agency (2016). Critical Decision Making for Complex Coordinated Terrorist Attacks, *PER-335, Version 1.1*.

FEMA (N.D.) *ICS 100 – Incident Command System.* https://www.usda.gov/sites/default/files/documents/ICS100.pdf

FEMA (2017) *National Incident Management System*, 3rd Ed. https://www.fema.gov/sites/default/files/2020-07/fema_nims_doctrine-2017.pdf

FEMA (2019) *National Response Framework*,4th Ed, Retrieved from: https://www.fema.gov/sites/default/files/2020-04/NRF_FINALApproved_2011028.pdf)

FEMA (2019) E/L/G 0191 Emergency Operations Center/Incident Command System Interface.

FEMA (2022) E/L/G 0950 All-Hazards Incident Commander.

Findley, Michael. 2008. Strategies of Terrorism During Civil War. Presented at the Annual Meeting of Midwest Political Science Association, Chicago, IL, April 3-6.

Galea, Sandro, Jennifer Ahern, Heidi Resnick, Dean Kilpatrick, Michael Bucuvalas, Joel Gold, and David Vlahov. "Psychological sequelae of the September ll terrorist attacks in New York City." New England Journal of Medicine 346, 13 (2002): 982-987.

Galea, Sandro, David Vlahov, Heidi Resnick, Jennifer Ahern, Ezra Susser, Joel Gold, Michael Bucuvalas, and Dean Kilpatrick. "Trends of probable post-traumatic stress disorder in New York City after the September l1 terrorist attacks." American Journal of Epidemiology I58, 6 (2003): 514-524.

Ganor, Boaz (2002). “Defining terrorism: Is one man’s terrorist another man’s freedom tighter?” *Police practice & research: an international journal.* 3.4 287–304.

Garcia, Evan; Buch, Jason (June 28, 2022). "Death toll from migrants found in truck in Texas reaches 50, Mexico says". Reuters.

Gearty, Conner (2007). Terrorism and human rights. *Government and Opposition*, *42*(3), 340–362.

Glaser, B., & Strauss, A. (1967). The discovery of grounded theory: Strategies for qualitative research. *Mill Valley, CA: Sociology Press.*

Global Terrorism Database (GTD), University Maryland, May 2022

Goldman, Russell (December 24, 2012). "Gunman, William Spengler, Shoots 4 Firefighters, Kills 2, in 'Trap' at Webster, NY, Blaze". *ABC News*. Retrieved November 14, 2020.

Goodwin, Jeff. 2006. A Theory of Categorical Terrorism. *Social Forces* 84(4): 2027- 2046.

Gulick, Luther (1937) Notes on the theory of organization.

Ha, Kyoo-Man (2009) Emergency management in Korea: Just started, but rapidly evolving.

Harrald, J. R. (2006). Agility and discipline: Critical success factors for disaster response. *The ANNALS of the American Academy of Political and Social Science*, *604*(1), 256–272.

Healthcare Information and Management Systems Society (2020), “What is interoperability?”.

HIMMS, Chicago, IL, available at: https://www.himss.org/resources/interoperability-healthcare.

Huntsman, David & Greer, Alex & Murphy, Haley & Li, Xiangyu. (2022). The effects of empowerment at multiple leadership levels in the fire service: a moderated mediation model. International Journal of Emergency Services.

H.M. Government (2020), “Joint emergency services interoperability principles”, JESIP, London, available at: http://www.jesip.org.uk/home

H.M. Government (2013), “The joint doctrine: the interoperability framework”, JESIP, London, available at: http://www.jesip.org.uk/uploads/resources/JESIP-Joint-Doctrine.pdf.

Hofstede, Geert (1984). Culture’s consequences: International differences in work-related Values. *Volume 5, cross-cultural research, and methods.*

Hoffman, Bruce. (1998). *Inside Terrorism*. New York: Columbia University Press.

Hood, J.C. (2007). Orthodoxy vs. Power: The Defining Traits of Grounded Theory.

Hubbard, Ben, et al. (2019). Pompeo calls attacks on Saudi Arabia “Act of War” and seeks coalition to counter Iran. *New York Times, September 18, 2019.*

Ikle F. (1951) The effects of war destruction upon the ecology of cities, *Social Forces*, 29(4), 383-391.

Jacob, Jamey & Muphy, Haley (2022). Public safety small unmanned aerial systems (sUAS) compliance training: Literature review & use case study. *National Fire Protection Association, February 2022.* Oklahoma State University.

Jackson, Brian A. & Frelinger, David R. (2008). Rifling through the terrorists.

arsenal: Exploring groups’ weapon choices and technology strategies, *Studies in Conflict & Terrorism, 31:7*, 583-604.

Jenkins, Brian M. (1974) *International Terrorism: A new kind of warfare.*

Jensen, J., & Thompson, S. (2016). The Incident Command System: A literature review. *Disasters, 40*(1), 158–182.

Johnson, Keith H. (2014). Changing the paradigm: Implementation of combined law enforcement, fire, and emergency medical service (EMS) cross-disciplinary response to hostile events. *Naval Postgraduate School, Monterey, California.*

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of theory under risk. *Econometrica, 47*(2), 263–292.

Kahneman, D., & Tversky, A. (1984). Choices, values, and frames. *American Psychologist, 39*(4), 341–350.

Kahneman, D. (2011). Thinking, fast and slow. Farrar, Straus and Giroux.

Kasperson, R. E., Renn, O., Slovic, P., Brown, H. S., Emel, J., Goble, R., Ratick, S. (1988). The social amplification of risk: A conceptual framework. *Risk Analysis*, *8*(2).

Khan, Md. N. H., & Neustaedter, C. (2019). Exploring drones to assist firefighters during emergencies. *1st International Workshop on Human-Drone Interaction.*

Kiefer, J. J, and R. S Montjoy. 2006. "Incrementalism before the storm: Network performance for the evacuation of New Orleans." *Public Administration Review* 66(s1): 122–30.

Lake, David. 2002. Rational Extremism: Understanding Terrorism in the Twenty First Century. *Dialogue IO* 1(1): 15-29.

Lambert, S. D., & Loiselle, C. G. (2008). Combining individual interviews and focus groups to enhance data richness. *Journal of advanced nursing*, *62*(2), 228–237.

Lasaffre, Xavier, et al. (2017). Remote damage control during the attacks of Paris: Lessons learned by the Paris Fire Brigade and evolutions in the rescue system. *Trauma Acute Care Surgery*, *82*(6), 107-113.

Lindell, M. K., & Perry, R. W. (2012). The protective action decision model: Theoretical modifications and additional evidence. *Risk Analysis, 32*(4), 616–632.

Lindell, M. K. (2013). Disaster studies. *Current Sociology, 61*(5–6), 797–825.

McDerwitt, Deanna M. (2017). Searching for effective training solutions for firefighters: The analysis of emergency responses and line of duty death reports for low frequency, high-risk events. *Naval Postgraduate School, Monterey, California.*

Moynihan, Donald P. 2009. "The network governance of crisis response: Case studies of Incident Command Systems." *Journal of Public Administration Research and Theory* 19: 895–915.

Murphey, Jack J., Ellson, James P. (2010). Responding to target buildings in a terrorist attack: are your crews prepared? *Fire Engineering,* 20-26.

Marino, Michael et al. (2015). To save lives and property: High threat response. *Homeland Security Affairs, 11*(5), 1-18.

Marino, Michael. "Defining Fire as a Weapon (FaaW): Clarity, Implications, and Opportunity for the Homeland Security Enterprise" *Journal of Homeland Security and Emergency Management,* 2022.

Martin, Gus (2017). *Understanding Terrorism: Challenges, Perspectives, and Issues 6th Edition.* Sage.

Martin, Gus (2020). *Understanding Terrorism: Challenges, Perspectives, and Issues 7th Edition.* Sage.

Martin, L. J. 1985. "The Media's Role in International Terrorism." *Terrorism* 8 (2): 127–46.

Maxwell, J. A. (1992). Understanding and validity in qualitative research. *Harvard Educational Review, 62*(3), 279–300.

Maxwell, J. A. (2002). *Understanding Validity in Qualitative Research*. Sage Publications.

Maxwell, J. A. (2017). The validity and reliability of research: A realist perspective. In *The BERA/SAGE handbook of educational research: Two volume set* (Vol. 1, pp. 113-141). Sage. https://doi.org/http://dx.doi.org/10.4135/9781473983953.n6

McAleavy, T. (2010), "Facing disaster with wide-area emergency preparedness", Resilience, pp. 50-53, 2010, August.

McAleavy, Tony. (2016). Metaphors of command and control in the United Kingdom and the United States of America.

McAleavy, T. and Rhisiart, M. (2019), "Harnessing the power of metaphor: uncovering a hidden language of interoperability within the natural speech of emergency managers", International Journal of Emergency Management, Vol. 15 No. 1, pp. 1-25.

McAleavy, Tony (2020) Perceiving the effects of scale on command and control: A conceptual metaphor approach, *Journal of Emergency Management, 18(2)* 91-104.

McAleavy, Tony (2021), "Interoperability and standardization: Lessons from the fruit-bowl", *Disaster Prevention and Management*, Vol. 30 No. 4/5.

McEntire D. (2014) *Disaster Response & Recovery: Strategies & Tactics for Resilience*, Wiley, Hoboken, NJ, USA

Miletta, Samual (2021). Risks associated with the use of fire as a weapon by terrorists in the Australian context.

Moody, Theodore (2010). Filling the gap between NIMS/ICS and the law enforcement initial response in the age of urban jihad. *Naval Postgraduate School, Monterey, California.*

Morgan, D. L., Morgan, D. (1997). Focus Groups as Qualitative Research. *India: SAGE Publications.*

Muller, Edward and Karl-Dieter Opp. 1986. Rational Choice and Rebellious Collective Action. *American Political Science Review* 80(2): 471-488.

National Emergency Management Agency of Korea. (2009). NEMA Website. Available at http://eng.nema.go.kr/

Nalbandov, Robert Dr. "Irrational rationality of terrorism." *Journal of Strategic Security* 6, no. 4 (2013): 92-102.

National Counter Terrorism Center (2020). Persistent Threat of Terrorist Ambush Attacks on First Responders.

National Counter Terrorism Center (2022). Mitigating the Threat of Terrorist-Initiated Arson Attacks on Wildland-Urban Interface Areas.

NFFF. (n.d.) Initiative 12: National protocols for response to violent incidents should be developed and championed [White paper]. National Fallen Firefighters Foundation.

National Center for Biomedical Research and Training (NCBRT) (2022) Active Threat Integrated Response Course (PER-340)

National Fire Protection Association (2015). Response to civil unrest. *Urban Fire Forum 2016.*

National Fire Protection Agency. (2018) *NFPA 3000 Standard for Active Shooter and Hostile Event Response*. Quincy: NFPA.

National Police Improvement Agency (2009), "Guidance on multi-agency interoperability", NPIA, London, available at: http://library.college.police.uk/docs/acpo/Multi-agency-Interoperability-130609.pdf

Newman, Sean (2011). Braving the swarm: Lowering anticipated group bias in integrated fire/police units facing paramilitary terrorism. *Naval Postgraduate School, Monterey, California.*

Nesser, Peter & Stenersen, Anne (2014). The modus operandi of jihadi terrorists in Europe. *Perspectives on Terrorism, 8(6), 2-24.*

Neal, D. M., & Phillips, B. D. (1995). Effective emergency management: reconsidering the bureaucratic approach. *Disasters*, *19*(4), 327–337.

Neal, D. M. (1997). Reconsidering the phases of disasters. *International Journal of Mass Emergencies and Disasters*.

Nemeth, Stephen. (2010). A rationalist explanation of terrorist targeting. Theses and Dissertations.

Nemeth, S. (2017). Rational Choice and Religious Terrorism: Its Bases, Applications, and Future Directions. In J. Lewis (Ed.), *The Cambridge Companion to Religion and Terrorism* (Cambridge Companions to Religion, pp. 102-115). Cambridge: Cambridge University Press. doi:10.1017/9781316492536.008

Oliver-Smith, A. (1999). "What is a disaster?": Anthropological perspectives on a persistent question. *The Angry Earth: Disaster in Anthropological Perspective*.

O'Neill, Brian G. (2008). A model assessment tool for the Incident Command System: A case study of the San Antonio Fire Department. *Texas State University, San Marcos, Texas.*

Pate-Cornell, E. (2002). Risk and Uncertainty Analysis in Government Safety Decisions. *Risk Analysis, 22*(3), 633–646.

Pearson, M., S. Wilking, and L. Effron. 2018. "Survivors of 1993 Waco Siege Describe What Happened in Fire that Ended the 51-Day Standoff." *ABC News*. Retrieved from: at https://abcnews.go.com/US/survivors-1993-waco-siege-describe-happened-fire-ended/story?id=52034435.

Pendrotti, Andrew (2011). On trial: The Branch Davidians of Waco Texas 1987-1993. *Wright State University.*

Peek, L. A., & Sutton, J. N. (2003). An exploratory comparison of disasters, riots and terrorist acts. *Disasters, 27(4),* 319–335.

Pennardt, A. M., & Schwartz, R. B. (2014). Hot, warm, and cold zones: applying existing national incident management system terminology to enhance tactical emergency medical support interoperability. *Journal of special operations medicine: a peer reviewed journal for SOF medical professionals*, *14*(3), 78-79.

Perry, R.W. (2003). Emergency operations centers in an era of terrorism: Policy and management functions. *Journal of Contingencies and Crisis Management, 11*, 151-159.

Perry, R. W. (2003). Incident management systems in disaster management. *Disaster Prevention and Management*, *12*(5), 405–412.

Perry, R. W. (2018). Defining disaster: An evolving concept. In H. Rodríguez, W.

Pfeifer, Joseph W. (2013). Fire as a weapon in terrorist attacks. *Combating Terrorism Center Sentinel,* (6)7, 5-8.

Phibbs W.M. & Snawder M.A. (2014) Embracing the Incident Command System above and beyond theory.

Phillips, Brenda D. "Qualitative methods and disaster research." *International Journal of Mass Emergencies and Disasters* 15.1 (1997): 179-195.

Phillips, Brenda. 2014. *Qualitative Disaster Research*. Oxford University Press.

Pollock, K. (2013), Review of Persistent Lessons Identified Relating to Interoperability from Emergencies and Major Incidents since 1986, EPC, Cabinet Office, Easingwold.

Pollock, K. (2017), Local Interoperability in UK Emergency Management: A Research Report, EPC, Cabinet Office, Easingwold.

Quarantelli, E.L. (1983), "Emergent citizen groups in disaster preparedness and recovery activities", Ohio State University, OH, USA, DRC, available at: http://udspace.udel.edu/handle/19716/1206

Quarantelli, E. L., Lagadec, P., & Boin, A. (2007). "A heuristic approach to future disasters and Crises: New, Old, and in-between Types." *Handbook of Disaster Research*, 16–41.

Quarantelli, E. L., Boin, A., & Lagadec, P. (2018). Studying future disasters and crises: A heuristic approach. In H. Rodriguez, W. Donner, & J. E. Trainor (Eds.), *Handbook of Disaster Research* (pp. 61–83). Springer.

Rabasa, Angel, et al., (2009*).* The lessons of Mumbai. *RAND,1-27.*

Repousis, Spyridon (2018). Pyro terrorism in Greece? Greek forest fires August 2007 and impact on Greek banks stocks. *Journal of Money Laundering, (21)*2, 163-170.

Roman, Jesse (2014). The next threat. *NFPA Journal, 108(6), 9-10.*

Ross, Jeffrey. 1993. Structural Causes of Oppositional Political Terrorism: Towards a Causal Model. Journal of Peace Research 30(3): 317-329.

Runciman, W. G. (1983). A treatise on social theory, vol. 1: The methodology of social theory. *Cambridge: Cambridge University Press.*

SAFD Community Risk Assessment and Standards of Cover (SAFDCRASOC) (2017).

Sandler, Todd, John Tschirhart, and Jon Cauley. 1983. A Theoretical Analysis of Transnational Terrorism. *American Political Science Review* 77(1): 36-54.

Schmid, Alex P. and Jongman, Ablert J. (1988). Political terrorism; A new guide to actors, authors, concepts, data bases, theories, and literature. *New Brunswick, NJ: Transaction,* pp. 5–6.

Schroeder, A., G. Wamsley, and R. Ward (2001) 'The evolution of emergency management in America: from a painful past to an uncertain future'. *In A. Farazmad (ed.) Handbook of Crisis and Emergency Management. Marcel Dekker, Inc., New York, NY*. pp. 357–418.

Slovic, P., Finucane, M., Peters, E., & MacGregor, D. G. (2004). Risk as Analysis and Risk as Feelings: Some Thoughts about Affect, Reason, Risk, and Rationality. *Risk Analysis*, *24*(2), 1–12.

Galea, Sandro, Jennifer Ahern, Heidi Resnick, Dean Kilpatrick, Michael Bucuvalas, Joel Gold, and David Vlahov. "Psychological sequelae of the September ll terrorist attacks in New York City." New England Journal of Medicine 346, no.13 (2002): 982-987.

Scarborough, R. C. (2017). Risk a Lot to Save a Lot: How Firefighters Decide Whose Life Matters. *Sociological Forum*, *32*(S1), 1073–1092.

Schwab, A.K., Sandler, D., & Brower, D.J. (2016). *Hazard Mitigation and Preparedness: An Introductory Text for Emergency Management and Planning Professionals*, (2nd ed.). CRC Press.

Seidel, Gary (2007). Using area command to manage multiple incidents. *Fire Engineering, (160)*9, 23-26.

Shafritz, Jay; Ott, J. Steven (2001). "Classical organization theory". *Classics of Organization Theory (5 ed.). Orlando: Harcourt.*

Shafritz, Jay M. and Albert C. Hyde. (2016). Classics of public administration, *8th ed. Cengage Learning.*

Sheppard, Adrian (2017*).* Fire as a weapon: High rise structures. *Naval Postgraduate School, Monterey, California.*

Shu-yingm, Li, Shun-jiang, Ni, Shi-fei, Shen (2014). Risk analyzing on target type of arson attack. *Procedia Engineering, 71, 502*-511.

Shields, Patricia M., Rangarajan, Nandhini (2013). *A Playbook for Research Methods: Integrating Conceptual Frameworks and Project Management*. New Forums, Stillwater, Oklahoma.

Simon, Herbert (1946) The proverbs of administration.

Slovic, P., Finucane, M., Peters, E., & MacGregor, D. G. (2004). Risk as Analysis and Risk as Feelings: Some thoughts about Affect, Reason, Risk, and Rationality. *Risk Analysis*, *24*(2), 1–12.

Stohl, Michael. 1988. “Demystifying Terrorism: The Myths and Realities of Contemporary Political Terrorism.” In *The Politics of Terrorism* 3rd ed., ed. Michael Stohl. New York: Marcel Dekker.

Stohl, Michael. 2007. Swamps, Hot Spots, Dick Cheney, and the Internationalization of Terrorist Campaigns. *Conflict Management and Peace Science* 24(4): 257-264.

Taherdoost, Hamed. (2022). How to Write an Effective Discussion in a Research Paper; a Guide to Writing the Discussion Section of a Research Article. Open Access Journal of Addiction and Psychology. 5.

Taylor, F. W. (1912.). The principles of scientific management.

Texas All Hazard Incident Management Team Program, Master Plan (2022). Texas A&M University. Retrieved from https://ticc.tamu.edu/IncidentResponse/tier3_ahimt.aspx

Texas Department of Emergency Management (TDEM) (2022). Retrieved from: https://www.tdem.texas.gov/regions

Tierney, K. J. (1999). Toward a critical sociology of risk. *Sociological Forum*, *14*(2), 215-242.

Tierney, K. J. (2007). From the margins to the mainstream? Disaster research at the crossroads. *Annual Review of Sociology*, *33*(1), 503–525.

Tierney, Martin (2016). Facilitating the medical response to an active shooter hot zone. *Naval Postgraduate School, Monterey, California.*

Thornberg, R. & Charmaz, K. (2012). Grounded Theory. *Qualitative research: An introduction to methods and design,* 41-67.

Trainor, J. E., Stern, E. K., & Subbio, T. (2018). On bridging research and practice in disaster science and management: Unified system or impossible mission. In H. Rodriguez, W. Donner, & J. E. Trainor (Eds.), *Handbook of Disaster Research* (pp. 161–178). Springer

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science, 185(4157),* 1124–1131.

United States Department of Energy (2016) Comprehensive Emergency Management System

United States Fire Administration (2018). Risk Management Practices in the Fire Service. *FEMA.*

United State Senate Select Committee (2014). Review of the Terrorist Attacks on U.S. Diplomatic Facilities in Benghazi, Libya, September 11–12, 2012.

Urban Fire Forum- Metro Fire Chiefs Position Paper, 2014. *Fire and Smoke as a Weapon.*

Wildavsky, Aaron & Dake, K. (1990). Theories of Risk Perception: Who Fears What and Why? Daedalus, 119(4), 41–60.

Wallace, A. F. C. (1956). Human behavior in extreme situations. *Washington, DC, USA: National Research Council—National Academy of Sciences.*

Waugh, W. L. (2006). Terrorism as disaster. In H. Rodriguez, E. L. Quarantelli, & R. R. Dynes (Eds.), Handbook of disaster research (pp. 388–404). New York, NY, USA: Springer.

Waugh, W. and G. Streib (2006) 'Collaboration and leadership for effective emergency management.' *Public Administration Review. 66(1)* 131–140.

Weber, Max (1922) Bureaucracy.

Weber, M. (2017). Characteristics of Bureaucracy.

Weeks, Douglas M. (2007). Strategic changes for the fire service in the post -9 /11 era. *Naval Postgraduate School, Monterey, California.*

Wenger, D., E. Quarantelli, and R. Dynes (1990) 'Is the Incident Command System a plan for all seasons and emergency situations?'. *Hazard Monthly.* 10 (March). pp. 8–12.

Yin, Robert K. (2007). Case Study Research: Design and Methods. *Applied Social Research.* (5) 3.

Yonko, David J., Brienen, Martin W., Wu, Hao-Che, Chang, Hsien-Ho Ray (2018). *Phenomena Within the National Fire Incident Reporting System: Practices of Resource Deployment and Safety Concerns from 1998-2014 in the American Fire and Emergency Services*.

APPENDICES

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Appendix A

Interview Scenarios *(Individuals and Focus Groups)*

1. You are the IC for a fire at a local hotel. You are notified that there is an active shooter inside. Additionally, there are confirmed reports of occupants needing rescue inside. *(See scenario one photos)*

    a) What is your strategy? How & why? Please describe any specific tactics?

    b) How will ICS be utilized?

    c) How do you manage risk?

    d) How do you achieve interoperability?

    e) What resources do you need? Why**?**

2. Your city is experiencing civil unrest. Protesters are becoming increasingly hostile and have set fire to the local police sub-station. Calls are coming in from staff that are trapped inside. *(See photos scenario two photos)*

    a) What is your strategy? How & why? Please describe any specific tactics?

    b) How will ICS be utilized?

    c) How do you manage risk?

    d) How do you achieve interoperability?

    e) What resources do you need? Why**?**

Semi-structured Interview Questions *(Individuals and Focus Groups)*

1. Overall, what are the most critical strategies for the fire service in responding to structure fires involving an active threat? Examples: Active shooter, ambush, civil unrest, terrorism, barricaded subject.

2. What components of the ICS are most valuable in these situations? How will ICS be deployed?

3. How do IC's initiate effective strategies while balancing the risk to their crews? What variables drive your decisions? How might the fire service risk philosophy apply or not apply to these situations?

4. How can effective interoperability for these events be achieved? Any specific recommendations?

5. What are the best methods for allocating and managing resources? Any specific recommendations?

6. Do you envision different strategies for the scenarios? If yes, what variables drive your decisions?

Ending Questions

1. Did the scenarios and questions elicit new thoughts on the subject?

2. What advice can you give for future questions?

3. Is there something else you think I should understand better?

4. Are there any individuals you think I should interview?

Scenario One

(mysanantonio.com; bakersfieldnow.com)

Scenario Two

(nbcnews.com)

Appendix B

Oklahoma State University Institutional Review Board

Date:	08/15/2022
Application Number:	IRB-22-312
Proposal Title:	Structure Fire Response Under Active Threat: A Critical Analysis of Urban Fire Service Strategies in South Texas
Principal Investigator:	Brian O'Neill
Co-Investigator(s):	
Faculty Adviser:	Tony McAleavy
Project Coordinator:	
Research Assistant(s):	
Processed as:	Exempt
Exempt Category:	

Status Recommended by Reviewer(s): Approved

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in 45CFR46.

This study meets criteria in the Revised Common Rule, as well as, one or more of the circumstances for which continuing review is not required. As Principal Investigator of this research, you will be required to submit a status report to the IRB triennially.

The final versions of any recruitment, consent and assent documents bearing the IRB approval stamp are available for download from IRBManager. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be approved by the IRB. Protocol modifications requiring approval may include changes to the title, PI, adviser, other research personnel, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms.
2. Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.

3. Report any unanticipated and/or adverse events to the IRB Office promptly.
4. Notify the IRB office when your research project is complete or when you are no longer affiliated with Oklahoma State University.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact the IRB Office at 405-744- 3377 or irb@okstate.edu.

Sincerely,
Oklahoma State University IRB

VITA

Brian Garret O'Neill

Candidate for the Degree of

Doctor of Philosophy

Dissertation: STRUCTURE FIRE RESPONSE UNDER ACTIVE THREAT: A CRITICAL ANALYSIS OF URBAN FIRE SERVICE STRATEGIES IN SOUTH TEXAS

Major Field: Fire and Emergency Management Administration

Biographical:

Education:

Completed the requirements for the Doctor of Philosophy in Fire and Emergency Management Administration at Oklahoma State University, Stillwater, Oklahoma in May, 2023.

Completed the requirements for the Master of Arts in Public Administration at Texas State University, San Marcos, Texas in May, 2008.

Completed the requirements for the Bachelor of Science in your Resource and Environmental Studies at Texas State University, San Marcos, Texas in December, 1999.

Experience: Assistant Fire Chief & Executive Officer, Battalion Chief, Safety Division Chief, District Chief, Fire Captain, Fire Lieutenant, Fire Engineer, & Firefighter for the San Antonio Fire Department from August 2001 to present. School Safety & Intrusion Detection for Texas State University's School Safety Center from August 2022 to present. Environmental Scientist & Consultant from August 2000 to March 2001. FEMA Flood Map Researcher from February 2000 to July 2000.