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**THE NEW YORK CITY URBAN SEARCH AND RESCUE
TEAM (NY-TF1):
A CASE STUDY OF INTERAGENCY EFFECTIVENESS**

by

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March 2011

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A CASE STUDY OF INTERAGENCY EFFECTIVENESS**

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ABSTRACT

Since September, 2001, the New York City (NYC) emergency services have striven to more closely align their component disciplines into one coordinated and collaborative effort. Despite improvements in emergency management, the New York City Fire Department (FDNY) and New York City Police Department (NYPD) are still separate operational entities. An evolution in the terrorist threat challenges NYC emergency agencies and finds them unprepared for a complex terror event. Terrorist seek to divide first-responder efforts at such an attack. Evidence from the Mumbai attacks indicates an optimal response to a similar incident requires an unprecedented level of first-responder synergy. This thesis asserts that the synergistic elements in the New York City Urban Search and Rescue Task Force (NY-TF1) are applicable to the interagency challenges in the FDNY-NYPD response relationship.

The methodology of this thesis is a single case study of NY-TF1 involving set of seven key leader interviews. Each discipline provided three levels of leadership confirmed the assertions of this thesis. The seventh interview, the senior civilian administrator for the New York City Urban Search and Rescue Task Force (NY-TF1), also supported this study's findings.

The conclusions of this study are drawn from commonalities in the data collected. The FDNY and NYPD can achieve an emergency services synergy adapting NY-TF1 organizational designs and systemic processes into the greater response relationship.

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TABLE OF CONTENTS

I.	INTRODUCTION.....	1
A.	PROBLEM STATEMENT—BACKGROUND.....	1
B.	RESEARCH QUESTION	3
C.	METHODOLOGY	4
D.	CHAPTER OVERVIEW	8
II.	EMERGING TERROR THREAT.....	11
A.	MODERN RESURGENCE OF SUICIDE TERRORISM.....	13
1.	Military Suicide Operations: A Precursor to Suicide Terrorism Evolution.....	13
2.	Reemergence of Suicide Terrorism	14
B.	FROM A TACTIC TO STRATEGY: THE EVOLUTION OF SUICIDE OPERATIONS	16
C.	THE MUMBAI EVOLUTION	18
1.	Command and Control (C2) Maturity.....	19
2.	Tactical Simplicity	20
3.	Promote Chaos and Uncertainty	21
D.	THE FLAWED RESPONSE	22
E.	SIGNIFICANCE AND PROBABILITY	23
III.	LITERATURE REVIEW	27
A.	SOCIAL SCIENCE THEORY	27
1.	Complex Endeavors	29
2.	Synergies	30
a.	<i>Division of Labor</i>	30
b.	<i>Functional Complementarities</i>	31
3.	Power to the Edge Principles	31
B.	THE FEMA URBAN SEARCH AND RESCUE PROGRAM	34
1.	Origins.....	35
2.	Task Force Organizational Design	42
3.	Task Force Procedure.....	45
IV.	THE NEW YORK CITY URBAN SEARCH AND RESCUE TASK FORCE (NY-TF1): A CASE STUDY ON INTERAGENCY EFFECTIVENESS	53
A.	PARADIGM OF NYC SYNERGY	53
B.	CREATION OF NY-TF1	54
C.	NY-TF1 ORGANIZATIONAL DESIGN	56
1.	Task Force Tactical Structure	56
2.	Unity of Command.....	59
3.	Component Role Definition.....	61
D.	NY-TF1 SYSTEMIC PROCESSES	62
1.	Shared Command Responsibility	63
2.	Interpersonal Interaction	64

3.	Common Standard Operating Procedure (SOP)	65
E.	NY-TF1 SYNERGY ASSESSMENT	66
F.	INTERVIEW KEY FINDINGS.....	68
1.	Common Themes	69
a.	<i>Defined Understanding of NY-TF1 Team and Individual Roles and Responsibilities Contributes to Operational Clarity</i>	70
b.	<i>Common SOP and Organizational Structure Eliminates Discipline Uncertainty Between Services and Provides a Foundation for Collaboration</i>	71
c.	<i>Personnel and Discipline Interaction Is the Most Significant Factor in Fostering Task Force Synergy.....</i>	71
d.	<i>Unified Command System and Shared Decision-Making Authority Provide the Conditions That Are Favorable for NY-TF1 Collaboration.....</i>	72
2.	Summary.....	73
V.	RECOMMENDATIONS / CONCLUSION	75
A.	NYC FIRST-RESPONDER DIRECTION AND TWENTY-FIRST CENTURY THREAT.....	75
B.	RECOMMENDATIONS: TOWARD A NYC FIRST-RESPONDER MEGACOMMUNITY.....	76
1.	Promote FDNY-NYPD Operational Interaction.....	78
a.	<i>“True” Interdisciplinary Drills for the Greater FDNY and NYPD.....</i>	79
b.	<i>Expand the FDNY-NYPD Liaison Program.....</i>	79
c.	<i>Interdepartmental Training Exchanges.....</i>	80
2.	Create a NYC First-Responder Interagency Advisory Panel.....	81
3.	Establish Formalized Unified Command for All Interagency Incidents.....	83
C.	IMPLEMENTATION IMPLICATIONS	84
D.	CONCLUSION	85
APPENDIX A.	INTERVIEW QUESTIONS & ANSWERS	87
A.	STUDY PARTICIPANTS AND THE INTERVIEW PROCESS.....	87
1.	Fred Lafamina, Deputy Chief (Acting)—FDNY (Respondent F-1).....	88
2.	Joseph R. Downey, Battalion Chief—FDNY (Respondent F-2)	88
3.	Liam J. Flaherty, Captain—FDNY (Respondent F-3)	89
4.	James Molloy, Chief—NYPD (Respondent P-1).....	89
5.	Robert Lukach, Deputy Inspector—NYPD (Respondent P-2)	89
6.	Franco Barbiero, Lieutenant—NYPD (Respondent P-3).....	89
7.	John Grimm—OEM (Respondent O-1).....	89
B.	INTERVIEW TRANSCRIPTS AND TEXT CODING.....	90
APPENDIX B.	DATA ANALYSIS	101
A.	DATA INTERPRETATION.....	101
1.	Core Components of NY-TF1 Synergy	101
2.	Major Challenges to Interdepartmental Synergy	102

3. **Role Clarity and Shared Decision Rights Strongly Support Inter-Service Synergy102**

4. **Departmental Paradigms Prevent Service Collaboration.....102**

5. **FDNY-NYPD Synergy Areas of Interest103**

B. DATA CONSOLIDATION.....103

LIST OF REFERENCES105

INITIAL DISTRIBUTION LIST109

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LIST OF FIGURES

Figure 1. C2 Approach Space (From Alberts & Hayes 2006)33
Figure 2. Task Force Deployment Allocations (From NYC OEM Directive, 2006/003)59
Figure 3. NYC First-responder C2 Approach Space (From Alberts & Nissen 2009).....67

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LIST OF TABLES

Table 1.	Synergy Elements	91
Table 2.	Synergy Challenges	92
Table 3.	Text Coding	93
Table 4.	NY-TF1 Synergy Matrix.....	104

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LIST OF ACRONYMS AND ABBREVIATIONS

ADR	Allocation of Decision Rights
AQ	Al Qaeda terrorist network
C2	Command and Control
CIMS	Citywide Incident Management System
CE	Complex Endeavor
DHS	U.S. Department of Homeland Security
DoD	U.S. Department of Defense
DOI	Distribution of Information
ESU	NYPD Emergency Services Unit
FDNY	New York City Fire Department
FEMA	Federal Emergency Management Agency
IC	Incident Commander
ICS	Incident Command System
LE	Law Enforcement
NIMS	National Incident Management System
NRP	National Response Plan
NRF	National Response Framework
NYC	New York City
NYPD	New York City Police Department
NY-TF1	New York City Urban Search and Rescue Task Force
OEM	NYC Office of Emergency Management
POI	Patterns of Interaction
SME	Subject Matter Expert
SOC	FDNY Special Operations Command
SOD	NYPD Special Operations Division
SOP	Standard Operating Procedure
TFL	Task Force Leader
USR	Urban Search and Rescue

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I. INTRODUCTION

Inasmuch as modern terrorist objectives bring a form of warfare into the realm of the emergency services, it is imperative that those services be prepared to address and counter these events with training and preparations at a level, and on a scale, that have previously been thought of as matters confined to war and military leaders and decision makers.

Robert T. Mahoney, *Homeland Security Affairs Journal*, 2010

A. PROBLEM STATEMENT—BACKGROUND

The global terror threat has evolved and presents new challenges to first responders in America's larger municipalities. Recent events in Mumbai, India indicate that extremists are fostering initial chaos and confusion in terror operations for tactical advantage. Terrorists' motives, operational intents and objectives are not clear to responders who first confront these attacks. This threat evolution only magnifies the equivocality and uncertainty inherent in the FDNY-NYPD response framework. Simultaneous fire-fighting, law enforcement and emergency medical activities are required in the same geographic space. These emergency service disciplines have differing operational priorities and approaches that are, at times, conflicting. This adds to the challenges for interagency collaboration and synergy. Compounding this is the lack of accurate situational awareness early at complex terror attacks.

The ultimate goal of the Mumbai attacks was to maximize lethality in the conduct of a suicide operation. This is a new perspective in terrorist tactics. First responders (fire, police, and emergency medical services) were forced to operate in unison, similar to military task force configuration, to confront the terror threat. These complex responses necessitated a synergistic approach to ensure that first responders had an optimal response while minimizing the threat against them.¹ These attacks required:

¹ Complex endeavors (CE) are explored later in this paper as incidents with specific traits that require different response approaches as opposed to routine incidents.

1. Closer command structures and operational procedures. Unified command and control along with common operating protocols being the pillars of first responder synergy.
2. Better prepared and trained leaders at interagency operations. Leadership cognizant of the force-multiplying effect of first responder synergies of effort.
3. More easily understood and employed interagency protocols. Providing the free flow of information without which first responder synergy could not be realized.

These issues are problematic in New York City (NYC) because of a flawed incident management approach to emergency operations management. The synergy necessary to meet such a complex endeavor is not available to NYC first responders. Major stumbling blocks to collaboration (a joint response framework) and coordination (a synchronized response framework) between the FDNY and NYPD at interagency operations are both internal and external: the lack of a collective understanding of synergy and the absence of mechanisms to promote first responder collaboration throughout the emergency service community in NYC. Each agency, having distinct and varied influences on its organizational understanding of first responder interagency coordination and collaboration, has a different understanding of the collective concepts. In addition, the fire service and law enforcement definitions of synergy are not analogous. The FDNY perspective consists of an operational command and control dynamic while the NYPD perspective of interagency collaboration is more administrative. Many police incidents are investigative in nature and are not command intensive in terms of supervision, as in the case with fire service operations. This contributes to a disconnection between the FDNY and NYPD collective definition. This disconnect fosters uncertainty and equivocality in the NYC first-responder environment.

An example of a best-practice model that seems to transcend the NYC “Battle-of-the-Badges” is the combined FDNY-NYPD Urban Search and Rescue (USR) team, NY-TF1. Organized in the early 1990s to support the FEMA effort to respond to major earthquakes, this group of firefighters and police officers has deployed to hurricanes, terrorist bombings, major structural collapses and, most recently, to the earthquake in Haiti where the team successfully rescued six trapped people. Unique among the 28

national USR teams, NY-TF1 is composed of 50 percent firefighters and 50 percent law enforcement personnel. All members of the team are specially trained individuals from each department and follow accepted national response frameworks for rescue operations at structural collapse.

The NY-TF1 model offers insight into how the FDNY and NYPD can cooperate at emergency operations on deployments outside of NYC. The team is populated with many of the same personnel from the respective Special Operations Commands that also routinely respond to major emergencies within the city. Interestingly, many of the same members of NY-TF1 who perform well on team activations also experience synergy challenges between the two agencies when responding in NYC. The disconnect between the synergy of NY-TF1 operations and the current friction between the FDNY and NYPD suggests that there are organizational designs, structures and processes present in the NY-TF1 model that are not evident in the greater FDNY-NYPD emergency responder dynamic.

The goal of this research project is to identify the operational level components of the NY-TF1 team. From these NY-TF1 synergy fostering components, recommendations are made that enhance the greater FDNY-NYPD operational relationship. This thesis has confirmed that these enhancements can effectively prepare NYC for the next complex endeavor terror event.

B. RESEARCH QUESTION

What can we learn from NYTF-1, and how might it be utilized as the foundation for a nation-wide model?

Specifically:

1. Are there organizational/operational level designs or systemic processes found in the NYC Urban Search and Rescue model (NY-TF1) that contribute to a more coordinated and collaborative relationship between FDNY and NYPD personnel?

2. How are these NY-TF1 structures/processes applicable to creating interagency synergies at a complex endeavor terror event similar to the Mumbai attacks?

An overview of the NYC synergy problem reveals the following issues with the analysis of the FDNY-NYPD relationship as related to interagency synergy:

- Since 9/11, the NYC Battle of the Badges problem has been significantly documented. Study on the solution side of this problem is necessary.
- Social science theory has not been leveraged to solve the FDNY-NYPD synergy problem.
- There is a disconnection between the law enforcement (LE) investigative and the fire service consequence management perspectives that current literature does not address.
- Literature surrounding terrorist dynamic evolution has a dominant LE focus to the detriment of interagency considerations.
- Academic writing on the synergy of first responders produces more collaborative solutions than agency policies and procedures.
- There is a wealth of material from the military regarding interagency operations. This resource provides synergy solutions that are accepted across the emergency responder community but is not being leveraged by NYC emergency agencies.

This thesis identifies collaborative commonalities that can be incorporated into both the FDNY and NYPD responses to everyday multi-agency operations. Applying the appreciative inquiry (AI) method into an analysis of the NYC USR team, this thesis has found synergistic constructs already in use by both the FDNY and NYPD.

C. METHODOLOGY

Research for this thesis utilized appreciative inquiry in a single case study of the NY-TF1 model supported by a set of seven interviews with key task force leaders. The assertion is that the joint FDNY-NYPD Urban Search and Rescue team exhibits the synergistic organizational designs and systemic processes not found in the larger interagency relationship which are critical for response to a complex endeavor terror event in NYC.

The NY-TF1 model is relevant to study for two reasons: first, it isolates the team members from each department's cultural influences and second, the model limits the competition frequently experienced between the two emergency disciplines. As previously stated, the unique composition of the NYC USR team allows limited analogy to the other 27 regional USR teams. While other USR teams have law enforcement representation, NY-TF1 alone has a strictly equal percentage of fire service and law enforcement personnel on each deployment. This limits social and organizational variables that might influence analysis of the team. Additionally, command of the team is shared. On an alternating basis, the leadership of the team is passed from the lead FDNY officer to the lead NYPD officer, and back again for each deployment. This rotating command structure is also a novelty found among the 28 regional USR teams. The unique organization and command responsibility for the team are prime factors in choosing this single case study.

Aside from its organization and command structure, the operational foundation of the team makes the NY-TF1 model a strong choice for study. The team utilizes an independent standard operating procedure (SOP), the Federal Emergency Management Agency's National Urban Search and Rescue Response System. While each department has responsibility for search/rescue at collapsed structures and operates according to different SOPs within NYC, these independent procedures are not utilized during team deployments. This reduces the variables of competing tactical competency and technical proficiency between the separate FDNY and NYPD emergency operations procedures. This independent SOP serves to create an even field on which the interagency dynamic can be observed and studied.

The dearth of writing on the NYC USR model provides little opportunity to measure the effectiveness of the synergy on the NY-TF1 team. Consequently, this research project relied on interviews to gather qualitative data on NY-TF1. The individuals selected are key task force leaders who ideally have made at least one active deployment of the team to a real-world incident or are in strategic planning leadership roles in the respective departments. In order to objectively evaluate NY-TF1, each level

of command included one fire service perspective and one law enforcement perspective. An objective, third-party interview is included to verify the opinions given by the emergency service participants. The NY-TF1 Program Director, the civilian Office of Emergency Management (OEM) administrator for the task force is included in the interview pool. The categories for the interviews are:

- Tactical - Leaders who have been responsible for direct supervision of independent rescue teams. This paradigm provides a first-hand perspective of interagency collaborative effort and achievement without the filter of higher level opinion. Specifically, how the members of each service interact with one another. Individuals selected are in the rank of Fire Captain and Police Lieutenant (equivalent civil service supervisory grades).
- Operational - Leaders who have been the sole team commander for an active deployment to a real world incident. This paradigm provides a command level perspective regarding how independent search and rescue teams perform from both a collaborative view but also a comparative view. Specifically, how teams are assessed as units and how those independent units perform in terms of each other. Individuals selected are in the rank of Fire Battalion Chief and Police Captain (equivalent civil service supervisory grades).
- Staff - Leaders who have been directly responsible for the USR program for each department. This paradigm provides the organizational perspective of overall success for NY-TF1, but also the agency specific assessment of the program. Specifically, an objective analysis is made by individuals who are not influenced by intra-team politics, conflicts or bias. Individuals selected are in the rank of Fire Deputy Chief and Police Chief (civil service appointed levels only).
- Administrative -A civilian program manager (outside the FDNY or NYPD) that supervises many of the interagency directives, personnel issues and support requirements for the sustainment of task force training and operation. This paradigm provides an unbiased assessment of task force collaborative nature from an outside agency. The individual selected is the senior civilian administrator for the NY-TF1 program from the NYC Office of Emergency Management (nonuniformed service title).

Seven interviews were conducted for this case study; two interviews for each level of command, resulting in a total of three fire service and three law enforcement interviews. The seventh interview was the senior civilian administrator for the NY-TF1 program. Seven scripted questions were posed for each study participant. Dependent on

the quality of the data gathered from each interview, unscripted ancillary questions were asked to expand upon information collected from individual participants. These unscripted questions were not asked of other participants and were largely used to amplify answers that were previously given.

From the collected transcripts of all the interviews, a qualitative data analysis was conducted. From this analysis, common themes were identified through the use of text coding. This project primarily coded for the below themes:

- Organization designs that enhances collaboration.
- Systemic processes that influence synergy.
- Information flow and processing that promotes effective situational awareness.
- Synergy barriers and challenges that prevent synergy.

Identifying these common themes allowed this thesis to: (1) qualitatively assess the degree of synergy between the FDNY and NYPD elements on the task force, (2) identify the organizational designs and systemic processes supporting this collaborative dynamic, and (3) recommend applicable solutions for the greater emergency responder challenges posed by a complex endeavor terrorist event. The NY-TF1 interviews were a rich source of the qualitative data that support this thesis. Additionally, the argument of this thesis was strengthened by the commonality of themes identified by both fire and law enforcement disciplines.

Independent interviews encouraged a free-flow of ideas and information from the respondents in order to allow for common themes to emerge and limit influence on the respondents' answers on one another. That being said, there were seven formal questions used to start and direct each interview:

- How does the collaborative nature of the NY-TF1 team compare with the general FDNY and NYPD relationship?
- What are the barriers to collaboration/synergy found in the greater FDNY-NYPD relationship that are not found in the NY-TF1 model?
- What barriers to collaboration/synergy does NY-TF1 overcome?

- Describe examples of synergy found on the NY-TF1 team during deployments?
- What elements/factors contribute to the collaborative success of the NY-TF1 model?
- Are the collaborative dynamics found in the NY-TF1 model applicable to a complex endeavor event like the Mumbai terror attack?
- Is the synergy of the NY-TF1 team unique or can it be replicated in the greater FDNY-NYPD dynamic?

These questions were purely a starting point and were refined and expanded upon as necessary during the interview process.

The goal is to develop these themes into policy recommendations for the New York City Fire Department at the strategic level. It is hoped that a better understanding of the fundamental NY-TF1 collaborative elements developed through an appreciative inquiry of the task force will provide a vision for future interagency operations between NYC's firefighters and police officers. These themes have applicability across the nation for comparable fire-police relationships.

D. CHAPTER OVERVIEW

This thesis is structured to answer the question: how can the FDNY-NYPD response relationship be improved to meet the emerging terrorist threats against NYC? After posing this problem in Chapter I, this paper examines this threat more closely in Chapter II, which covers the emerging terrorist evolution. This chapter explains how terrorist tactical and strategic innovation has significantly changed how emergency services must approach future attempted attacks. Following this, an in-depth literature review in Chapter III explores social science theory that this thesis uses in examining the current terror threat and assesses the NYC Urban Search and Rescue Task Force. Chapter III also discusses the literature and history of the Federal Urban Search and Rescue initiative that spawned the NYC version. This provides a foundation for supporting Chapter IV, which discusses the assertion that the NYC USR model contains organizational designs and operational processes that can improve the NYC first-

responder dynamic relationship. This paper concludes with Chapter V's recommendations for applying the FDNY-NYPD synergy solutions found in the NY-TF1 model, Chapter IV.

Supporting the five chapters of this thesis are two appendices that cover the research involved in this project. Appendix A is an explanation of how the methodology was executed. Each research participant is identified and his relationship to this study is discussed. This allows the reader to understand the validity of the participant's opinion and perspective. Also in Appendix A is the complete transcript for the qualitative data collected from those participants along with the thematic coding of each answer. Appendix B is where the data collected in Appendix A is analyzed. Here, a critical examination of the data is conducted and the strength of the conclusions from this analysis is explained.

The organization of this thesis clearly establishes the assertion that the NYC first-responder community can learn from the NY-TF1 model. The argument of this paper is supported by an attempt to minimize organizational bias and discipline influences. The methodology laid out in Chapter I that uses social science theory from Chapter III and is supported by the appendices serve to prove this paper's core assertion: the NYC Urban Search and Rescue Task Force is a template for preparing for the next complex terror event in New York City.

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II. EMERGING TERROR THREAT

The reemergence in the early 1980s of terrorism motivated by a religious imperative set in motion profound changes in the nature, motivation, and capabilities of terrorists that are still unfolding.

Professor Bruce Hoffman, *Inside Terrorism* (2005)

The impetus for this research has been an evolution in the use of suicide tactics by radical Islamic extremist. Today, “America is at war...the frontline duties at home in this war of terrorism have become the responsibility of those who have not been tasked with that previously: America’s emergency services” (Mahoney 2010, p. 1). This emerging terror threat needs to be understood by all disciplines of emergency first response. An understanding of this contemporary evolution must begin by developing the historical context behind the concept of suicide operations, in both war and terrorism, and the fundamentals that drive them. From the radical Islamic perspective, there is no distinction between a state of armed conflict between nations and their jihad against Western involvement in the Middle East. According to the Foreign Policy Research Institute, “the objectives of such terrorist attacks on the U.S. are to create social disruption and chaos; to use fear and extensive disorganization to precipitate the collapse of the United States’ ability to maintain both a presence in the Middle East and its domestic economy” (Gale, Husick, & Rabinow 2009). An examination of how these terror operations have been conducted is required to fully understand how suicide terror attacks have changed in the first part of the twenty-first century.

A basic understanding of suicide terror operations is the foundation that supports this paper’s premise, that the Mumbai attacks signal a metamorphosis in terror strategy. Radical extremism has expanded the use of suicide tactics from operations that were once isolated in both incidence and venue. Terror events previously conducted by individuals or small groups to advance a message or achieve a specific objective (prisoner release, ransom, etc.) now have evolved into coordinated and controlled operations. While prior terror incidents may have demonstrated tactical insight and planning, today’s terror

attacks are displaying a level of strategic operational maturity not previously witnessed. Terror incidents for the first time are displaying effective command and control (C2) capability during operations. And this operational control of independently functioning elements is a shift in terrorist tactics.

Combined with this tactical evolution is the fundamental change in strategy that radical Islam has adopted. The Mumbai attacks reinforced evidence that the ultimate objective of these attacks is to maximize their lethality and inspire fear/uncertainty. There is no other immediate goal besides increasing the body-count and the number of wounded. Terrorist are not espousing demands for an exchange of detainees or dictating the restoration of territory. Extremist groups today see nothing less than a cultural struggle, a jihad between Muslims and non-Muslims. That struggle is to the death. This chapter explores this perspective, how it has altered our understanding of terror operations and how those attacks have been and will be conducted.

Given that this emerging threat is possible, what makes it a probable occurrence in the U.S.? Establishing evidence that supports the likelihood of a Mumbai-style event is necessary to justify the premise of this paper: a similar attack needs to be expected in order to properly develop an emergency response strategy. Extrapolating this assertion from the evolution of suicide operations completes the foundation of this study.

Finally, what are the strategic and tactical objectives for this evolution in suicide terror operations? These fundamental elements need to be understood in order to design an appropriate strategy for first-responders. This thesis asserts that a synergy of emergency services is necessary to meet the coming threat. How the Mumbai attacks achieved their results must be understood so as to develop the synergies that this paper argues are required. An examination of the Mumbai events, attackers' intent and accomplishments must be made in detail to identify the critical tactical and strategic elements where the terrorists were most successful. These elements will direct what synergistic best-practices are required to oppose a similar attack in a municipal U.S. setting, specifically NYC.

A. MODERN RESURGENCE OF SUICIDE TERRORISM

1. Military Suicide Operations: A Precursor to Suicide Terrorism Evolution

The tactical use of suicide operations in both open, armed conflict between nations or in acts of terror has seen a marked increase in the twentieth century. The Japanese resorted to squadrons of Kamikazee attacks when there was no hope of tactical, conventional military success. These maneuvers were conducted in last resort as surrender was not an acceptable option for the majority of Japanese military personnel. Individual incidents of suicide attacks on military command and control centers during a tactical engagement gave way to the strategic use of suicide operations. The direct objective of these attacks once tactical; to neutralize military units, changed to a strategic objective. The strategic goal was to inflict enough punishment on U.S. forces in casualty levels so as to make continued conflict unpalatable to the American public. The targeting of popular public opinion and the attempt to affect change in U.S. national defense strategy is a central tenet of terror operations. World War II suicide operations foreshadowed this future strategic shift in terrorism.

While this type of operation was hard for Western military planners and the general U.S. population to understand, it did contain some basic principles that, from the Japanese perspective, were logical. First, there was little alternative to defeat. The looming invasion of the Japanese mainland was clearly evident, but surrender was not an option. Second, the targets of all Japanese suicide attacks were strictly military, as opposed to the Allied air-campaign against Japanese civilian centers. And lastly, from the Japanese perspective, they were willing and able to accept higher casualty rates of military as well as civilian losses. The American public was viewed as less willing to suffer the expected losses in a full-scale invasion of Japan. This opinion provided what the Japanese needed most, a chance, however infinitesimal, of a negotiated peace, if not victory. These three factors, no alternative, strategic objectives or opportunity for an acceptable outcome, are all specific to the military use of suicide operations. Although

ultimately unsuccessful, these suicide tactics did have deep impact on the American public. Even military planners had pause when they were considering the invasion of the Japanese main islands. This fact has not been lost on the extremist groups that are utilizing suicide as a tactic in recent decades.

2. Reemergence of Suicide Terrorism

The threat of suicide operations during terrorist events reappeared in the last two decades of the twentieth century. Although its use was infrequent, suicide attacks did emerge in the 1970s as a tactic that extremists could use to generate media and political attention (Chaulk & Hoffman, 2005, p. xiii). Similar to the military use of suicide tactics during World War II, the general public and political leaders in Western societies saw this evolution in terror tactics with revulsion and misunderstanding. From the West's perspective, the use of suicide was not understandable to achieve any goal of a terror organization. But from the radicalized-extremist psyche, suicide operations were as logical a conclusion as the Japanese made. Just as the Japanese in the Second World War envisioned themselves as a *divine* wind, today's Islamic extremists see themselves as divinely inspired. Terror organizations such as al-Qaeda view themselves as warriors of God. And the jihad against infidels is viewed as a war against nonbelievers and Satan who are an affront to Allah and a threat to the Muslim world. The resort to terror operations and the use of suicide tactics emerged in the 1980s as a logical tactic from the radical fundamental Islamist perspective.

As Western influence and involvement in the Middle East expanded, there was also an awakening of religion in the Arab societies in the region. After years of Islamic radicalization of influential clerics, the Iranian revolution inspired outbreaks of religious movements aimed to return the Islamic world to its former greatness. The Iranians overthrew a corrupt, authoritarian regime that had been backed by the United States. Religious movements, like the Muslim Brotherhood in Egypt, had been repressed by authoritarian governments supported by the West. Western governments, including the U.S., had been intent on ensuring an adequate supply of cheap oil and had increasingly

brought Western culture and influence to the Middle East. In the case of Iranian revolutionary leader Ayatollah Khomeini, radical clerics preached that Western influence was the cause of all evil in the Arab world. Furthermore, these religious revolutionaries preached that Islam required its spread throughout the region and the world. Terrorism experts point to public statements by leading Islamic fundamentalist leaders that urge Muslims to “export our Revolution throughout the world,” which Ayatollah Khomeini declared on the occasion of the Iranian New Year in March 1980 (Hoffman 2006, p. 89). These radicalized religious leaders saw Western involvement in their society as a threat to their teachings and an attempt by non-Muslims to lure young Arabs away from Islam. Since armed conflict with the vastly superior militaries of the West was not a viable option, terrorism in this light can be viewed as a “logical” option; similar to the Japanese determination made in WWII.

In the last 20 years of the twentieth century, Islamic terrorist events involved typical terrorist tactics: kidnappings, aircraft hijackings, bombings and murders. The employment of suicide operations was a relatively rare and isolated occurrence. In fact, of the suicide attacks committed by terrorists from 1968 to 2005, 78 percent happened between 2001 and 2005 (Hoffman, 2006, p. 131). During the early period of suicide attacks, they were confined to Lebanon and Kuwait. But slowly, the use of suicide would not be restricted to those two countries. The adoption and growth of suicide tactics by terrorist organization was driven by two factors. First, terrorist groups needed to communicate the intensity and belief in their message. In their view, the sacrifice of an individual for the cause of God demonstrated the gravity of their message and their devotion to the cause. Second, their need to disseminate their message increasingly drove greater use of suicide tactics. By the late 1980s, news reports of kidnappings and murder attempts had become commonplace for the Middle East, despite the emergence of 24 hour news organizations. Terror groups began to see that suicide events tended to garner greater attention from news agencies. And since terror events are ultimately about communicating a message, suicide operations began to become a more common occurrence. Terrorists were also attracted to suicide operations because of their tactical advantage over conventional attacks. They were usually more effective in terms of

lethality. Suicide attacks are less expensive and require less tactical support. And, they had a greater likelihood for success; there is no escape plan that needs to be considered. Simply put, these attacks were operationally easier to execute.

However, in a similar fashion to the desensitization of general terror attacks, suicide events in the Middle East and other areas became less news-worthy as their incidence increased in the late 1990s. This trend reinforced the perception that to the West, especially in America, terrorism was something that happened “over there.” Again, this was a fact not lost on terror planners in the Middle East.

B. FROM A TACTIC TO STRATEGY: THE EVOLUTION OF SUICIDE OPERATIONS

At the end of the twentieth century, terrorism became an accepted fact of life for those nations that comprise the Arab states and Israel. The adoption of suicide tactics had not significantly changed the proposition that disaffected terror groups would continue to employ greater levels of violence to advance their cause. While there were occasionally events that affected Western/American interests, in the U.S. public opinion, suicide attacks only happened in the Middle East.

This all changed with the rise of Osama bin Laden and the al-Qaeda (AQ) terror organization. Years of violence that occurred predominantly on Arab soil had not succeeded in removing Western presence and influence in the Muslim world. Additionally, there was a permanent presence of Western military forces (primarily U.S.) still in the Persian Gulf. This led to the fundamentalist determination that violence must be brought to American soil. Bin Laden made this strategic shift in the late 1990s and decided to employ suicide operations to do it. AQ made a command decision that in addition to tactical operations like the suicide attack on the USS Cole, strategic operations must be conducted in America. The destruction of U.S. military resources in the Middle East was not seen by AQ leaders as advancing their purpose: withdrawal of all Western involvement in the region. The American public was not significantly drawn into the AQ message. Bin Laden realized that while Americans were angered by the

bombing of the USS Cole, most viewed the attack as part of the price the U.S. had to pay for a presence in the Persian Gulf. The American public, and most in government, were not engaged in the conflict in the Middle East. And as bin Laden understood the situation, until America was significantly impacted and intimidated, the U.S. would remain in the region. This shift in AQ's command emphasis from the Middle East to a focus on attacks in America took suicide operations from a tactic used in individual events to a strategy that AQ hoped would expel the West from the Arab world. At the same time, depending on the success of such an operation, there was hope that substantial destruction on American soil from suicide "martyrs" would rally the Arab world to his side.

This evolution of terrorism with the increased utilization of suicide tactics is a significant turn in its metamorphosis as terrorism experts have identified, "terrorism today is being transformed from a mode of conflict that was hitherto characterized by mostly limited and symbolic objectives to one that now manifests itself in a far more direct and lethal manner" (Chaulk & Hoffman 2005, p. 5). Whereas the targets of terrorism were once limited to military, governmental or economic objectives, the expansion of suicide attacks to include civilians not directly linked to a specific target changed the understanding of terrorism. AQ now classified all nonbelievers as infidels and acceptable for direct attack. Because of his determination that the American public was weak and had no collective stomach for loss of life, bin Laden concluded that a direct strike at a U.S. city causing large loss of life and destruction would result in an American withdrawal from the Persian Gulf Region. This analysis was derived from bin Laden's observation of American forces withdrawing from Lebanon in 1983 and Somalia in 2000 after suffering relatively few losses of soldiers and marines . A suicide attack would have the best chance for success and have the most devastating results in numbers of casualties.

The execution of the September 11, 2001 suicide terror attacks were unprecedented in terms of ambition, coordination, scale and effect. "In short, al-Qaeda has expanded and redefined the practice of suicide terrorism from both a tactical and

strategic perspective” (Chaulk & Hoffman 2005, p. 75). Succeeding beyond their wildest expectations in terms of death and destruction inflicted, AQ brought the use of suicide operations to a new strategic level. As with traditional martyrdom operations, the target of the 9/11 operation was greater than those directly affected by the direct destruction of the World Trade Center and the Pentagon. The American public psyche was the actual intended target of the attacks. In the case of the 9/11 attacks, AQ hoped that the scale and extent of the operation would achieve what any series of lesser attacks could not, the rejection of interest in the Middle East by the U.S. population. This with the added benefit of raising bin Laden’s and AQ’s stature in the Islamic world.

AQ introduced into suicide martyrdom operations a command and control (C2) element that had not been present before. Independently conducted and synchronized suicide operations occurring virtually simultaneously required planning and logistical support that had been previously unheard of in terrorism. This operational maturity inherent in the 2001 attacks signaled a new era in the evolution of suicide terrorism.

C. THE MUMBAI EVOLUTION

Just as AQ transformed the use of suicide tactics into a strategic plan to create support in the Muslim world and instill fear that would push the West out of the Middle East, Islamic extremists have further transformed suicide terrorism. Martyrdom operations have evolved from isolated acts of desperation to coordinated, large-scale operations. In India, the Mumbai attackers added an operational maturity not seen in past terror events. The separate suicide teams that attacked Mumbai in November 2008 demonstrated small unit assault tactics that directly received coordinating instructions from a command element located in Pakistan. The NYPD Commissioner Raymond Kelly gave this evaluation of the event in his 2009 U.S. Senate testimony:

...one of the most important aspects of this attack was the shift in tactics from suicide bombs to a commando-style military assault with small teams of highly trained, heavily armed operatives launching simultaneous, sustained attacks.

U.S. Senate Testimony, Senate Committee on Homeland Security & Governmental Affairs. "Lessons from the Mumbai Terrorist Attacks" Washington, D.C. January 8, 2009

Commissioner Kelly observed that this "shift in tactics" included an outside command influence making this attack a significant evolution in suicide operations. The sophistication of the coordination that directed these teams gave this attack a substantial advantage according to Kelly; "the ability of terrorist handlers to direct operations from outside the attack zone using cell phones and other portable communications devices. With this comes a formidable capacity to adjust tactics while attacks are underway" (Kelly, 2009, p. 2). This formidable capacity of the attackers lies in their C2 ability to direct an operation in real time. The 24-hour news coverage of the Mumbai attacks provided the attacker handlers with an added ability to track their progress. In addition to information that the attackers themselves were transmitting to their controllers, the international news media provided the terrorist command element in Pakistan with constant updates concerning positioning of terrorist teams, as well as the Indian response.

The 2008 Mumbai attacks have three common themes that define a new transformation in radical Islamic terror operations. These significant characteristics are critical to the strategic success of similar terror events.

1. Command and Control (C2) Maturity

This command and control ability is what differentiates the Mumbai attacks from earlier suicide terrorist operations. Terrorist events that employed similar small unit tactics, like the 1972 Munich Olympic Hostage siege, did not possess the operational maturity witnessed in 2008 Mumbai. Using easily accessible satellite and cellular phone technology and monitoring any of the readily available electronic news media platforms, either television or through the internet, provided an almost unlimited ability to maximize the terrorist opportunity to kill. Given the explosion of Information Technology, this is a significant evolution and advantage for terrorist groups.

2. Tactical Simplicity

The genius displayed in the planning, coordination and command of the Mumbai suicide attacks is only magnified by the simplicity in its design. The sophistication of the C2 elements behind the attack was coupled with what has been termed “the Art of the Possible” (Sawyer, 2010). Just as the 9/11 attackers utilized common, everyday items (box cutters, razor blades) that avoided detection and gain control of multiple aircraft, the Mumbai terrorists employed easily obtained small arms and explosives that required limited training. With no advanced instruction in weapons, demolition or assault tactics, the 10 attackers managed to kill or injure over 500 people and retain control over a city and the mass media for over 60 hours (Indian Ministry of External Affairs, 2009).

The perpetrators of the Mumbai attacks, members of the radical Islamic militant group Lashkar-e-Taiba, entered into the city by way of a fishing trawler that they had hijacked, the M.V. Kuber. After killing the captain and crew of this boat, the terrorists used a hand-held global positioning system (GPS) device to navigate to a preprogrammed point on the Mumbai shore. From this vessel, the attackers used a small rubber dingy to land with their weapons and explosives undetected. Each member of the assault team carried an assault rifle (Chinese AK-56 or Russian AK-47), a 9mm pistol and a duffle bag. The contents of these bags were identical; each had 300 to 400 rounds of ammunition in as many as 12 magazines, a half dozen hand grenades and an improvised explosive device (IED) that consisted of approximately eight kilograms of RDX explosive (Indian Ministry of External Affairs 2009, pp. 9–11). These weapons were inexpensive and easy to obtain. They required only basic instruction with which to become proficient and were simple to transport by individual members.

The objectives that the attackers targeted were soft targets, with relatively weak or nonexistent security measures: the CST Central Railway Station, the Leopold Café and Bar, the Taj Mahal Hotel, the Oberoi-Trident Hotel and the Nariman (Chabad) House. All these locations were well known to be frequented by Westerners and/or Jewish occupants. They had been previously identified by handlers in Pakistan and were specifically chosen for this reason. On these sites, the attackers used a sieze-and-hold

tactic. Before they were killed or captured (one attacker was taken alive), the terrorists were able to murder 165 innocent civilians, military commandoes and first responders, with an additional 304 wounded (Indian Ministry of External Affairs, 2009).

During the attack, the individuals demonstrated a knowledge of basic small unit procedures that indicated they had trained together significantly prior to the attacks. They used hand signals in crowds to communicate and moved in tactical formation when proceeding from position to position. Additionally, they used the cell phones of their victims to transmit and receive information while the attacks took place. The NYPD Commissioner referenced this tactical ability in his Senate testimony stating:

They were experienced in working together as a unit. And they were sufficiently disciplined to continue their attack over many hours. This had the effect of increasing the public's fear and keeping the incident in the news cycle for a longer period of time (Kelly, 2009, p. 2).

At all the targets after the CST Railway Station, hostages were taken to delay an immediate assault of law enforcement. In the Taj Mahal and Oberoi-Trident Hotels, terrorists planted explosives and constructed barricades to impede eventual counter attacks. Attackers also set fires in the Taj Mahal Hotel on the first, fifth and sixth floors to increase confusion and chaos while adding to the challenge of retaking the hotel.

The use of relatively simple weapons and tactics coupled with a mature C2 element was the formula that led to over 500 casualties and almost three days of terror on Mumbai's streets. This combination of suicide tactics and small unit procedures has fundamentally altered our understanding of future terrorist events. The Mumbai attacks presented new challenges for emergency responders that have not been faced before.

3. Promote Chaos and Uncertainty

Landing on shore unnoticed, the assault team split into five pairs and proceeded to their objectives by taxi. To increase the "fog of war" and to confuse the local and government responses to their attacks, IEDs were planted in two of these taxis and exploded shortly after the violence began. This gave the impression to authorities that

there were more assault elements than were actually present. Also, as the teams approached their targets, each pair fired randomly, killing people in the streets. This hit-and run tactic confused officials initially as to the ultimate targets that were under attack. The terrorists appeared to be moving randomly and have more objectives than what were actually planned.

The confusion and chaos that followed the initial terrorist movements served to conceal their ultimate objectives, to disrupt the first-response efforts to defeat the attack and prolong the duration of the event. Mumbai emergency response commanders had no tactical C2 ability to meet the interagency challenges of such a tactically mature incident. Uncertainty of attacker intention and objectives, coupled with the confusion inherent in Mumbai's disjointed response enabled the attackers to control the event for 60 continuous hours (Indian Ministry of External Affairs, 2009).

D. THE FLAWED RESPONSE

The initial reactions of the city's emergency services to the Mumbai attacks were hampered by a number of factors that culminated in an inefficient and ineffective response. Law enforcement did not engage the attackers for fear of harming the hostages. Furthermore, police were out-gunned. They attackers had relatively modern fire arms (AK-56 and AK-47) when compared to the bolt-action rifles and hand-guns carried by average Mumbai police. In addition, the Mumbai police were not trained to confront a coordinated, multi-location operation. The local emergency services had no capacity to conduct simultaneous hostage negotiation, explosive ordinance disposal, and close-quarters combat with added dimension of emergency medical triage and treatment at multiple scenes. The Taj-Mahal Hotel presented the additional challenge of concurrent fire suppression activities. All the interdisciplinary missions had to be conducted nearly simultaneously in the same operational space. These attacks overwhelmed the Mumbai emergency services and created a delay in response, exactly what the attackers had planned for. The NYPD Commissioner's assessment succinctly summarized the Mumbai response:

In an active shooter incident such as we saw in Mumbai, by far the greatest number of casualties occur in the first minutes of the attack. Part of the reason the members of Lashkar-e-Taiba were able to inflict severe casualties was that, for the most part, the local police did not engage them. Their weapons were not sufficiently powerful and they were not trained for that type of conflict. It took more than 12 hours for Indian commandos to arrive.

U.S. Senate Testimony, Senate Committee on Homeland Security & Governmental Affairs, "Lessons from the Mumbai Terrorist Attacks." Washington, D.C., January 8, 2009

Commissioner Kelly's remarks addressed the law enforcement nature of the Mumbai response, but all emergency service disciplines were overwhelmed in November 2008. There were no protocols for police, fire and medical interaction on an effective scale for such a scenario. The Mumbai Fire Brigade was prevented from extinguishing the fires at the Taj-Mahal hotel and caring for the wounded at all the scenes because of the small-arms fire coming from the structures. Police were unable to advance into the hotels because of the IEDs and the fires that were burning (Indian Ministry of External Affairs, 2009). Municipal hospitals were inundated with critical-care patients and in some cases were unable to handle the number of injured. Patients had to be transferred to healthcare facilities outside of the city. The Mumbai emergency response was uncoordinated and fragmented; the attacks demanded a coordinated, collaborative effort; a synergy of first responders. All these factors resulted in the flawed response to the terror attacks and ultimately in a greater loss of life.

E. SIGNIFICANCE AND PROBABILITY

Analysis of today's terrorism and the Mumbai suicide attacks in the end must come full circle to determine its significance to America, and if a similar event can happen here. Despite an aggressive foreign policy and the active engagement of the U.S. military, the threat of radical Islamic terrorism still exists in America today.

Muslim extremism has spread to countries such as Somalia where, for the first time, American citizens are known to be participating in a foreign terrorist organization.

The Al-Shabaab extremist group has successfully attracted young American men to travel into the region. According to the Associate Press, “details are emerging about how terrorists in Somalia have lured young American men, including as many as 20 from Minnesota, back to their homeland to join their jihad. At least three have died, including one who authorities believe is the first American suicide bomber. Three others have pleaded guilty in the U.S. to terror-related charges” (AP, 2009). Recent incidents like these have raised concerns in the U.S. State Department, Intelligence Community, and the F.B.I. that individuals with valid American passports are being radicalized and given training in terror operations.

We must also look within our borders for a threat to develop that could initiate a similar Mumbai episode. The Fort Hood shootings provide evidence that Islamic extremism is finding ways to infect American citizens and naturalized residents. As recently as May 2010, radical Islam motivated the failed Times Square bombing attempt in New York City. This is further evidence that the will to conduct terror operations on U.S. soil is still present. The requisite next question is: what is the probability of a Mumbai event taking place here?

Speaking soon after the November 2008 attacks, the Director of the Combating Terrorism Center at the U.S. Military Academy at West Point, Lieutenant Colonel (then Major) Reid Sawyer, stated, “You can't prevent this type of attack.... These are 10 individuals with small arms and a bunch of grenades that have killed nearly a couple hundred people and certainly wounded a large amount more” (R. Sawyer, personal communication, April 22, 2010). If we consider the low-tech nature of the attack, the low cost of the operation and the success achieved in news coverage and damage inflicted, combined with the ease in duplicating the Mumbai attack in other locations, the U.S. must anticipate that jihadist groups everywhere will attempt to build on such methods elsewhere. At a recent seminar specifically on the Mumbai event, reporter John Miller, the last American journalist to interview Osama bin Laden had this to say regarding the attacks: “the Mumbai model is very attractive to terrorists; and it coincides

with an up-tick in terrorist operational tempo” (2010). Given all of these factors, we can significantly predict that an event similar to the Mumbai suicide attacks is probable in the U.S. in the near future.

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III. LITERATURE REVIEW

Success requires unity of effort, which respects the chain of command of each participating organization while harnessing seamless coordination across jurisdictions in support of common objectives.

FEMA National Response Framework, DHS 2008, p. 10

This thesis investigates the NYC Urban Search and Rescue team (NY-TF1) to discover the organizational designs and processes that make it a best-practice example of emergency service interdisciplinary synergy. An in-depth discussion of the written material that explores the social science that dissects the NY-TF1 model is presented here for use later in this paper. Following this, the literature that defines the federal FEMA Urban Search and Rescue program is examined to explain the foundation of the synergistic elements in the NY-TF1 model. These two categories of literature provide an understanding of synergy development that follows in later chapters.

A. SOCIAL SCIENCE THEORY

The application of social science to the NYC emergency service dynamic relationship is a crucial factor in preparing for response to endeavors like a Mumbai-style terror event. In order to understand the synergies that are required to meet the current evolution of suicide terror, an understanding of social science synergy theory and its challenges must be established. This paper examines the interagency effectiveness of the NY-TF1 USR model regarding C2 from a social science perspective. The synergies present in the NY-TF1 model are what this paper maintains are essential for the greater FDNY-NYPD first responder relationship in light of the emerging terror threat. A review of this literature provides a lens to view the NY-TF1 model.

The study of social science and social network theory is being applied across many domains and disciplines. For decades, this field of research has been utilized by educators and manufacturers to enhance the effectiveness of educational approaches and increase production of goods and services. Increasingly today, military and emergency

management officials are finding the application of social science successful for command in combat and emergency operations. A particular area of emphasis of these studies has focused on command and control (C2) dynamics between hierarchies, especially in military frameworks. Analysis of C2 issues and command operational models has developed a common understanding of successful military command philosophy and protocols. Current research has begun to apply management theory with classic military organizational models; these “two domains offer a very clear opportunity for productive linkage, since a great many of the activities associated with commanding and controlling pertain to organizing and managing and vice versa” (Alberts & Nissen, 2009, p. 3). This relatively new perspective in social science study is offering interesting applications to emergency operation command structure and procedure.

Today’s emergency managers are tasked with responding to an evolution in terrorism as well as challenging disasters, natural and man-made. Emergency service commanders see many analogies in military organization, planning and strategy. Current periodicals such as *International C2 Journal* have been focusing on relevant operational dynamics both in civil and military contexts. Applied to these command approaches is the concept of complex endeavors. Current incidents that NYC First-responders confront, structural collapses, hazardous materials emergencies, terror events, etc., have been referred to by social scientists as “endeavors [where] no single entity has the wherewithal to succeed” (Alberts & Nissen, 2009, p. 6). These endeavors are incidents that demand a unified, coordinated and collaborative response; in other words, a synergy of the fire service, law enforcement and emergency management. Command needs to be unified; departmental leaders need to join together in the decision-making process (unified command). Agencies need to synchronize their efforts (coordination). And each agency’s effort needs to support one another (collaboration). Central concepts that this thesis uses in its argument for the best-practices of the NY-TF1 team are summarized below.

1. Complex Endeavors

Scenarios that require an approach that is greater than what one agency (FDNY or NYPD) can offer alone have been identified as complex endeavors (Alberts & Nissen 2009). The 2008 suicide terror attacks in Mumbai, India are just one recent example. According to Dr. David Alberts and Dr. Nissen in their work *Toward Harmonizing Command and Control with Organization and Management Theory* (2007, p. 6–7), these events exhibit one or more of the following:

- i. The number and diversity of the participants is such that
 - (a.) There are multiple interdependent “chains of command,”
 - (b.) The objective functions of the participants conflict with one another or their components have significantly different weights, or
 - (c.) The participants’ perceptions of the situation differ in important ways; and
- ii. The effects space spans multiple domains and there is
 - (a.) A lack of understanding of networked cause and effect relationships, and
 - (b.) An inability to predict effects that are likely to arise from alternative courses of action.

The incidents and operations that are discussed in this paper clearly satisfy this definition. A major interagency incident similar to the 2008 Mumbai terror attacks, large-scale structural collapse, or another significant incident in NYC will involve the following:

1. Multiple interdependent chains of command under the Citywide Incident Management System (CIMS, a unified command of FDNY, NYPD, etc.);
2. Departmental objectives will be prioritized differently and be of varying critical importance to the resolution of the incident with each scenario;
3. The FDNY will approach the incident from a consequence management perspective while law enforcement use an largely investigative, security management perspective;
4. Multiple emergency operations (fire suppression, IED operations, emergency medicine, etc.) Will need to be conducted in the same geographic space;

5. Department commanders have minimal understanding of the operations conducted by sister agencies; and
6. There is no joint operational strategy and therefore no context to predict success or failure; the two disciplines (fire service and law enforcement) have no ability to anticipate consequences of courses action outside their individual domains.

2. Synergies

A complex endeavor demands that emergency services employ a response synergy of all agencies that arrive on scene. As exhibited in Mumbai, the law enforcement forces could not advance into the burning hotel without fire suppression forces to extinguish the fire. Fire service units could not commence operations without force protection against the active-shooters targeting them. Additionally, explosive ordinance disposal (EOD) activities and emergency medical operations had to be conducted simultaneously with these other missions. All these actions in a Complex Endeavor like Mumbai demand a synergy of effort; they must be conducted in concert with one another. Each task is dependent upon another. And these tasks must be accomplished in the same physical space and time period.

For the purposes of this thesis, the Corning definition of synergy is useful: “Synergy—here defined as otherwise unattainable combined effects that are produced by two or more elements, parts or individuals” (Corning, 2007, p. 109). In simple terms, a Complex Endeavor of necessity requires a synergistic response. A Mumbai-type event in NYC will require an FDNY-NYPD synergistic response.

This definition needs to be expanded upon for the purposes of this paper. There are many different forms and examples of synergy. This thesis examines two forms specifically:

a. Division of Labor

A classic example of this concept is found in *The Wealth of Nations* (Smith, 1776) in which economist Adam Smith provides one of the textbook examples: At a pin factory that Smith had personally observed, 10 workers performing 10 different

tasks were able to manufacture about 48,000 pins per day. But if each of the laborers were to work alone, attempting to perform all of the tasks associated with making pins rather than working cooperatively, Smith doubted that on any given day they would be able to produce even a single pin per man (Corning, 2007, p. 116). The NY-TF1 model for urban search and rescue of collapsed structures demonstrates a division of labor in its organizational design. The complex and dangerous USR mission is divided up into component tasks, search, rescue/removal, emergency medicine, etc., thereby accomplishing the rescue of trapped victims from collapsed buildings. The exact synergy components of the NY-TF1 team are examined later in this paper.

b. Functional Complementarities

Closely related to a division/combination of labor is the concept of a functional complementarity. For instance, some species of crabs form symbiotic relationships with sea anemones. They do not divide up a single task but provide complementary functions. The crabs provide legs and mobility for the partnership while the sea anemones, armed with an array of potent, poison-filled stingers (nematocysts), provide the crabs with a formidable defensive weapon against potential predators (Corning, 2007, p. 117). The NY-TF1 model exhibits a functional complementary synergy between the fire service and law enforcement members in their discipline specific capabilities that contribute to the task force mission. These NY-TF1 functional complimentary designs are discussed later in this paper.

3. Power to the Edge Principles

As this paper will demonstrate, the solution to the problem of response to complex endeavors are the synergies examined in the NY-TF1 model. Those synergies are the direct result of an organization that exemplifies the concept of *Power to the Edge principles*. In general terms, “*Power to the Edge* directly addresses the seismic shift in relationships required to leverage shared awareness to foster self-synchronization and achieve dramatic improvements in mission effectiveness” (Alberts & Nissen, 2009, p. 12). These edge principles are integral in a synergy between C2 entities.

This organizational and management theory (OMT) espoused by the social scientists Alberts and Nissen analyzes entities in terms of *C2 Maturity*(2009). Maturity being a conceptual evolutionary scale used to evaluate an entity; be it an individual or collective. Edge entities are said to be self-synchronized when they are capable of organizing themselves and coordinating their time-dependant activities without hierarchical input. This is the ultimate evolution of an individual, organization or collective relationship. The opposite end of this spectrum is the traditional (military) hierarchical organization found in the military and para-military agencies such as the FDNY and NYPD (see Figure 1). The ability of an edge organization to progress from a rigid, hierarcical C2 entity to an edge C2 organization is the concept of C2 maturity. It is within an edge C2 organization that synergies are developed. A successful response to a complex endeavor requires elements found in an edge organization and the synergies of effort that they produce.

C2 approach space, or the components of edge principles are patens of interaction (POI), distribution of information (DOI), and allocation of decision rights (ADR) (Alberts & Nissen 2009). Within these three parameters, entities can be evaluated and measured to determine their respective C2 maturities. The POI and DOI demensions span from “none” to “broad,” while the ADR demension covers a continuum from “highly constrained” to “unconstrained.” For example, a traditional hierarchical organization (FDNY or NYPD) in a joint context has limited interaction and information sharing ability as well as limited span of control from a collective understanding; the two departments do not communicate, interact or realize control with each other in a way that approaches an “edge” entity. An edge organization, such as the NY-TF1 model, has a well established common organizational structure, collective interactive procedures and communicative processes in addition to an unconstrained command influences. Note that these metrics are more qualitative than quantitative and do not definitively measure exact delineations for this organization. The graphic representation of C2 approach space in Alberts and Niseen’s C2 Approach Space is meant to portray a very approximate relationship between C2 approaches, not to precisely measure differing entities C2 designs and structures.

Using the graph in Figure 1, we can get a general understanding of where an entity (FDNY, NYPD or NY-TF1) is in terms of C2 maturity. Organizations that exhibit less C2 maturity are deemed to have limited interaction with outside entities (POI), little control in collective situations (ADR) and do not contribute to developing a greater situational awareness between organizations (DOI). As examined later, the FDNY and NYPD dynamic relationship most closely resembles a traditional military organizational hierarchy. Consequently, its position on the C2 approach space graph will closely approximate that of a traditional military organization. This thesis asserts that the NY-TF1 model is an edge organization and is expected to be positioned closely to where an edge entity would be graphed.

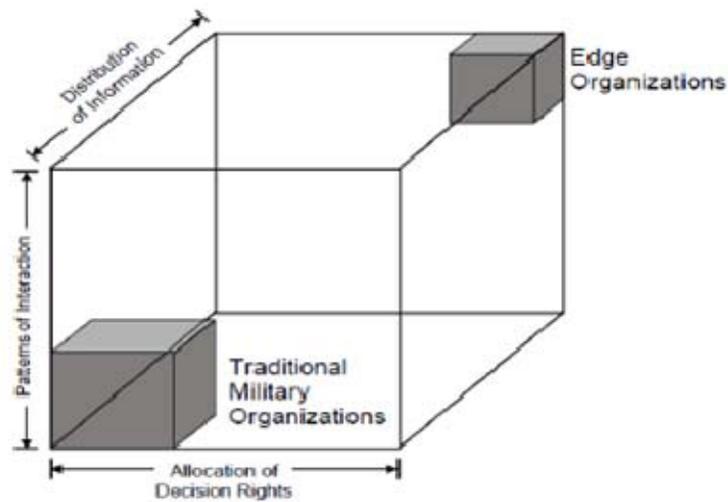


Figure 1. C2 Approach Space (From Alberts & Hayes 2006)

Within the three-dimensional graphic depicting the C2 approach space are five categories or C2 approaches into which an entity (or organization) can be assigned. They include: 1) *Conflicted*, 2) *De-Conflicted*, 3) *Coordinated*, 4) *Collaborative*, and 5) *Edge*. This spectrum approximates the C2 maturity and, consequently, the level of synergy found in entities. This spectrum progresses from *conflicted*, wherein the “whole” of a collective is far less than the potential sum of its parts, to *edge*, where “a robustly networked force [POI]...increases information sharing [DOI]. Information sharing improves both the quality of information and shared awareness. Shared awareness

enables self-synchronization [ADR] and improves mission effectiveness” (Alberts & Nissen, 2009, p. 19). An edge organization is better equipped to confront a complex endeavor. Improving an organizations C2 maturity is the solution for responding to a complex endeavor event.

It must be recognized that these aspects of edge entities are not constants; they must remain fluid. The operational requirements and parameters of emergency incidents are never identical. Each incident is unique in nature,size, scale and goeographic location. This is the very nature of complex endeavors. In referencing analogous military scenarios, the social scientists Alberts and Nissen comment on complex endeavors: “There is no single approach, no best system design or configuration, no best process for all situations and circumstances” (Alberts & Nissen 2009, p. 15). Its more important to provide edge entities with a freedom of manuever so they can realize the potential of edge principles. Because of their decentralized authority, close integration and superior situational awarness, edge organizations have an operational *agility*, where agility “is the capability to maintain effectiveness in the face of changing circumstances and a variety of stresses” (Alberts 2007, p. 15). It is this agility that contributes to an Edge edge organization’s ability to meet a complex endeavor.

This thesis identifies these edge organizational traits in the NY-TF1 model that foster collaboration and reduce uncertainty at complex endeavors. The evidence provided later in this paper is derived from first-hand accounts of these edge principles in action.

B. THE FEMA URBAN SEARCH AND RESCUE PROGRAM

The NY-TF1 model is part of the greater FEMA Urban Search and Rescue Program. The body of literature behind the national USR effort is predominantly U.S. Congressional legislation, operational guidelines and procedures, media reporting on deployments, and technical/tactical manuals that build a framework for a synergistic

mission: rescuing victims from structural collapse incidents. A review of these documents establishes an understanding of how USR operations provide a platform for synergy development.

As the global population becomes more and more concentrated in urban settings, the significant need for plans and resources to rescue victims trapped in collapse structures will become more and more critical. According to the University of Michigan, more than 60 percent of the world's population will live in an urban area by 2025, and this trend is increasing in developing nations (University of Michigan, 2006). Concurrently, the incidence of collapsed structures is also increasing. In response to this, the United States government has established the FEMA Urban Search and Rescue Program. This effort is a national network of resources, response teams and supporting agencies that can assist local emergency responders or conduct operations independently to rescue trapped victims in collapsed structures. This highly challenging and dangerous mission requires the collective activities of numerous emergency service disciplines: firefighting, emergency medicine, structural engineering, etc. The ability of first responders to respond to disaster scenes with a synergy of effort will be a determining factor in the success of a USR operation. The earthquake in Kobe, Japan in 1995 demonstrated the need for a unified response of all first response organizations. Evaluating emergency service synergy during that event identified that “coordination among responders is...especially critical in the early stages” (Active Learning Network, 2009, p. 10).

1. Origins

The 1990 National Earthquake Hazards Reduction Program Reauthorization Act expanded the federal involvement in responding to major earthquakes. It specifically gives FEMA responsibility to “develop and coordinate” federal interagency plans to respond to an earthquake. This amendment of the 1977 bill details plans for high-risk areas in terms of adequate emergency medical resources, search and rescue personnel and equipment. Prior to this federal initiative, FEMA had been occupied with a strategic

approach to responding to large-scale earthquakes while direct control of immediate emergency services was left to local and state authorities. Every state and most of the larger municipalities had, until this point, created separate and independent search and rescue resources and capabilities. As can be expected, there was a wide spectrum of qualifications, expertise, procedures, equipment and staffing levels found throughout the country as far as Urban Search and Rescue (USR) was concerned. In 1990, the federal government saw a need to unify these disparate approaches and establish a national USR response capability.

Under this greater national structure the spectrum of approaches regarding USR operations would be focused and unified. The national FEMA system provided a direction for the numerous other local and state emergency managers. Those local and state USR elements that were not part of the larger FEMA program (the 28 FEMA task forces) could adapt their abilities and resources to support the FEMA program. Regions and municipalities that had neither the financing nor resources to field similar USR task forces could now at least contribute support to the FEMA program when and where the need arose in their communities. FEMA had formed the backbone of a consolidated national USR system in its 28 task forces. Those 28 teams could be supported by local emergency responders in terms of manpower, logistics and emergency finances when needed. This was a significant advance for the American USR effort.

The first real test of the FEMA USR system came in 1995. When the Alfred P. Murrah building was bombed on April 19, 1995 in Oklahoma City, the FEMA Urban Search and Rescue system was called upon. A total of 11 USR task forces responded during the course of the incident. Although there were no live victims extricated from the collapse due to the nature of the collapse, the varied emergency disciplines and distinct task forces worked extremely well together. During the 16-day event, approximately 700 FEMA personnel and 1,000 Oklahoma City Fire Department personnel were involved in the rescue and recovery operation (Downey, 1995). In his appraisal of the effectiveness of the multijurisdictional, interdisciplinary incident, the Rescue Operations Chief, FDNY's Ray Downey made this observation: "Coordination and teamwork during the

operation were exceptional” (Downey, 1995, p. 7). Considering the extent of the destruction involved and the inherent hazards present, all rescue operations were efficiently accomplished while the safety of emergency personnel was ensured. There were no serious injuries during the operation and all areas of the site were effectively searched in an expedient manner. The Oklahoma City Bombing incident, although not the result of an earthquake, realized the national vision of the 1977 NEHRA legislation; the organization of emergency services to mitigate devastation and limit loss of life.

The response history of the national USR program illustrates an expanding utilization of the system to support emergency responders at the local government level. Clearly, this program demonstrated its value outside of strictly earthquake hazard mitigation. In supporting emergency response at each of these disasters, the FEMA USR program acquired critical expertise in search and rescue operations. The task forces developed essential skills in incident management, command and support functions in addition to the tactical aspects of response to collapsed structures. The FEMA program in its entirety would be strained to its limit in the late summer of 2001.

In theory, the national USR plan can be employed as a whole in response to a national disaster. All 28 task forces can be assigned at one time to a specified event. However, it was created to provide immediate, federal response to an affected jurisdiction(s) while also ensuring adequate stand-by capability for an additional incident somewhere else in the U.S. necessitating search and rescue of collapsed structures. The terrorist attacks on the World Trade Center (WTC) in NYC and the Pentagon in Washington, D.C. would come close to stripping FEMA of all its response capability.

The national scope of the 9/11 attacks was apparent within hours of the initial attacks. As the country watched the destruction unfold, the national USR program was moving to respond. Barely an hour passed since the first aircraft crashed into the North Tower of the WTC when FEMA headquarters had activated 16 USR task forces (more than 1,000 personnel and 64 canine search dogs) for deployment (Collins, 2002), The remaining 12 task forces went on “alert” status and instructed to prepare for deployment

(Collins, 2002). In that one morning, the largest commitment of national USR resources had already been ordered. Before operations were concluded in both cities, all but two task forces would be put to work.

In terms of size and complexity, the Pentagon attack was comparable to operations conducted at the 1995 attack on the Murrah Building in Oklahoma City. A total of five FEMA task forces were ultimately assigned to the collapse in Washington during its approximate two week operational period. Activities in New York City on the other hand, presented challenges for USR task forces on an unprecedented scale. FEMA maintained a USR presence on scene for the first three months of operations at the WTC site. Twenty-one of the 28 FEMA task forces would rotate through NYC during this period. At both disaster sites, the strength of the national USR program was demonstrated in the coordination and collaboration of its effort to the total response to the attacks. Under what was known as the *Federal Response Plan*, the official standard operational procedure for disaster response by the federal government, FEMA task forces enhanced the greater emergency response effort in a number of synergistic ways (Federal Emergency Management Agency [FEMA], 2003). First, the FEMA task force organization and SOP were adaptable. At the Pentagon site, USR task forces operated as a subject matter expert (SME) resource for the incident commander (IC). In that situation, the FEMA teams were the primary search and rescue forces. The situation at the WTC site was significantly different. There, FEMA teams augmented the NYC search and rescue capability. The FEMA teams provided additional resources to handle the vast scale of the site in addition to FDNY and NYPD Special Operations resources. The USR task force mission is to support local IC's objectives. This respects and maintains the local IC's authority while at the same time provides an advanced federal USR capability that becomes part of local emergency incident command. USR task forces coordinate and collaborate under the nationally accepted Incident Command System (ICS). This supports the overall response effort and helps to eliminate competition and redundant effort.

Next, FEMA task forces provide technical proficiency and tactical expertise in USR operations that many municipalities, even our larger urban areas, lack. At large-scale and/or complex structural collapse incidents, the FEMA Urban Search and Rescue System is designed to simultaneously conduct the various stages of the FEMA Collapse Rescue Plan. At all substantial structural collapses, generally all five stages of the Collapse Rescue Plan need to be conducted during the course of rescue and recovery operations.² This plan is situationally dependent on conditions that are unique to each collapse incident. Often, the stages of the *Collapse Search and Rescue Plan* need to be mixed and/or conducted concurrently depending on site-specific requirements (Dunn, 1988). While the order that each stage is performed is generally critical, skipping a search of voids and proceeding to general removal of debris could doom otherwise viable victims, a mix of stages depending on circumstances may be required to rescue the maximum number of trapped victims. In his assessment of prior USR operations, Los Angeles County Fire Chief Larry Collins (a nationally renowned USR leader) offered this insight on the 9/11 response: “Clearly, experience is a key component of readiness for unusual missions like the Pentagon and World Trade Center incidents” (Collins, 2002, p. 14). The expertise that the federal government had fostered in the USR system, since its inception in 1990, would pay dividends in 2001.

The FEMA task force system not only brings tactical capability in the conduct of such operations; it also provides expertise to coordinate simultaneous similar efforts at multi-locations. This response can be tailored as conditions dictate. After the 9/11 attacks, this ability was invaluable because of the unprecedented size, scale and scope of the two simultaneous collapse incidents. Testimony before the U.S. Senate has highlighted the national USR ability to assemble a unified response of local, state and federal emergency personnel into a first response synergy. Fred Endrikat, Special

² The five standard stages of the nationally recognized *Collapse Search and Rescue Plan* are: 1) Size-up and Reconnaissance, 2) Surface Rescue, 3) Primary Void Search, 4) Selected Debris Removal, and 5) General Debris Removal (Dunn 1988). Greater detail on the tactical elements of collapse operations can be found in *Collapse of Burning Buildings* (Dunn, 1988).

Operations Chief for the Philadelphia Fire Department and a FEMA Task Force Leader, referenced the strength of the national USR program in his testimony before the Senate:

One of the demonstrated strengths of the National US&R System has been the ability to coordinate state and local US&R assets and quickly fold them into field operations at disaster sites (at the request of the local Authorities having Jurisdiction).

Fred Endrikat, Testimony before the United States House of Representatives, May 6, 2007.

This ability to foster a collective, synergistic team between diverse layers of emergency responders and government is the product of preparation and unity of the program's direction. State, regional and local first responders follow FEMA's USR training curriculum, equipment standards and policies in preparation for responding to local emergencies. This national direction is followed for two reasons. One, local emergency response agencies have recognized that the FEMA USR model is a best-practice model for search and rescue operations at structural collapses. Additionally, the national USR program actively reaches out to all tiers of local response and is willing to share technical knowledge, training curricula, policies and procedures. Each agency is empowered as a stakeholder in the greater national USR system. This was evident in the integrated FEMA response to the WTC on 9/11.

Task force expertise and leadership effectively operated in NYC and Washington, D.C. This was shown in the safety record during both operations. Not a single rescuer was killed during rescue and recovery operations despite some of the most hazardous conditions present after the respective collapses. The experience of the task force members and the ability of task force leaders to coordinate their efforts and form collaborative partnerships with local agencies were critical to the overall safety witnessed in the conduct of operations.

After the 9/11 attacks, the FEMA USR system would face another event of national significance that solidified the 28 national task forces as an "all-hazards" response resource. In 2005, Hurricane Katrina challenged FEMA with the search of thousands of homes and buildings and the rescue of 6,587 victims (Endrikat, 2007).

Although responding to hurricanes had been performed by task forces in the past, the wide scale flooding that damaged or completely destroyed structures and the complications that followed presented new challenges for the FEMA task forces that were deployed to the Gulf Coast region. Katrina demonstrated that the FEMA USR program is expandable outside of the original mission, earthquake hazard mitigation. When presented with operational tasks and objectives not specifically within its domain, the FEMA USR program demonstrated an inherent ability to deal with operational uncertainty. Missions that were outside the FEMA task force concept of operations were now conducted by USR task forces.

In the wake of Hurricane Katrina's path, three states suffered a level of destruction that has rarely been seen in North America. An almost countless number of structures, streets and even entire communities were rendered uninhabitable. To impede response efforts even further, sustained flood conditions in New Orleans and other areas hindered access to many affected areas. All 28 national USR task forces were activated during this incident and 10 were again called upon for a second deployment because of the duration of operations. Without a doubt, this mission did not fall within the parameters of its original formation. The task forces had no SOPs or organic equipment that were designed for rescuing occupants from flooded areas. The basic concepts of search and rescue operations coupled with ingenious task force leadership were able to overcome these challenges. In so doing, the FEMA USR program evolved into a response force expandable for deployments in addition to earthquake incidents. LAFD Fire Chief Larry Collins identified this evolution in his case study of the 9/11 Pentagon attacks and the FEMA response: "It's become clear that the Federal USR Task Forces can be effectively deployed to augment local resources during disasters involving floods, mud & debris flows, dam failure, and even unusual events like volcanic eruptions and tsunamis" (2002, p. 14). This evolution of the FEMA USR program enhanced of the national task forces' expertise in terms of coordinating and collaborating with local and state agencies at multi-agency, multijurisdictional incidents. This command expertise and operational ability promotes a synergy of emergency services at prolonged search, rescue and recovery operations.

Over the last two decades, the FEMA USR program has grown from a vision to limit loss of life and mitigate the hazards resulting from a major earthquake to a national response capability for largescale emergencies and disasters. During the course of this evolution, this program has developed an adaptability to local incident response. Task forces are easily assimilated into local emergency incident management—an uncommon virtue in federal government. This aspect of the national USR program supports its ability to coordinate resources at disaster scenes and collaborate with local agencies in the overall response effort. Furthermore, the expandable nature of the USR mission has allowed the system to grow out of its strict role in earthquake response. In becoming an all-hazards resource, the task forces have expanded their ability and expertise to coordinate and collaborate with local agencies across the nation. In short, the FEMA USR program has evolved into a synergistic federal response force that works exceptionally well with the local, state and regional agencies it supports during diverse and uncertain emergencies.

2. Task Force Organizational Design

The nature of the USR mission is one that demands a synergy of all the component disciplines. Assembled as a cohesive unit, each FEMA task force is able to perform undertakings that the separate component emergency disciplines are unable to accomplish alone—the effective and expeditious search and rescue of trapped victims from collapsed structures. Without a coordinated, collaborative approach, each USR task force could not perform their assignments under the strenuous and dangerous conditions found at virtually all collapsed structures (Endrikat, 2007):

- Search Specialists utilize canines and technical electronic search equipment to locate trapped victims.
- Rescue Specialists are skilled in shoring operations, lifting, and cutting and breaching all types of building materials including structural steel and reinforced concrete to extricate trapped victims.
- Physicians and Medical Specialists (at the paramedic or equivalent level) provide advanced life support capability and prehospital and emergency care for Task Force members and crush syndrome medicine and confined space medicine for rescued victims.

- Rigging Specialists work in conjunction with heavy equipment, such as large hydraulic cranes, to remove heavy debris and expose collapse voids where victims are buried.
- Structural Engineers (some of them firefighters also licensed as professional engineers) perform structural integrity assessments of structures in rescue operations.
- Hazardous Materials Specialists and Technical Information Specialists provide support to the overall search and rescue mission including planning, hazards evaluation, hazardous materials assessments in rescue operations, and technical documentation.
- Logistics Specialists support the overall search and rescue mission by providing supplies, equipment, communications, and transportation for the Task Force and managing the mobilization and demobilization processes.

All of these component specialties contribute unique skills, resources and abilities to the task force. Depending on conditions that vary from incident to incident, any one of these disciplines can be critical to the success or failure of the entire task force. And all of these task force elements are leveraged at every incident. The components of each USR task force enable the unit to rescue trapped victims from collapsed buildings whereas the individual specialists could never accomplish such an endeavor independently. As stated by Corning, synergy is the otherwise unattainable combined effects that are produced by two or more elements; USR produces these effects and satisfies the definition of synergy (Corning, 2007).

In addition to organizing each task force into a synergistic structure according to specialty, every FEMA task force is organized to be able to operate under the following guidelines (Endrikat, 2007):

- 24-hour around-the clock operations.
- Self-sufficiency for 72 hours.
- Report to the Point Of Departure within 4-6 hours of activation, and to be able to deploy all personnel and the entire equipment cache by ground or air (as required).
- Cross-trained personnel.
- Standardized equipment and training.

- Standardized operating procedures.
- Operate under the Incident Command System (ICS).

Each of these requirements demands that a USR task force maintain a high degree of intra-unit coordination and collaboration among its subordinate elements. Task forces that do not foster a synergy of its component parts cannot operate on a 24-hour rotational basis, unsupported for up to 72 hours. If task forces do not cross train personnel, the loss of even one or two members in critical tasks could render the task force ineffective. All seven of these organizational guidelines are predicated on task force synergy.

Task force organizational structure fosters synergy in its design. Each of the 28 FEMA USR task forces consists of 68 members. Those 68 persons make up four, six-member rescue squads, two two-member technical search squads, four canine search teams, two medical squads and a support section that comprises specialists in heavy equipment, communications, structural engineering, technical information and hazardous materials response. Each task force is broken down into component teams, with primary and assistant team leaders. Note that each task force is expected to conduct operations around-the-clock. Consequently, each position on a FEMA USR task force is duplicated, in order to allow for continuous operation: half the task force operating and half at rest in 12-hour cycles. The organization of each task force provides for a division of labor among its subordinate elements and maximizes the functional complementary strengths of each subordinate discipline. Canine search teams locate victims. Rescue teams use specialized entry and removal techniques to remove victims. Engineers evaluate structures to identify weak areas, assess entry options and ensure rescuer safety. Logisticians identify support requirements and maintain sufficient equipment for rescue teams. Medical personnel enter collapses to administer advanced life support to victims before removal and prepare triage stations for removed victims and injured rescue workers. Hazardous materials technicians identify dangerous substances that may threaten trapped victims and rescuers. All these specialties are critical to the success of the task force as a unit.

The structure of each task force fosters synergy both within the task force but also in concert with local emergency resources. Task forces are structured to operate completely independently or collaboratively with local responders. Task force division of labor into search, rescue, medical and support teams can perform each USR task (search, technical rescue, etc.) without local support for up to 72 hours and accomplish the USR mission. Each task force team can also augment local resources. Collaborating with local response agencies enhances the capability of first responders with national USR expertise, while federal resources benefit from the local emergency personnel knowledge of geography, environment and situational awareness. The end result is a USR response effort that is stronger than either a federal or local independent approach. Again, this is Corning's definition of synergy (2007).

The federal USR concept is well organized to develop synergy independently and collectively with local USR assets. FEMA task force structure sets the stage for synergy while FEMA USR standard operational procedure expresses the synergistic vision of successful victim rescue operation.

3. Task Force Procedure

Interdisciplinary synergy is fostered not only in task force organizational design but also through the utilization of two unifying standard operating protocols: the *National Response Framework* (NRF) and the *Urban Search and Rescue Response System in Federal Disaster Operations Manual* (FEMA, 2000). These two documents are the governing protocols for the FEMA USR task force program. The former addresses the national approach to catastrophic emergency management and the latter outlines guidance for specific search and rescue operations. Together, the NRF and the USR operations manual set the parameters for utilization of the 28 FEMA task forces. These procedures define roles and responsibilities, standardize organization, assign objectives and clarify component relationships and authority for each element of a FEMA task force. The resulting impact from these protocols is the fostering of a synergistic environment that is evident on each task force. The NRF is the federal strategy to promote a synergistic

response to large-scale emergency incidents, while the USR operations manual is the tactical guidance for response synergy of national assets during search and rescue operations.

The *National Response Framework* is the current evolution of the nation's federal emergency management. The NRF supersedes the *Federal Response Plan* (FRP), 1992 and the *National Response Plan* (NRP) (FEMA, 2004). It was adopted in 2008 and represents the federal approach to managing "incidents of national significance". Defined by the NRP; these events consist of the following criteria and are clearly complex endeavors (FEMA, 2004):

- The resources of State and local authorities are overwhelmed and Federal assistance has been requested by the appropriate State and local authorities.
- More than one Federal department or agency has become substantially involved in responding to an incident.
- Threats or incidents related to high-profile, large-scale events that present high-probability targets such as National Special Security Events (NSSEs) and other special events as determined by the Secretary of Homeland Security, in coordination with other Federal departments and agencies.
- The Secretary of Homeland Security has been directed to assume responsibility for managing a domestic incident by the President

The NRF is synergistically superior to the earlier federal strategies in that it integrates local and state authorities, which were substantially left out of the FRP and the NRP. This fact is referenced in the NRF, itself:

...[the FRP and NRP are] insufficiently national in focus, which is to say that it should speak more clearly to the roles and responsibilities of all parties involved in response. Moreover, it was evident that the NRP and its supporting documents did not constitute a true operational plan in the sense understood by emergency managers. Its content was inconsistent with the promise of its title. (FEMA, 2008, p. 2)

The national approach to incident management should seek to achieve a synergy of national, state, and local resources. The NRF substantially achieves this by aligning federal coordinating structures, capabilities, and resources into a unified, all-hazards and

all-discipline approach to incident management. When called upon, the NRF is used to manage the federal resources required at major disasters (complex endeavors) like Hurricane Katrina and the September 11, 2001 terrorist attacks. By amending the NRP and adopting the term “framework,” the current federal incident management strategy acknowledges that effective response to an event is the shared responsibility of governments at all levels (FEMA, 2008). From this perspective, a synergy of emergency response resources is assembled.

The core of the federal response to any disaster, according to the NRF, is the National Incident Management System (NIMS). As stated in the NRF, NIMS provides a:

...consistent, nationwide template to enable Federal, State, tribal, and local governments, the private sector, and Non-Governmental Organizations (NGO) to work together to prepare for, prevent, respond to recover from, and mitigate the effects of incidents regardless of cause, size, location, or complexity. (U.S. Department of Homeland Security 2008, p. 4)

By coordinating and integrating all the stakeholders involved at major USR operations (federal, state, and local), the NIMS protocol achieves a unity of effort from all contributing agencies and partners. This is accomplished through unified command at USR incidents. The NRF strategy uses unified command to assemble “a team effort that allows all agencies with jurisdictional authority and/or functional responsibility for USR incidents to provide joint support through mutually developed objectives and strategies at the command level” (U.S. Department of Homeland Security 2008, p. 10).

NIMS supports USR operations by enforcing the following elements of unified command:

1. Developing a single set of objectives;
2. Using a collective, strategic approach;
3. Improving information flow and coordination;
4. Creating common understanding of joint priorities and restrictions;
5. Ensuring that no agency’s legal authorities are compromised or neglected and

6. Optimizing the combined efforts of all agencies under a single plan. (U.S. Department of Homeland Security, 2008, p. 11)

Participation in the planning and decision making processes ensures that specific capabilities and resources (e.g., firefighting, law enforcement, emergency medicine, public works, environmental protection, etc.) are integrated into a workable course of action. Just as importantly, this plan and leadership construct is supported by each subordinate agency and stakeholder. Unified command establishes a framework for the synergy of resources that USR operations demand. These elements of unified command are also traits exhibited by edge organizations.

Unified command employs the Incident Command System (ICS) to align and coordinate the subordinate components of a USR operation. Developed in the 1970s to command federal, state, and local wildland fire services, ICS is the accepted organizational protocol for incident management for interagency, multidisciplinary operations. The NRF uses ICS to facilitate USR activities in five major areas: command, operations, planning, logistics and finance administration. The use of ICS allows for the establishment of a unified command at USR operations. Under this ICS protocol, competition and conflict between agencies and jurisdictions is eliminated. This ensures that all resources and capabilities can contribute to the rescue of trapped victims at USR operations. At the Oklahoma City Bombing, ICS was used to establish command and manage resources. This was referenced by the *Journal of Homeland Security and Emergency Management*: “In this incident most if not all of the elements of the ICS were used to manage the inter-agency response to the disaster...ICS provided an effective means to coordinate inter-agency efforts” (Aguirre, Buck, & Trainory, 2006, p. 7).

If the NRF is the federal strategy for emergency management of events like Katrina and 9/11 (complex endeavors), then the *Urban Search and Rescue Response System Operations Manual* is the playbook that the federal government uses at catastrophic USR incidents. This document promotes a synergistic effort of federal, state and local resources by clearly specifying *how* operations are conducted under the ICS structure in response to incidents dominated by uncertainties (FEMA, 2000b). The USR

operations manual recognizes that local and state authority is maintained while federal assets support or independently undertake search and rescue operations, while at all times observing established incident command authority. The USR operations manual provides specific details regarding:

- Delineation of organizational responsibilities and roles.
- Description of relationships between FEMA USR assets and other supporting organizations.
- Identification of procedures for on-site operations.

By establishing these written protocols, the USR operations manual eliminates confusion and equivocality over mission assignments, objective responsibility, competition for resources and clearly establishes lines of communication and the chain of command. The importance of how a FEMA USR task force coordinates and collaborates during a rescue operation in terms of developing synergy cannot be overstated. This document recognizes this by dedicating an entire appendix that addresses incident management and coordination to reduce operational uncertainties (FEMA, 2000b). Appendix A directs Task Force Leaders (TFL) to closely align operations into the NIMS incident command structure:

The local IC should understand that the task force is a resource, available for their use and under their operational control... The TFL should make every attempt to integrate the local rescue effort with the task force operations, when possible. This cooperation promotes harmony and minimizes any friction between the local effort and the task forces. The TFL must be cognizant of potential problems that can occur when there is a perception that the FEMA US&R resources will overwhelm the local rescue effort and take over the incident. The TFL should work with the local command personnel to diffuse any personnel issues that may occur that could impede the rescue effort. (FEMA, 2000b, p. A-7)

Under this protocol, the major contributing agencies from all levels of government easily understand their position in the greater response effort and how federal assets can support them. Varied jurisdictional and functional emergency response entities can establish a cohesive effort. Clarifying these roles and relationships strengthens and

unifies overall incident command. This enables each response discipline to contribute their independent specialties to the operation. In so doing, a synergy of response can then be realized and operational chaos and uncertainty is minimized.

Having established the “playing field” and exactly where each response agency fits into USR organizational structure, the operations manual fosters a synergy of effort in unifying and consolidating the “how:” the tactical direction covering SOPs for search and rescue operations (FEMA, 2000b). There are two specific appendices that govern strategic and tactical procedures for USR operations. Nationally, there are numerous approaches to affect USR incidents and these approaches use different procedures, techniques and staffing levels with significantly different certification, training standards and qualification requirements. The USR operations manual consolidates these approaches, certifications, training standards and qualification requirements in one document. This not only unifies the SOP for the 28 FEMA task forces, but also provides a protocol for supporting agencies and municipalities to emulate.

Understanding that search and rescue operations in the urban disaster environment require the close interaction of all task force elements (search, rescue, medical and technical personnel from all levels of government) for safe and successful victim extrication, the USR operations manual standardizes rescue strategy and tactics. This fosters a synergy of all task force elements that results in:

- Effective management and coordination of rescue operations.
- Better task force resource utilization and coordination.
- Proper integration of all task force disciplines (i.e., medical, hazardous materials, and structures specialists, etc.) in the rescue operations.
- The incorporation of assistance from entities outside the task force.
- Simultaneous, multiple-site rescue operations.
- Increased safety for all task force members involved in rescue operations.
- Around-the-clock (24-hour) operations.
- Organized and rapid victim extrication.

Following the national framework, the USR operations manual provides clear direction for component teams to follow (FEMA, 2000b). This ensures that all resources under task force leadership are utilized efficiently with minimal duplication of effort or wasted time and energy.

Urban search and rescue operations challenge the emergency response capabilities of government at the federal, state and local level. Catastrophic events that precipitate USR incidents will overwhelm virtually all resources quickly and demand a unified synergy from all responding agencies. The FEMA *Urban Search and Rescue Response System* provides the organizational designs and processes that enable a coordinated and collaborative response to such complex endeavors, reduces the challenges posed by the influence of operational uncertainties and gives trapped victims a better chance for survival.

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IV. THE NEW YORK CITY URBAN SEARCH AND RESCUE TASK FORCE (NY-TF1): A CASE STUDY ON INTERAGENCY EFFECTIVENESS

New York Task Force 1 (NY-TF1) is a key member of the federally led Urban Search & Rescue response system...an excellent example of inter-agency coordination and cooperation, an excellent representative of the City's superb emergency response capability.

Joseph F. Bruno, NYC OEM Commissioner, 2006

A. PARADIGM OF NYC SYNERGY

This chapter presents the research found during the investigation of the NY-TF1 model. Having established that USR operations and a Mumbai-style terror attack are both complex endeavors necessitating a synergistic response and that the FEMA USR program is a synergistic environment, this chapter examines the NYC USR task force to identify its organizational designs and systemic processes applicable to those complex endeavors. This examination has concluded that these designs and processes are contributing factors behind the FDNY-NYPD synergy inherent in the NY-TF1 model. Analysis of the NY-TF1 model in this chapter begins with a brief history of the task force. Understanding the creation of the team facilitates a qualitative assessment of its organization and processes for intrinsic synergistic strengths. This qualitative assessment uses the metrics that describe "edge" entities to analyze the common themes collected through interviews of leadership positions involved in the NYC USR program. The alignment of commonalities found throughout command interviews has confirmed that there is a synergy among the FDNY and NYPD components of the New York City USR task force.

The organizational designs and processes presented here are derived from data collected through interviews of the three levels of task force leadership and research on the NY-TF1 program. Common themes and elements identified from both emergency service disciplines are the qualitative evidence for this thesis' assertion, that NY-TF1 is a

best-practice example of interdisciplinary synergy. The application of these identified NY-TF1 synergy factors into the NYC emergency service relationship can produce a positive impact, moving the FDNY and NYPD from a “conflicted” relationship and closer to a dynamic “edge” synergy.

B. CREATION OF NY-TF1

The origin of the NYC Urban Search and Rescue program mirrored the national effort started in the late 1980s. This is because the first commander of the task force, FDNY Fire Chief Raymond Downey, was also a major contributor in the creation of the national FEMA program. In the late 1980s, local emergency service leaders recognized the importance of the national USR effort and sought to incorporate their own expertise and qualifications into a NYC contribution to the FEMA program. However, as it does with most things, New York City approached the national program in a distinctly different fashion. The New York task force would incorporate law enforcement into half the unit. It is within this unique approach to the national USR program that a best-practice example of interagency synergy between the FDNY and NYPD emerged. The interdisciplinary collaboration found in the NY-TF1 model leverages a division of labor in organizational design and systemic processes developed since its establishment. At the same time, the divergent emergency disciplines bring specific complimentary abilities to the NY-TF1 model. These intrinsic service capabilities (canine search, NYPD, and structural specialists, FDNY) established at its founding gave NY-TF1 a synergy of agency resources not found in the greater NYC response framework. NY-TF1 systemic procedures incorporate these functional complimentary capabilities into a synergy of interdisciplinary effort unique to the NYC task force.

Unlike emergency management in virtually all other municipalities across the U.S., the city of New York responds to major life-threatening operations with both its fire and police services. The FDNY and NYPD share roles and responsibilities for the rescue of victims involved in structural collapses, confined-space entrapments, hazardous materials incidents, motor vehicle accidents, high-angle rope incidents and other life-threatening situations. This approach to emergency management is unique when

compared to other communities of similar size. These types of public safety incidents are almost universally the realm of the fire service in America and around the developed world. In NYC, this is not the case.

The NYPD deploys 457 police officers in their Emergency Services Units (ESU) around the city. These units, similar to S.W.A.T. police found in other departments, respond to incidents ranging from hostage negotiations, emotionally disturbed persons, active-shooter incidents and other emergencies that require specially trained and equipped law enforcement resources. They also are dispatched to incidents that are traditionally understood to be fire service operations; such as collapsed buildings, etc. Since NYC employs both emergency services in response to such events, the FDNY and NYPD were both incorporated into the creation of its FEMA task force. By the end of 1992, the New York City Urban Search and Rescue Task Force 1 (NY-TF1) had completed all its required training and certifications as a member of the greater FEMA program. Where the other FEMA task forces were comprised almost exclusively of fire service personnel, the NYC version had half its personnel from the law enforcement discipline.

The federal concept of USR operations and the NYC multidiscipline approach to the rescue of trapped victims has provided a venue for service interaction between the FDNY and NYPD that has not substantially existed on the streets of New York. As illogical as that statement sounds the FDNY and NYPD had evolved into independent organizations that utilized distinct and separate methodologies to affect emergency management in NYC. The NY-TF1 framework forced the two antagonists in New York's "Battle-of-the-Badges" onto the same team. This team plays in a game, USR operations, which demands the coordinated and collaborative effort from its component disciplines to accomplish its mission. NY-TF1's establishment, out of mission necessity, required fostering synergy between the FDNY and NYPD elements. The synergy between the emergency service disciplines is a product of the organizational designs and processes that govern the NY-TF1 model.

C. NY-TF1 ORGANIZATIONAL DESIGN

NY-TF1 derives FDNY-NYPD synergy from organizational designs used during USR operations. Task force structural themes that promote interdisciplinary synergy are interagency tactical integration, unity of command and the component role definition of NY-TF1. Over time, a collective synergy has developed from these organizational designs between the FDNY and NYPD elements. NY-TF1 organization is structured to meet the challenges to coordination and collaboration demanded at complex endeavors such as USR incidents. The synergy that NY-TF1 realizes is a product of the “edge” characteristics of its structure that foster coordination/collaboration between disciplines and minimizes organizational uncertainty.

1. Task Force Tactical Structure

The structure of the NY-TF1 model leverages a division of labor and a functional complimentary effort from both its FDNY and NYPD components. This results in a synergy of the combined FDNY-NYPD response to USR operations. Both disciplines are equally integrated into search, rescue and support elements which share roles and responsibilities for the subordinate tasks in a USR operation. Each task force position has an FDNY and an NYPD assigned member. This equity of departmental representation on each of the subordinate task force elements (search, rescue and support teams) embeds an interdisciplinary design at every operational and supervisory level of NY-TF1. Neither the FDNY nor the NYPD has a dominant position in terms of authority or team representation during training or deployments. The equality of team composition provides task force leaders with teams of analogous capability, training and qualification. Whereas in the greater NYC first-responder environment there exists uncertainty and distrust with opposing departmental structure and resources, NY-TF1 benefits from defined team composition. As a result of this tactical integration, NY-TF1 realizes a joint construct benefit in expertise and training from both its FDNY and NYPD contributors. Operational missions are divided into more manageable assignments for each search, rescue and support element.

Additionally, each discipline also contributes specific service functional capabilities that are critical to mission success without which the task force would be significantly degraded. FDNY members educated as civil engineers occupy one of the two specialties that do not cross the interagency divide on NY-TF1; the other being the NYPD canine search teams. These are the two emergency service special contributions that make the NY-TF “whole” better than the sum of its parts.³ FDNY expertise in evaluating structural integrity allows joint FDNY-NYPD search teams, rescue teams and support elements to operate in maximum safety. NYPD canine search specialists provide efficient and effective identification of possible survivors. The resultant combined NY-TF1 capability is superior to the independent NYC approaches to collapse rescue operations. There is a high degree of FDNY-NYPD interaction and superior information exchange between discipline specialists and integrated task force teams. The net effect of the NY-TF1 division of labor and the exploitation of each department’s inherent discipline strengths produces a synergy of FDNY-NYPD effort unique to the task force.

The equity found in its tactical structure is mandated for all activation of NY-TF1. Its search, rescue and support teams are staffed in terms of personnel numbers similar to the other 27 FEMA task forces. The defining characteristic of the NY-TF1 model is the further specification for task force composition. Each emergency service discipline contributes personnel in accordance to a strict deployment assignment. According to NYC Office of Emergency Management directive and depending on operational command for an incident, the FDNY and NYPD each comprise approximately half of a deploying task force (NYC Office Of Emergency Management, 2004). Furthermore, each element of the task force is structured to include each discipline in equal proportions. A rescue team of five members, led by an FDNY officer, will have three NYPD and two FDNY personnel. A rescue team of five members that is led by an NYPD officer will have three FDNY and two NYPD personnel. This strict multidiscipline composition imposes a design that demands discipline integration.

³ The FDNY is designated in NY-TF1 organizational design as having sole responsibility for filling the civil engineering position for structural integrity specialist while the NYPD is responsible to fill the canine search team positions required of all FEMA USR task forces.

Whereas subordinate search, rescue and support teams structured along discipline specific lines might compete against one another, the joint team organization found in NY-TF1 breeds a camaraderie that is not commonly found in the NYC first-responder environment. Mission tasks and objectives create a dependency within the team structure. In order to accomplish those tasks and achieve task force objectives, a synergy must be established both on each team and between each subordinate task force elements (search, rescue, support). Because of the integration of both services at the tactical level, there is a resultant high degree of FDNY-NYPD interaction compared to the general FDNY-NYPD service relationship.

Evidence of this structure is contained in the strict deployment guidelines for activation of a task force that ensures equal service representation. Each deployment of a FEMA task force dictates the exact number of personnel for a deployment. The sponsoring agencies, however, determine how the task force positions are assigned. For each deployment, NY-TF1 follows the specific assignment in Figure 2 (NYC Office of Emergency Management, 2006). If the FDNY is designated as task force leader (TFL), as depicted on the left, then there is one less FDNY support member assigned. Conversely, if the NYPD is assigned as TFL, as on the right, there is one less NYPD support member assigned. This organization maintains equal representation from both departments for each mobilization of the task force. At the same time, each discipline is integrated with the other at the tactical level. Because of this equal proportional structure, task force deployments are not viewed as “FDNY” or “NYPD” deployments, but as *task force* deployments. This design also limits an over-representation from either department. The equity in terms of task force positions guards against FDNY or NYPD personnel dominance during deployments. The resultant task force deployment structure promotes one unit identity and eliminates structural ambiguity that might challenge team synergy on NY-TF1.

<u>FDNY TF Command</u>		vs.	<u>NYPD TF Command</u>	
FDNY	1 TFL 30 Team Members 4 Support Personnel		NYPD	1 TFL 32 Team Members 4 Support Personnel
NYPD	1 TFL 32 Team Members 5 Support Personnel		FDNY	1 TFL 30 Team Members 5 Support Personnel
EMS	6		EMS	6
OEM	1		OEM	1

Figure 2. Task Force Deployment Allocations (From NYC OEM Directive, 2006/003)⁴

Examining NY-TF1 structure in terms of “edge” principles and the parameters that define them, it is clear that the NYC task force is well organized for complex endeavors. The disciplinary integration that is central to NY-TF1 embeds a high *pattern of interaction* (POI) between the FDNY and NYPD components. This drives the familiarity and trust that SMEs identify as crucial for USR operations. At the same time, this structure requires a high degree of information exchange (*distribution of information* or DOI) to achieve the situational awareness required at USR incidents. Both of these factors confirm that the NY-TF1 model is applicable to complex endeavor events. The greater NYC First-responder community does not have similar POI or DOI characteristics and can benefit from these factors if they can be adapted for that environment.

2. Unity of Command

The design of NY-TF1 operational command structure fosters task force synergy by sharing decision-making authority and eliminating command ambiguity. Since USR operations may be required to be conducted on a 24-hour basis in order to maximize

⁴ Figure 2 depicts task force deployment positions, but it does not describe operational or tactical assignment. NY-TF1 is not *tactically* organized along departmental lines, as shown in Figure 2.

rescue possibilities, there are two positions assigned as task force leader (TFL) and each of the component leaders; search team, rescue team, and support teams. While there is only one designated task force commander for a deployment, there are two TFL positions per activation. Similarly, the search, rescue and support teams have two respective team managers. This design provides the task force with continuous command supervision if two 12-hour shifts are utilized during an operation. When the FDNY has command the NYPD sends a similarly qualified representative to occupy the second TFL position. The same organizational design functions when the NYPD has operational command. As depicted in Figure 3, the two TFL assignments and 10 team manager positions will support 24-hour task force operations. When half of NY-TF1 is engaged, the other half is resting or preparing for operations. When continuous 24-hour operations are not necessary, the second TFL and the second team manager positions perform the roles of second-in-command or as an executive officer for the task force and assistant team leaders, respectively. In effect, the requirement for two TFL's produces a unified command section between the FDNY and NYPD during all NY-TF1 deployments. This unified command results in a broad sharing of decision-making authority between the FDNY and NYPD leadership of NY-TF1. The search team and rescue team managers who operate under the TFLs recognize that both disciplines substantially contribute to task force unified command. This command structure is in stark contrast to the general NYC incident command structure where entirely separate tactical command organization is employed under nominal unified command. In that emergency management structure, there is strictly limited and controlled decision making authority with almost no interagency influence. The requirement for continuous operation capability of NY-TF1 and the designs that support this effort instill synergy between the FDNY and NYPD components of the task force.

NY-TF1 exhibits characteristics here that identify it as an "edge" organization. The task force unity of command structure incorporates a high degree of shared decision-making authority between disciplines (*allocation of decision rights* or ADR) and an advanced level of discipline interaction (*pattern of interaction* or POI) between command

positions. These organizational traits are critical for USR operations and offer direction for the greater FDNY-NYPD relationship to build first-responder synergy.

3. Component Role Definition

NY-TF1 enjoys component role clarity among its subordinate organizational elements not found in the NYC emergency response environment that reinforce task force structure and aid information exchange between disciplines. Mission essential tasks specific to the three teams of task force structure (search, rescue and support) are performed solely by assigned NY-TF1 components. A division of labor for USR operations in the subordinate task force structure allows for concentration on separate mission essential tasks without redundant organizational waste. There is no duplication of duties or effort. Search teams only attempt to locate trapped victims, and rescue teams perform removal of identified victims. Support sections focus on-site-safety monitoring and medical specialists concentrate on treatment of rescued victims and care for task force personnel. This defined mission responsibility eliminates competition between components and promotes a more efficient and effective USR effort from the task force. Teams and individuals do not operate outside of their assigned role and position. There is no equivocality as far as mission responsibilities found in the NY-TF1 model. This is in direct contrast to the FDNY-NYPD first-response relationship where both agencies share roles and responsibilities for rescue operations. Joint responsibility for emergency service operations combined with minimal interagency organization or procedural approaches fosters departmental competitiveness and uncertainty between the FDNY and NYPD. Consequently, there is substantial duplication of effort at multiagency operations involving the FDNY and NYPD. Distrust and unfamiliarity inherent in the general FDNY-NYPD relationship with both ability and departmental approaches to rescue operations produces separate operational designs and procedures. Adherence to strict task force structural assignment eliminates the “battle of the badges” atmosphere and the resultant separate service structures and approaches.

Defining the roles and responsibilities of each task force entity (individual position assignments and team responsibilities) eliminates much of the operational equivocality and tactical uncertainty found in NYC interagency emergencies. Because all participants and leaders understand their position and authority there is no competition or division of effort. Individuals and teams must rely on each other in order to accomplish the task force mission. *Edge* entities demand this organizational theme in order for them to interact and exchange information internally. Component role definition supports the *patterns of interaction* (POI) and *distribution of information* (DOI) necessary for complex endeavors. This NY-TF1 characteristic offers interesting possibilities for the greater FDNY-NYPD relationship.

D. NY-TF1 SYSTEMIC PROCESSES

Perhaps more influential on task force synergy than its organizational design are the operational processes and protocols that NY-TF1 follows both during training and deployments. Due to its unique composition of fire service and law enforcement disciplines, NY-TF1 has established a number of standard guidelines, both formal and informal, that promote task force coordination and collaboration between FDNY and NYPD personnel. These SOPs take the form of official, written directives and un-written practices that are intended to integrate personnel from the two, sometimes antagonistic agencies. And in terms of applicability to the greater FDNY-NYPD response relationship, these operational processes may be more replicable than structural changes to the organization of either department. Three NY-TF1 processes are central to building the interagency effectiveness found on the task force: shared command responsibility, interpersonal development, and a common standard operating procedure (SOP). NY-TF1 systemic processes enhance the three “edge” characteristics (*patterns of interaction, distribution of information and allocation of decision rights*) that are the foundation of its interdisciplinary synergy. These protocols drive the FDNY-NYPD collaborative effort that is behind the task forces’ recent successful deployment to Haiti.

1. Shared Command Responsibility

Research into the dynamic NY-TF1 processes identified the joint responsibility for command as a significant factor for task force synergy. Since command of NY-TF1 is shared between the FDNY and NYPD, both departments are capable of performing this duty when an activation order is received from FEMA. Obviously, only one individual can be designated as *primary* TFL at any given time and this could become an issue that inhibits task force collaboration. Competition for command and territoriality are both problematic concerns for the greater FDNY-NYPD relationship. This barrier to collaboration has been eliminated by NY-TF1 Program Directive 2007-01. This task force command protocol established a rotational basis for the assignment of NY-TF1 command. This official policy written by the program administrator, the NYC Office of Emergency Management, alternates the position of TFL between the FDNY and NYPD for each deployment of the task force (NYC Office of Emergency Management, 2007).⁵ Rotating responsibility for task force command evenly allocates decision-making rights (ADR) and opportunities between both the FDNY and NYPD. At the same time, interaction between each discipline (POI) is ensured at the task force command level. Since each agency will both command *and* support the command of the other in alternating succession, each must collaborate with the other. Rotating command promotes the free-flow of information between disciplines (DOI). This produces better situational awareness for tactical operations. Operational efficiency, effectiveness and safety are thus enhanced by this high degree of information exchange. As a result, this policy's affect on NY-TF1 is an improved interdisciplinary synergy.

This *edge* procedural characteristic of NY-TF1 eliminates command ambiguity and shares leadership responsibility between the FDNY and NYPD. In the interdepartmental response setting, this is obviously not possible. Incident command for

⁵ The NYC Office of Emergency Management is the program administrator for NY-TF1 and is not formally in the operational chain of command for the task force. Both the FDNY and NYPD share command and control for NY-TF1. Before establishing any program directive, both departments need to accept the protocol.

every emergency cannot be rotated between the FDNY and NYPD, but examining how incident command is assigned does have potential direction for the FDNY-NYPD response dynamic relationship.

2. Interpersonal Interaction

One of the strongest common procedural themes that emerged from both emergency service disciplines during this study was the importance of personal interaction on NY-TF1. FDNY and NYPD leadership emphasized that much of the team-building effort is accomplished through “un-official,” unwritten practices. Of the three parameters that are central to “edge” organizations, the NY-TF1 *pattern of interaction* between the FDNY and NYPD is the most influential factor in NY-TF1 synergy. Every leadership position interviewed in this study referenced that the personal relationships and familiarity developed between members of the task force were crucial to the coordination and collaboration demonstrated during training and deployments. Interaction between disciplines is not only encouraged but mandated by simple practices. Integration of FDNY and NYPD personnel is promoted by standard policies involving housing/room assignments on deployment and training missions. Each NY-TF1 member is required to live with his counterpart from the other department. Out of necessity, this results in greater interpersonal familiarity on the task force, a core component of the “edge” synergy found in the NY-TF1 model. Uncertainty between rival agencies is reduced and much of the equivocality present between individuals is eliminated. Understanding individual abilities, expertise, training, strengths and weaknesses provides task force command with a better ability to employ the subordinate search, rescue and support teams. And the trust that develops between NY-TF1 members creates a bond between the emergency services. These bonds and relationships have carried over to the inter-service operational environment that the FDNY and NYPD special operations resources share with one another.

An encouraging indication that a similar effect can be developed in the greater NYC first-response relationship is the improving professional relationship present in the

FDNY Special Operations Command and the NYPD Emergency Services Command. Both departments' highly-trained resources expressed agreement that their working relationship has substantially improved; a direct product of the *pattern of interaction* found in the operational record of NY-TF1.

3. Common Standard Operating Procedure (SOP)

Without a commonly accepted language and operational plan, *edge* organizations cannot function; and NY-TF1 is no different. A unifying protocol is required for patterns of interaction to develop, for information exchange, and for decisions to be made (ADR). The central procedural theme identified as responsible for the synergistic nature of NY-TF1 was the official SOP for FEMA USR operations. As presented in the previous chapter, the guidelines established in the *Urban Search and Rescue Response System Operations Manual* address the three parameters characteristic of “edge” organizations; patterns of interaction, allocation of decision rights, and distribution of information (FEMA, 2000b). With the utilization of this protocol, NY-TF1 is able to realize a unique synergy between the FDNY and NYPD elements of the task force; a high degree of discipline interaction, shared responsibility for decision making, and a broad exchange of information. These FEMA procedures eliminate much of the uncertainty and equivocality present in the greater FDNY-NYPD relationship. As opposed to the divergent approaches to interagency operations employed by the FDNY and NYPD, operating under one, common standard protocol unifies fire and law enforcement disciplines into one operational entity. The federal USR guidelines achieve (FEMA, 2000b):

- A truly unified command section that has full knowledge and situational awareness of its resources and how best to deploy them. [TF command uncertainty is eliminated.]
- A common tactical incident action plan. All subordinate elements and individuals understand both their position in the overarching plan and what their responsibilities in that plan comprise. [Tactical equivocality is minimized.]

- An atmosphere of personal trust is fostered. [Individual uncertainty is reduced as interaction between disciplines increases. Common experience built between TF members breeds confidence in ability, capability and responsibility for task accomplishment.]

Given that the primary procedural theme that fosters NY-TF1 collaboration is the unified command system, the federal USR standard procedures can be understood to be the tactical framework used under that command.

E. NY-TF1 SYNERGY ASSESSMENT

Applying the social science concepts of edge organizations, we can evaluate where the NY-TF1 model of command and control (C2) stands in relation to the greater FDNY-NYPD response C2 dynamic relationship. Figure 3 describes the C2 “maturity” of each model according to the degree of information sharing (z-axis), discipline interaction (y-axis) and the allocation of authority through decision making rights (x-axis). This graph depicts the superiority of the NY-TF1 model over the greater FDNY-NYPD response relationship in terms of C2 maturity. Using these three metrics, the FDNY-NYPD relationship is defined as “conflicted” as earlier established in this study. This is characterized by a rigid hierarchy of independent commands, poor information flow and significantly slower ability to achieve situational awareness of an incident. This produces slower and less effective decision-making. An “edge” organization such as the NY-TF1 model has substantially more C2 “maturity.” Because of a greater degree of discipline interaction, a broad allocation of decision rights between both disciplines, and a high degree of situational awareness achieved from a significantly better information exchange, the NY-TF1 C2 maturity is measurably better than the general FDNY-NYPD C2 dynamic relationship.

The organizational designs and processes discussed earlier in this chapter are the reasons for the better C2 maturity found in the NY-TF1 model. The NY-TF1 command and control (C2) ability demonstrates characteristics of an “edge” organization. As such, NY-TF1 has a greater ability to gather and process information, establish a better understanding of situational developments, make more effective decisions and

communicate instructions in a more efficient manner. This trait, referred to as C2 “agility,” is essential in complex endeavors like the Mumbai terrorist attacks (Alberts & Nissen, 2009). Supporting evidence for this finding is presented in the discussion of interviews conducted during this study (see Appendix B).

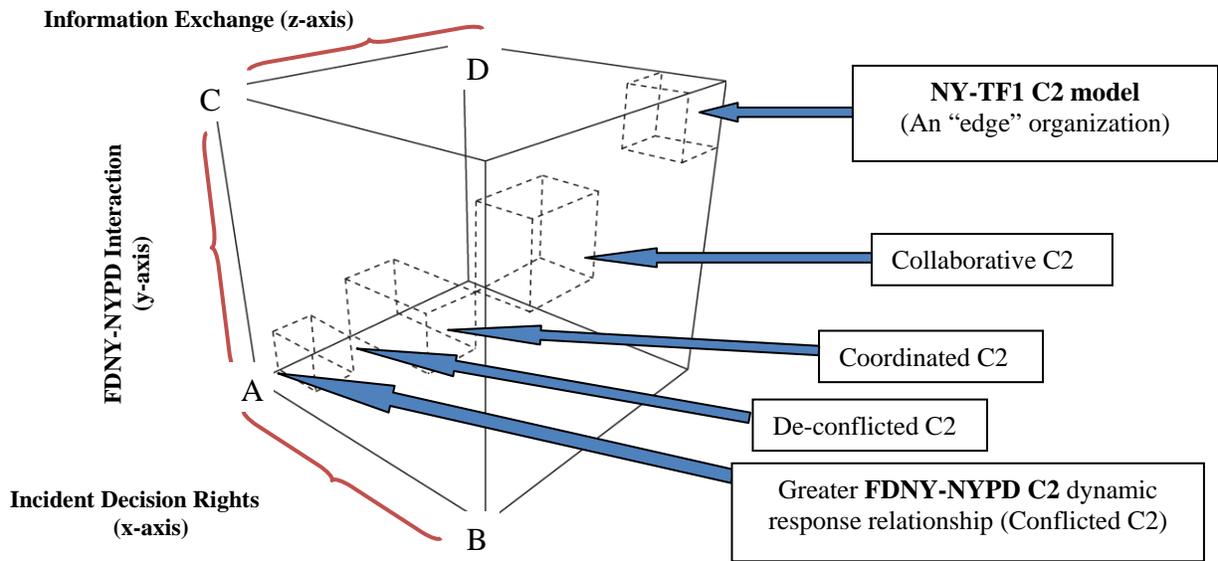


Figure 3. NYC First-responder C2 Approach Space (From Alberts & Nissen 2009)⁶

Note: The depiction of exact positioning on the graph is an approximation because of the qualitative nature behind the NYC first-responder C2 approach space. Precision in terms of placement in the model would require quantitative metrics that are not available to describe complex endeavors or “edge” social science theory. For this reason, depiction in the graph is not an exact point, but a general placement in relation to other entities.

⁶ The NYC first-responder C2 approach space graph (Figure 3) charts the maturity of C2 ability for depicted entities. The **x-axis** ranges from limited to broad decision-making authority (A-B), the **y-axis** ranges from no interaction to high integration (A-C), and the **z-axis** ranges from limited information sharing to high level of information exchange (C-D).

F. INTERVIEW KEY FINDINGS

The qualitative nature of this research project presents challenges in evaluating the effectiveness of NY-TF1 synergy. Synergy between emergency service disciplines does not have firm metrics to use when comparing how entities coordinate and collaborate together. Furthermore, in the field of emergency interagency operations there has not been significant study regarding collaborative response to complex events. This is particularly true in the NYC emergency service environment.

In the process of researching the NY-TF1 model, a general understanding of how synergy between the FDNY and NYPD elements was formulated from operations manuals, after-action reports, newspaper articles and mainstream media reporting. The evidence to support this appreciative inquiry of NY-TF1 synergy was obtained through command level interviews of leadership on the task force. Three levels of command were interviewed for their real-world knowledge of NY-TF1 organization, policies, procedures, tactics, and operational achievement. Additionally, an objective third-party subject-matter-expert, the NYC Office of Emergency Management (OEM) NY-TF1 Program Director was included in the pool of interviews. Participants in these interview sessions included tactical, operational and headquarters command supervisors from each agency (FDNY and NYPD) as well as the senior OEM administrator. Two rescue team managers, two task force leaders, two headquarters staff chiefs and the civilian administrator provided qualitative data that has confirmed the synergistic elements asserted in this thesis regarding the NY-TF1 model. The participants in this study have intimate experience with and knowledge of the NYC task force, its history and its recent achievements, especially with regard to the deployment to the 2010 Haitian earthquake. Formally scripted questions were asked of each participant that referenced their first-person experience with the task force and/or their active participation on deployments. Unscripted questions were added during the interview process when pertinent information related to this study presented itself.

During the course of this research project, it was discovered that the collaborative nature of the NY-TF1 model is presently moving a selected FDNY-NYPD response

relationship in a positive direction. As referenced earlier, this has become apparent in the respective Special Operations Command/Division units in the FDNY and NYPD. Membership on the task force has created interaction in the collaborative NY-TF1 environment during training and operational periods that have benefited the relationship between both departments' special operations units. The resultant effect is a more cohesive and collaborative emergency service relationship between FDNY and NYPD Special Operations units at NYC interagency operations. The natural question that arises from this observation is: Can this relationship fostered in the NY-TF1 model be applicable in an appreciable degree to the common FDNY-NYPD response framework? It is the first-responder (firefighter or police officer) who is first to confront a complex endeavor like the Mumbai attacks, not the highly-trained special operations personnel. Furthermore, since Special Operations resources from both departments may not be available due to the scale and scope of a complex endeavor, the FDNY and NYPD units first on the scene may be the only resources confronting a Mumbai-style event. It is the NY-TF1 collaborative, organizational designs and processes that foster a synergistic response. The following common themes identify synergistic factors that can be applied to the greater FDNY-NYPD response relationship.

1. Common Themes

There were seven standard, scripted questions presented to each participant in this study. Each participant was asked to begin with a brief description of their professional career and their specific experience with the NY-TF1 program. Following this introduction, each interview followed the written question format contained in Appendix A. Information that was relevant to this study generated from these formal questions is referenced in Appendix A.

The raw data collected is analyzed in Appendix B. Each interview is reviewed and coded to identify qualitative themes that emerged from each participant. The collaborative factors that contribute to the synergistic nature found in the NY-TF1 model were consistent with documentation presented earlier and through all interviews

conducted during this research project. Four common themes critical to NY-TF1 interagency effectiveness were identified from the interview participants: defined role and responsibility clarity, common standard organizational structure and procedure, discipline and interpersonal interaction and unified command. These specific findings are expanded upon below.

a. Defined Understanding of NY-TF1 Team and Individual Roles and Responsibilities Contributes to Operational Clarity

Emergency response to large-scale, multi-discipline incidents like USR operations or terrorist attacks, both complex endeavors, involves an array of tactical and command approaches from disparate agencies. It is clear that there is ample opportunity for duplication of effort, poor exchange of information and an overall inefficient use of resources at such incidents. NY-TF1 reduces or eliminates much of the inherent uncertainty that characterize complex endeavors through the strict adherence to specified roles and responsibilities assigned to each task force position and team. Battalion Chief Joe Downey, FDNY, directly attributes the NY-TF1 effectiveness to collaboration derived from the “definition that the respective task force teams have for every assigned role and position” (personal communication, October 13, 2010). Deputy Inspector Robert Lukach, NYPD, supported this assessment in referencing the 2010 Haiti deployment. During rescue operations conducted at the MHQ/Christopher Hotel, “all NY-TF1 teams and task force members knew their job description and followed it; there was no point where task force personnel operated outside the scope of their assigned duties” (R. Lukach, personal conversation, November 11, 2010). Both task force leaders agreed that there was none of the operational uncertainty during NY-TF1 operations that is found at many interagency incidents. Captain Liam Flaherty, FDNY, supported these TFL assessments regarding defined USR roles and responsibilities. As a rescue team manager, Captain Flaherty had witnessed in Haiti how acceptance of the task force division of labor and utilization of functional complimentary skills fostered a collective task force synergy (personal conversation, November 2, 2010). According to Captain Flaherty, the respect of position roles and responsibilities reduced operational waste in

terms of manpower, time and equipment. This reduced replication of effort and it coordinated all disciplines toward the common objective, the successful rescue of six trapped occupants from collapsed Haitian structures.

b. Common SOP and Organizational Structure Eliminates Discipline Uncertainty Between Services and Provides a Foundation for Collaboration

Response assignments and tactical protocols for interagency incidents in NYC can vary from department to department, and even from within one department depending upon several factors. Time of day, resource availability, staffing levels, and other factors can influence what equipment, personnel and units arrive at the scene of a complex endeavor that requires a joint emergency service operation. Chief James Molloy, NYPD, commented that there are a maximum of ten ESU units on an ordinary shift and “availability on any given day can be affected by dispatch assignments, training requirements or other law enforcement duties” (personal conversation, November 5, 2010). The NYPD response assignment to a collapsed structure can vary depending on these factors. While the FDNY response assignment to collapses is more formal, it too can be affected by similar factors such as time of day, location and resource availability. Consequently, the capabilities and tactical approaches to each incident can take various direction and format. Additionally, both departments use independent procedures for interagency incidents under a nominal unified command. Neither of these protocols address outside agencies except as supporting players. The NY-TF1 approach to USR incidents adheres to both a common organizational structure and a common SOP. Captain Flaherty, FDNY, identified task force operational procedures that are governed by the FEMA guidance are a major contributing factor in the synergy that NY-TF1 realizes.

c. Personnel and Discipline Interaction Is the Most Significant Factor in Fostering Task Force Synergy

Under normal circumstances, in the course of an average tour of duty, the emergency services in NYC generally operate only in supporting roles at incidents that

are almost universally the domain of the respective departments. Structural fires are managed exclusively by FDNY elements. Crime scene investigations are conducted entirely by NYPD resources; and so on. Adding to this perspective, the relative infrequency of major interagency events only magnifies the lack of substantial interaction between the FDNY and NYPD. The isolating effect of this lack of interaction is found at virtually every level: command, operational, tactical and interpersonal. Every study participant touched upon this factor as a barrier to interdepartmental collaboration.

Service interaction and the personal relationships that are the product of that interaction reduce individual uncertainties with respect for qualification, experience and the ability of rival service members. All study participants referenced the “familiarity” generated on NY-TF1 between the FDNY and NYPD components during training exercises and deployments. Lieutenant Franco Barbiero, NYPD, spoke to this point as a rescue team manager with experience from 2010 Haiti:

Interaction of task force members develops a trust factor that runs throughout the NY-TF1 model. The knowledge that each man understands his position and how to accomplish specific tasks develops a trust among members that filters down from the TFL. (F. Barbiero, personal conversation, November 18, 2010)

The net effect is that task force members are comfortable working with each other regardless of departmental affiliation outside of the team. This synergy fostering factor has developed over time through numerous service interactive opportunities. The informal relationships built on NY-TF1 are the bond that the collective task force synergy rests upon.

d. Unified Command System and Shared Decision-Making Authority Provide the Conditions That Are Favorable for NY-TF1 Collaboration

The NYC interpretation of the National Incident Command System (ICS) does not fully mandate or realize a collaborative effort from the FDNY and NYPD. Acting Deputy Chief Fred Lafamina, FDNY (retired), echoed the sentiments of both emergency service interview participants that CIMS does not enforce the operational

integration of resources required for complex, interagency incidents (personal conversation, December 1, 2010). The NYC interagency protocol only loosely combines emergency service commanders in a challenged, joint incident command protocol. The operational resources of each first-responder agency still maintain divergent tactical approaches at multiagency emergencies. Both Chief Lafamina, FDNY, and Lieutenant Barbiero, NYPD, agreed that the Unified Command Structure and ICS protocol utilized by NY-TF1 are applicable to complex endeavors and promote task force collaboration (F. Barbiero, personal conversation, November 18, 2010; F. Lafamina, personal conversation, December 9, 2010). These men from different command levels and disciplines affirmed that unified command procedures and shared decision-making authority could be leveraged in the greater FDNY-NYPD relationship.

NY-TF1 is able to realize the collaborative effort required for USR operations due to the shared allocation of decision rights between its FDNY and NYPD components. Battalion Chief Downey, FDNY, described much of tactical decision-making involved at USR operations as incident specific requiring the contribution of all disciplines' expertise. Interdisciplinary "group discussion" drives much of the tactical direction found on the task force (J. Downey, personal conversation, October 13, 2010). Because of this joint-effort understanding, each emergency discipline is considered as an equal stakeholder in NY-TF1 operations. This paradigm cultivates the collaboration required by complex endeavors.

2. Summary

There was a general consensus among all study participants that the current interdepartmental response relationship between the FDNY and NYPD is vastly improved in comparison with that of pre-9/11. Particularly encouraging was the common opinion espoused by every interviewee that the professional relationship between FDNY Special Operations Command units and NYPD Emergency Service Command units is significantly more collaborative than the greater first responder relationship. This is partly a direct result of the existence of the NY-TF1 program.

There was less uniformity of opinion concerning the applicability of the NY-TF1 synergy factors to a complex endeavor similar to a Mumbai event. While all interview subjects agreed that NY-TF1 organizational design and systemic process could positively influence the greater FDNY-NYPD relationship, there were differing opinions as to the applicability to specific complex endeavors like an active-shooter incident on the scale of 2008 Mumbai. The senior NYPD participant, Chief James Molloy, suggested that a Mumbai incident in NYC requires improving interdepartmental knowledge and trust through joint agency education (personal communication, November 5, 2010). Chief James Molloy sees the answer to the challenges of such an event in terms of eliminating uncertainty between the disciplines; unfamiliarity with corresponding procedures and response protocols are the major stumbling block to collaboration of the services. Battalion Chief Joseph Downey, FDNY, shares the same appraisal of first-responder synergy challenges, but in his view, a response to a Mumbai-style incident will require interagency relationships characteristic of the ones found in the NY-TF1 model (personal communication, October 13, 2010). The underlying theme drawn from these interviews was that minimizing the level of uncertainty and equivocality between the FDNY and NYPD in preparation for responding to a complex endeavor would substantially improve the effectiveness of such a response. The exact formula of NY-TF1 collaborative factors that reduces interdepartmental uncertainty and equivocality requires further study.

V. RECOMMENDATIONS / CONCLUSION

Indeed, for any complex situation anywhere in the world, it's become obvious that there is no one authority—whether in the form of a leader, an organization, a command operation, or a rescue squad—that can single-handedly save the day.

Megacommunities

(Gerencser, M., Kelly, C., Napolitano, F., & Vann Lee, R., 2008, p. 26)

A. NYC FIRST-RESPONDER DIRECTION AND TWENTY-FIRST CENTURY THREAT

This study explored the evolving challenges facing first-responders and how their standard approaches to incident management are no longer sufficient to meet a current threat which spans both jurisdiction and disciplines. This thesis investigated the following research question: What can we learn from NYTF-1, and how might it be utilized as the foundation for a nation-wide model? Having established that the NYC first-responder relationship does not currently possess the collaborative ability to effectively confront a complex endeavor similar to a Mumbai attack, secondary questions focused on the organizational/operational level designs and systemic processes found in the NYC urban search and rescue model (NY-TF1) that reduce uncertainty and equivocality effects among responding agencies thereby contributing to a more coordinated and collaborative relationship between FDNY and NYPD personnel. Taking the NY-TF1 structures and processes as best-practice examples of interagency synergies at a complex endeavor, this thesis has confirmed that these NY-TF1 practices and designs can significantly improve the greater FDNY-NYPD response dynamic.

Reducing the inherent uncertainties present in complex endeavors is critical for the NYC emergency services. Exploiting the chaotic challenges to response collaboration are part of the operational intent that today's Islamic extremist groups hope to capitalize on. While the operational "fog of war" can never be eliminated, its effect on responding agencies can be mitigated. To achieve an optimal level of emergency

response effectiveness all first-responder organizations in NYC must increase their collaborative capabilities to operate in an unprecedented, extremely chaotic environment. This will necessitate breeding a familiarity in the greater FDNY-NYPD response dynamic that does not presently exist. The qualitative evidence collected from subject-matter-experts in this study supports transforming the FDNY-NYPD relationship with synergy fostering elements (“edge” C2 principles) found in the NY-TF1 model of command and control in uncertain environments.

NYC shares the risk of a Mumbai-style attack occurring with every other major metropolitan area in the United States. Some of the dynamic relationships between their respective fire service and law enforcement organizations found in these analogous communities have better response synergy and some are worse. However, all U.S. first-response communities are faced with a common foe; the radical Islamist extremist groups that will use chaos and operational uncertainty to disguise objectives, delay the establishment of incident situational awareness, and disrupt first-response efforts and countermeasures. This will provide attackers with increased opportunity to maximize body-counts and serious injuries. Regardless of a municipality’s first-responder cohesiveness, there will be common interoperability issues between fire service and law enforcement agencies similar to the ones discussed in this thesis. Every American urban community will benefit from improved collaboration between emergency disciplines. While we cannot prevent a determined attack, we can mitigate its damage by fostering emergency services synergy between the organizations that will undoubtedly be the first to face this enemy.

B. RECOMMENDATIONS: TOWARD A NYC FIRST-RESPONDER MEGACOMMUNITY

The organizational divide between NYC’s fire and police departments is influenced by historical rivalries, command structural differences, cultural disparities and conflicting operational interests during the simplest interagency operations. During chaotic events that this thesis predicts, these organizational divides will be magnified by the inherent uncertainties of complex endeavors unless steps are taken to bridge this

interdepartmental gap. If NYC can more closely align the operational response of its first-response agencies it will be better prepared for an optimal response to a Mumbai-style terror attack. This thesis has identified the concept of “edge” command and control principles which leverage NY-TF1 organizational designs and systemic processes to achieve that optimal response. Edge C2 principles “optimize” first-responder efforts and not simply “maximize” the response of the FDNY and NYPD. Complex endeavors are beyond the reach of either agency and require a C2 system based on edge principles, “pooling capabilities and optimizes the benefit of criss-crossing agendas, instead of maximizing their own individual agendas” (Gerencser et al., 2008, p. 86). The megacommunity concept is such a system that edge principles will support.

New York City currently possesses a latent megacommunity among its emergency services that is poised to realize a synergy of fire service and law enforcement disciplines. The term megacommunity “is based on the idea that communities of organizations...have deliberately come together across organizational and sectoral boundaries to reach the goals they cannot reach alone” (Gerencser et al., 2008, p. 28). A NYC first-responder megacommunity is not simply a larger organizational structural approach, an FDNY-NYPD megacommunity deliberately joins both agencies around the common threat facing NYC (a Mumbai-style attack) and follows the “edge” practices and principles that make it easier for them to achieve an optimal response. This is accomplished without sacrificing their independent goals or identities. Using the NY-TF1 *edge* principles of tactical operational integration, unified incident command responsibility and increased situational awareness development will move NYC toward a megacommunity of emergency services.

These following recommendations are focused on achieving the emergency services synergy developed in this thesis by leveraging the *edge* characteristics identified in the NY-TF1 model.

1. Promote FDNY-NYPD Operational Interaction

This recommendation is intended for the strategic leadership of both the FDNY and NYPD. Senior departmental commanders need to encourage and facilitate an increase in agency interaction in the individual and collective spheres. The collaborative strengths and interdisciplinary synergy of the NY-TF1 command and control model stem from the strong personal interactions between the FDNY and NYPD components. The word “familiarity” was used numerous times by every interview subject when referencing the roots of NY-TF1’s synergistic properties. A formal, joint FDNY-NYPD structure is not a practical suggestion for the vast majority of emergencies that occur in NYC. The discipline specific nature most first-response operations demands that NYC emergency services remain distinct and separate; however, there is a real need to integrate the FDNY and NYPD on a fundamental/operational level. The current NYC interagency approach does not promote such interaction. The CIMS interagency protocol does not mandate a unified tactical approach for interdepartmental operations. It only requires the use of a “nominal” unified command for some incidents. Interdisciplinary events under the simplest circumstances demand the coordination and collaboration of all tactical as well as command elements. Moreover, the lack of operational interaction between the FDNY and NYPD, outside of the Special Operations environment, fosters an operational divide and discipline isolation that retards first-responder synergy from developing. During a complex endeavor similar to a Mumbai attack, these challenges will become more problematic if not insurmountable without substantial loss of life.

The remedy for this synergy challenge is greater departmental interaction at all levels. Each front-line FDNY firefighter should operationally understand his corresponding counterpart patrolling in an NYPD sector car, and vice-versa. First-line supervisors, fire lieutenants and police sergeants need a fundamental understanding of corresponding departmental interagency procedures and response assignments. FDNY and NYPD commanders need to be technically and tactically proficient with interagency protocols and be familiar with command counterparts in corresponding response areas. It is not necessary for a first-name relationship to develop, although this would be

beneficial, but increased interdepartmental exposure will reduce organizational and operational uncertainties. NYC firefighters and police officers need to attain a “familiarity” with each others’ approach to incident tactics and management as well as build an interagency expertise at all levels.

These interactions can be promoted through two interdepartmental initiatives to bring the FDNY and NYPD into closer contact.

a. “True” Interdisciplinary Drills for the Greater FDNY and NYPD

The majority of interdepartmental training activities focus on Special Operations units that already enjoy a greater familiarity and interaction with each other. A chaotic complex endeavor will quickly strip NYC of its Special Operations resources and require the first-to-arrive emergency responders to collaborate in ways they have never experienced. Only by fostering interaction between local firefighters and local police officers will a more synergistic relationship be able to form.

b. Expand the FDNY-NYPD Liaison Program

The extent of full-time liaison positions between the two departments consists of one FDNY captain working at NYPD headquarters and one NYPD captain working at FDNY headquarters. This is grossly insufficient. Information exchanges, command relationships and the personal interactions that are the hallmarks of the NY-TF1 model are absent in the present FD-PD liaison program. Furthermore, effective interagency discourse needs to be brought beyond the headquarters level to the operational level of emergency service response. An interagency liaison program that exchanged supervisors from the operational level of each department will significantly increase interdepartmental interaction for senior leadership levels of each service. This initiative can be modeled on the inter-service exchange of officers between the U.S. military branches. All senior commanders of each military service are required to perform a period of service with another military branch to broaden their individual

professional development. A similar program in the NYC emergency services would promote interdepartmental interaction necessary for first-responder synergy.

c. Interdepartmental Training Exchanges

The U.S. military routinely selects service members of one branch for attendance in another's professional development and skill qualification courses. This practice is also found in the NY-TF1 model. Task force members are expected to seek additional qualification and leadership training that exposes them to skills and expertise found outside of their parent discipline. This fosters the familiarity that has been identified as central to the NY-TF1 synergistic environment. At the same time, task force members become deployable in several USR positions. This increases the readiness of the task force for activation. NYC should explore sending personnel from one emergency service discipline to the complimentary training offered by the opposite department. FDNY firefighters can learn the fundamental requirements of law enforcement operations and NYPD patrol officers can learn basic tactics for structural firefighting. This interaction will promote a common understanding between the services and build interpersonal relationships that are the core of NY-TF1 synergy.

Greater interaction between the FDNY and NYPD will effectively minimize much of the uncertainty presently in existence between the two departments. Understanding the companion discipline's objectives, procedure and approach is the first step in establishing a familiarity between the FDNY and NYPD. Expansion of interdepartmental exercises around complex endeavors and increasing the exchange of liaisons between departments will foster interagency familiarity. Increasing the opportunity for FDNY and NYPD interaction will build FDNY-NYPD synergy with a positive effect in the three *edge* parameters:

- *Patterns of interaction:* The only way to develop the familiarity and trust that interdisciplinary synergy requires is for the two departments to develop an individual and organizational understanding of each other. These three initiatives will generate that interaction.

- *Distribution of information* Edge organizations exhibit a free flow of information. This is directly dependent on the familiarity resultant of a high degree of interaction. As the FDNY and NYPD become more closely aligned, the barriers to information exchange will shrink.
- *Allocation of decision rights* Increased interaction at the operational level of supervision will foster the unified command necessary for edge organizations. Departmental isolation and independent tactical divergence will be minimized if lower levels of tactical interaction are mandated.

Promoting increase interaction between the FDNY and NYPD will prepare the NYC first-responder community for the challenges of a complex endeavor. The interdisciplinary familiarity that results will be the foundation the collaboration that will be required to optimal respond when a Mumbai-style event comes to NYC.

2. Create a NYC First-Responder Interagency Advisory Panel

This recommendation is intended to integrate high-level leadership positions of both departments into a collective working group. A joint panel of senior departmental representatives needs to be empowered to examine the challenges that complex endeavors pose for FDNY-NYPD collaborative response. A First-Responder Interagency Advisory Panel should resemble the present advisory forum used in the city of London, England. The London Emergency Services Liaison Panel (LESLP) was created in 1977 and consisted of key agency leaders from each branch of London's emergency services as well as representatives from supporting governmental agencies (LESLP, 2007). This group of senior staff from each the London law enforcement authorities, the London Fire Brigade, the London Ambulance Service and other important entities was formed to develop an interagency operations protocol for major incidents occurring inside of London that require an interdisciplinary, interjurisdictional response. The LESLP meets every three months to review current initiatives, discuss recent issues and assess the current state of interdepartmental responses.

NYC needs a similar entity that can not only evaluate the present interdepartmental environment, but also explore solutions for FDNY-NYPD synergy obstacles. A First-Responder Advisory Panel can take the collaborative designs and

processes found in the NY-TF1 model and adapt them to the greater NYC emergency service community. This panel needs to meet regularly. The CIMS protocol was created from a committee of subject-matter-experts but has not been reviewed or amended since its inception in 2005. The evolving nature of terrorism demands and corresponding evolution in emergency response approaches. Only an active examination and adaptation of the NYC interagency protocol will be able to keep pace with such a threat.

A NYC version of the London interservice response panel will affect the FDNY-NYPD interdepartmental relationship on the three levels critical for “edge” organizations to be synergistic.

- *Patterns of interaction:* A higher degree of interaction between top commanders in a common goal will generate, over time, the requisite familiarity among the leaders of the FDNY and NYPD. The NY-TF1 model shows that the personal relations and departmental interaction will result in a more collaborative environment.
- *Distribution of information:* Departmental SMEs who are in senior level leadership are those most informed and empowered to influence agency policy and structure. The free exchange of information, as seen in the NY-TF1 model, between top leaders will eliminate interdepartmental equivocality and more closely align department commanders and operational leaders.
- *Allocation of decision rights:* Engaging key leaders in the decision-making process that assess, creates and reviews the NYC emergency service relationship will empower these leaders as stakeholders in the ultimate product. This will foster a commitment behind this initiative. A key-factor in the success of NY-TF1 is agency “buy-in,” a First-Responder Advisory Panel will replicate this departmental “buy-in” in the greater FDNY-NYPD community.

This recommendation will formally integrate key leaders of each department and create a common operational procedure for large-scale interagency operations, both common themes in the NY-TF1 model. The resultant definition in operational protocol and organizational role clarity will reduce uncertainties presently challenging the NYC emergency response framework.

3. Establish Formalized Unified Command for All Interagency Incidents

This recommendation is intended for the First-Responder Interagency Advisory Panel. A joint FDNY-NYPD committee needs to examine the current CIMS interagency response procedure. This group must strive to resolve command and operational equivocality. The current interagency protocol (CIMS) is too ambitious and vague. Under CIMS, all emergencies are assigned to a specific emergency service without mandating specified roles and organizational responsibilities. CIMS needs to focus on the specific challenges presented by complex endeavors. While no protocol can be applied equally in all scenarios and solve every operational challenge, there is substantial room for clarifying the present relationship. CIMS needs to be substantially rewritten to achieve clarity of departmental purpose and operational responsibility.

Unified incident command with a joint operational approach is demanded by complex endeavors. NYC needs to formally establish a clear and defined interagency incident management system similar to the one employed in the NY-TF1 model. Sharing decision-making responsibility at major incidents does not demand equity in command authority. Discipline specific incidents should remain in the sphere of each service (law enforcement needs to drive counter-terror decisions, etc.), but there needs to be an inclusion in the process not found under the present CIMS protocol. In terms of the “edge” characteristics for this recommendation:

- *Patterns of interaction:* Formalized unified command will mandate inclusion in the decision-making process and eliminate unilateral approaches to interagency incidents. Establishing this protocol will increase command interaction at the tactical, operational and staff levels.
- *Distribution of information:* Unified command allows input from all stakeholders at a multi-discipline operation. SMEs from each emergency service can contribute expertise and technical knowledge that may significantly impact command decisions. The end product is a more effective and robust incident management synergy.
- *Allocation of decision rights:* Incorporating input for decision-making throughout the organizational spectrum of command (tactical, operational, staff) will benefit the entire operation. Technical proficiencies and tactical expertise can positively influence the collaboration between the FDNY and NYPD at interagency incidents.

NY-TF1 is a command inclusive organization and this directly contributes to the interdisciplinary synergy of the task force. Real joint leadership of interagency operations integrates disciplines and ensures that interaction between agencies is realized on the operational level. Command and operational uncertainties are minimized and synergy between disciplines is fostered. Under CIMS, only a nominal joint command is created and does not flow down to an operational setting. This needs to be replicated in the NYC emergency incident approach for major operations at complex endeavors.

C. IMPLEMENTATION IMPLICATIONS

The above recommendations assume an agreement that the NYC dynamic emergency response relationship needs modification. There is no such consensus in the FDNY-NYPD hierarchy at this time. While there is common agreement that a Mumbai-style active-shooter event will present new response priorities, there is a wide spectrum of opinion regarding how to approach those priorities. Table-top command exercises have identified many of the issues discussed in this paper, but to date there has been no substantive movement toward the collaborative relationship necessary for an optimal response.⁷

The interview process during this study identified a “buy-in” challenge in aligning both departments in a joint response to an incident envisioned in this thesis. From the FDNY perspective, some department leaders see terrorism as a law enforcement responsibility with little role for the fire service. Conversely, there are some in the law enforcement community that feel that the NYPD can unilaterally respond to a Mumbai event in NYC without support from other agencies. The NYPD Commissioner’s testimony before the U.S. Senate about the Mumbai attacks never mentioned “outside” agencies and implied that the NYPD could address all operational issues that were faced at the Indian incident (Unites States Senate, 2009). Based on the data collected from the SMEs chosen for this study, these opinions are inaccurate and potentially

⁷ Five FDNY-NYPD interagency command table-top exercises conducted between May and September 2009 were observed by the author. These were conducted by the FDNY and attended by headquarters staff from each of the five boroughs in NYC.

counterproductive. Both NYC emergency services command structures (FDNY and NYPD) need to form a common understanding of the threat they are currently facing and the joint operational requirements such an event will produce. This must start at the top and be disseminated throughout each department. This is the first step that needs to be taken in order to build the requisite response synergy. The participants in this project have all agreed that this is a first-order task that may hinder the recommendations previously discussed.

D. CONCLUSION

The passage of time and the illusion of distance are significant challenges in understanding the nature and relevance of the threat facing major urban centers in the United States. Every day that passes without a successful terror attack inside of U.S. territory contributes to the malaise and indifference that many Americans share in perceiving the threat of Islamic extremism. The sense of security presently shared in America is an illusion and must be resisted by those tasked with responding to domestic terror events. This nation depends upon our military to prevent this extremist threat from directly reaching our shores; however, when terrorism does arrive, Americans look to the nation's first-responders for protection from the consequences of a successful attack. The U.S. government cannot be 100 percent effective in eliminating this threat. Since 2001, the question has never been about "if," but "when and where" it will arise next. Just as inevitable will be the response of our cities' emergency services. It is unacceptable that we do not take every opportunity to prepare them for this eventuality.

A complex endeavor on the scale and scope similar to 2008 Mumbai will seek to foment uncertainties in order to achieve attacker objectives. Disrupting the immediate response of emergency services will be of critical importance to terrorists. The organizational and operational divisions between the fire service and law enforcement communities will be used against us if we allow attackers to magnify their effect.

Fostering a synergy of effort among first-responders through the utilization of “edge” C2 principles will prevent divisions between emergency service disciplines from incapacitating the initial response to a Mumbai-style event.

The next step in preparing emergency services to realize a synergistic relationship is to expand the first-responder focus. All emergency services and jurisdictions in the New York and New Jersey metropolitan area need to be engaged in the NYC first-responder megacommunity. This thesis focused on the FDNY-NYPD dynamic response relationship to identify collaborative elements, but there is a wider array of response organizations in this geographical space. The New York-New Jersey Port Authority Police, the Department of Defense Police and U.S. military, the Federal Bureau of Investigation, the 11 volunteer fire departments inside of NYC and many more members of the New York City emergency services community should be involved in a joint solution for a complex response to the attack envisioned in this paper. These organizations, as well as the private-sector, have different resources and responsibilities that can improve and/or hamper the overall collaborative response effort. This situation is replicated in every major urban community across America. Further study in the totality of a geographic region’s response resources and challenges needs to be done. Additionally, research needs to address how localities can support each other. Terrorism seeks to identify and exploit seams in the defense against it. Collaboration between communities can use the synergistic elements identified in this thesis to better position them for an optimal response to the unthinkable.

APPENDIX A. INTERVIEW QUESTIONS & ANSWERS

A. STUDY PARTICIPANTS AND THE INTERVIEW PROCESS

Seven subject-matter-experts (SME) were chosen for this study; three key leaders from each emergency service discipline (FDNY and NYPD) and one, third-party civilian (OEM) who is currently the NY-TF1 program director. Most of the SMEs have first-hand knowledge and experience working on the team. All study participants have been in their current positions since at least 2006.

Three FDNY and three NYPD officers were selected to represent the three organic levels of command on the task force; those being tactical, operational and headquarters staff level supervisors. Each of these leadership positions contributes a separate perspective of NY-TF1's collaborative nature. The tactical level SMEs, the *team managers*, are responsible for the specific search or technical rescue missions. These positions offer direct evidential information regarding interpersonal relations between the two emergency disciplines. Team managers are the leaders who directly supervise identifying victim locations and their removal. The operational level SMEs, the *task force leaders* (TFL), contribute evidence of how the two disciplines factor into collective NY-TF1 success. TFLs are responsible to select task force members, develop training standards and assume the role of NY-TF1 commander during exercises and real-world deployments. Staff level SMEs, senior headquarters supervisors, are directly responsible for providing support to the task force offer evidence of NY-TF1 collaboration from an executive management perspective. Each of the study subjects has had at least one deployment with the exception of the NYPD staff level SME. Most have held more than one position (task force technician, team manager, TFL) during their involvement with NY-TF1. These six individuals are the source of the data from which this thesis' conclusions are drawn.

The one civilian SME chosen for this study was the senior administrator for the NY-TF1 program. This position works for neither the FDNY nor NYPD and is

responsible for coordinating support requirements (budget, logistics, etc.) as well as creating program directives that govern task force procedures and policy. With the agreement of both the FDNY and NYPD, this NYC Office of Emergency Management official publishes internal SOPs that have directly influenced task force management and operation. This individual was chosen because he is outside of the influences that affect the fire and law enforcement disciplines. In this position, the NY-TF1 Program Director contributes an objective appraisal of the task force's synergistic nature.

The following individuals were the participants in this study and provided exclusive insight into the collaborative aspects of NT-TF1's organizational design and systemic practices.

1. Fred Lafamina, Deputy Chief (Acting)—FDNY (Respondent F-1)

Recently retired as Chief of Rescue Services, Chief Lafamina had 27 years with the FDNY and has spent the majority of his professional career in the Special Operations Command. He has over 20 years experience with the task force. Since NY-TF1's creation, Chief Lafamina has been involved with the task force and has seen it develop into its current form. He has held virtually every position on the task force and was one of Chief Ray Downey's (NY-TF1 creator) original selections in 1990.

2. Joseph R. Downey, Battalion Chief—FDNY (Respondent F-2)

For the past three years, Chief Downey has been one of the four chief officers in charge of the FDNY's Rescue Battalion. The FDNY Rescue Battalion supervises the five elite Rescue Companies located throughout NYC. Chief Downey has 26 years with the FDNY and 13 in Special Operations. The son of task force founder, Chief Ray Downey, Joseph Downey has been in the TFL position for the last six years. During his membership on NY-TF1, Chief Downey has been deployed as a team manager and TFL and was the NY-TF1 commander for the deployment to the 2010 Haitian earthquake.

3. Liam J. Flaherty, Captain—FDNY (Respondent F-3)

Captain Flaherty is currently assigned as commander of Rescue Company 2, Brooklyn in the Special Operations Command and has 20 years with the FDNY, and all of his assignments in SOC have been with the elite rescue companies. He is a member of the NYC Incident Management Team (IMT) that provides C2 support for major wild-land fire operations nationally and recently deployed to the 2010 Haitian earthquake as a rescue team manager.

4. James Molloy, Chief—NYPD (Respondent P-1)

Chief Molloy currently is the commanding officer for the NYPD Emergency Services Bureau and has held that position for almost three years. He has over 29 years with the NYPD and has been in the Special Operations Division since 2002. He supervises all aspects of the NYPD involvement with NY-TF1. Although not a member of the task force, all command issues and support requirements are his responsibility.

5. Robert Lukach, Deputy Inspector—NYPD (Respondent P-2)

Inspector Lukach is the executive officer of the NYPD Emergency Services Bureau and has 23 years in service. He has been with the Special Operations Division for seven years and has been on NY-TF1 for the past five years. Inspector Lukach was the second TFL for the 2010 Haitian earthquake deployment.

6. Franco Barbiero, Lieutenant—NYPD (Respondent P-3)

Lieutenant Barbiero has 19 years with the NYPD, 16 years of which have been in the Emergency Services Bureau. He has been involved with NY-TF1 since 2003 and was a rescue team manager during the 2010 Haitian earthquake deployment.

7. John Grimm—OEM (Respondent O-1)

Mr. Grimm has been with the NYC Office of Emergency Management since 2006 when he was hired to become the Program Director for NY-TF1. Prior to entering that

position, Mr. Grimm had served with the United States Marine Corps as a company commander for a combat engineer unit (1999–2005). Mr. Grimm saw combat during the Iraq invasion in 2003 and again during the civil-support phase of the conflict in 2005. He has expertise in engineering and military leadership. Mr. Grimm was chosen by OEM to bring a fresh perspective to the NY-TF1 position.

B. INTERVIEW TRANSCRIPTS AND TEXT CODING

The interview process involved a set of seven scripted questions that were designed to open a discussion of the NY-TF1 command and control model. Participants were asked the formal questions to begin the interview and unscripted questions were used to amplify answers during the course of each interview. All study subjects were asked the scripted questions. Additional informal queries were only used to collect information correspondent to the formal questions. The transcripts that follow only contain data that directly references the formally scripted questions. Transcript texts were used to identify commonalities found in the answers given by the study subjects. These commonalities were coded for: (1) systemic processes, (2) organizational designs, (3) barriers to interdisciplinary synergy, and (4) collaboration gaps. These four commonalities are further defined by the following specific synergy elements and challenges.

Table 1. Synergy Elements

<i>Personal interaction</i> —The incidence of exposure individuals and disciplines have with each other in a training or operational setting.
<i>Familiarity</i> —The level of common knowledge, skills and experience developed from personal interaction which is shared between individuals.
<i>Trust</i> —The shared confidence in the qualification, training, ability and dedication between disciplines.
<i>Role clarity</i> —Distinct separation between disciplines as far as responsibility for incident essential tasks at interagency operations.
<i>Operational Definition</i> —Specific assignment of operational objectives that support incident command.
<i>Information Exchange</i> —The free-flow of communication between disciplines that enhances operational situational awareness.
<i>Unified Command</i> —Joint authority for incident command at emergencies.
<i>Shared Decision Rights</i> —Inclusion in command and operational decision-making processes.
<i>Common ID / Perspective</i> —The shared, singular identification accepted among task force members.
<i>Division of Labor</i> —The distribution of operational assignments and tasks between disciplines.
<i>Functional Complimentary Resources</i> - Separate and unique discipline capabilities that support a common incident objective.

Table 2. Synergy Challenges

<i>Agency Competition</i> —Struggle between disciplines for incident command and operational control at emergencies.
<i>Territoriality</i> —A behavior pattern that restricts information exchange, limits interagency cooperation, and duplicates effort between disciplines.
<i>Discipline paradigms</i> —Operational demands, priorities and approaches at emergencies that are discipline specific and not common to another agency.
<i>Uncertainty / unfamiliarity</i> —Doubt or hesitation involving the decision-making process due to a lack of knowledge or understanding with an opposing discipline or individual.
<i>Personnel turnover</i> —The change in individual staffing assignments to a unit which results from retirement, promotion or transfer.
<i>Independent department SOP's</i> —Departmental policies and operational tactics that do not significantly reference the roles and responsibilities of outside agencies.
<i>Political Influence</i> —Pressures on incident decision-making not directly related to incident demands.
<i>Personality Conflicts</i> —Incompatible individual relationships.
<i>Operational Isolation</i> —Separate departmental efforts at incidents that could be more effectively managed by a combined inter-service approach.

Table 3. Text Coding

Interview Transcripts	Text Coding
<p>1. How does the collaborative nature of the NY-TF1 model compare with the general FDNY-NYPD relationship?</p> <p>F-1:</p> <ul style="list-style-type: none"> • In terms of collaboration, the task force is definitely stronger than average FD-PD relationship. NY-TF1 has gotten its members to know each other during training and active deployments. • You don't see the turnover and personality conflicts on the team that you have in the greater FD-PD environment. <p>F-2:</p> <ul style="list-style-type: none"> • The task force benefits from a definition or respect that every member has for his job that isn't present in the FD-PD response role. It works better because everybody knows their job and does it. • I personally know every FD member on the team. ... he's chosen specifically for this team. <p>F-3:</p> <ul style="list-style-type: none"> • NY-TF1 has a unique organization that enforces cooperation between police and fire. There are fewer conflicts than you see in the street. We've gotten to know each other; we're familiar with what we're good at and what we need help in and we know that about each other. This guy's strong with tools and that guy is confident building shoring...it's something we're confident in. <p>P-1:</p> <ul style="list-style-type: none"> • The general FD-PD relationship has gotten better over time out of necessity, the nature of the threat and the types of emergencies has forced us to get along. But, clearly we've got more to go and the task force does do things better... this is because we pick the right guys for the team. Team selection produces synergy. • Conflicts arise from unfamiliarity between FD and PD resources in terms of departmental procedures. We don't have an understanding of how FD approaches things and your guys aren't familiar with our SOP's. <p>P-2:</p> <ul style="list-style-type: none"> • The task force definitely has better collaboration than the FD-PD guys in the precincts and firehouses. Personal relationships have a lot of influence on this. It increases collaboration and isn't found outside of them team and SOC/SOD environment. • Two separate tactical paths keep the FD and PD disconnected because of little or no interaction in day-to-day operations. • Interdepartmental information flow is a problem, there's not much communication at emergencies. NY-TF1 uses a common plan and communication procedures that aren't there for the general FD-PD units. <p>P-3:</p> <ul style="list-style-type: none"> • NY-TF1 is just "different," there aren't conflicts that are found the greater FD-PD. Collaboration barriers are broken with interaction; personal relationships enforced on the task force build cooperation. • Informal policies embed a collaborative atmosphere on the task force. 	<p>Systemic Process:</p> <ul style="list-style-type: none"> - Personal interaction. <ul style="list-style-type: none"> - Familiarity. - Trust. - Shared decision rights. - Information exchange. - Command screening. - Unified Leadership. <p>Organizational Designs</p> <ul style="list-style-type: none"> - Common identity / perspective. - Operational definition. <ul style="list-style-type: none"> - Division of labor. <ul style="list-style-type: none"> - Functional Complimentary Resources - Role Clarity. <p>Barriers to interdisciplinary synergy:</p> <ul style="list-style-type: none"> - Agency competition. <ul style="list-style-type: none"> - Territoriality. - Discipline paradigms. <ul style="list-style-type: none"> - Uncertainty / unfamiliarity. - Personnel turnover. <p>Collaboration Gaps</p> <ul style="list-style-type: none"> - independent departmental SOP - Political influences - Personality conflicts. - Operational isolation.

Interview Transcripts	Text Coding
<p>O-1:</p> <ul style="list-style-type: none"> • The separate discipline roles are not clear in the general FD-PD response relationship. That's not the case with NY-TF1. There's a more collaborative sense during task force operations. • The task force has redundancy, which is a good thing, but not duplication of effort. Individuals can pick-up other roles, but there isn't the crossing of job descriptions you see between FD and PD at daily interagency things. 	<p>Systemic Process:</p> <ul style="list-style-type: none"> - Personal interaction. <ul style="list-style-type: none"> - Familiarity. - Trust. - Shared decision rights. - Information exchange. - Command screening. - Unified leadership.
<p>2. What are the barriers to collaboration / synergy found in the greater FDNY-NYPD relationship that are not found in the NY-TF1 model?</p> <p>F-1:</p> <ul style="list-style-type: none"> • Training and experience go a long way to building trust on the task force. USR skills exercises and active deployments have help NY-TF1 to become a coordinated and collaborative team. Regular firefighters & police don't get that. • Unfamiliarity leads to conflict between FD and PD. If you don't know the person next to you, his skills and abilities, then you're not going to have that same level of familiarity and trust. • NYPD has more influence over city politics than every other agency. This tends to breed a distrust for them. <p>F-2:</p> <ul style="list-style-type: none"> • Personality conflicts play a big role that affects FD-PD collaboration. We don't let that happen on the task force. • Sometimes there are interagency issues between us [FD and PD] because there isn't the supervision to stop it. In NYC, the FD always arrives at jobs with a supervisor. That's not always the case with PD. • Not "knowing" what they [PD] know can be a problem. Qualifications are important. At the average emergency in NYC, the FD units are not familiar with PD procedures or response assignments. NYPD dispatch sends different response packages that change depending on the day, operational work-load. This is a problem for incident commanders. <p>F-3:</p> <ul style="list-style-type: none"> • Duplication of services is a barrier to FD-PD synergy. When the two departments are competing for command of an incident, they're not going to work well together. • When incident command is unclear there is a struggle between the two agencies that hurts cooperation. • There doesn't seem to be a formal structure of command at most interdepartmental operations in NYC. <p>P-1:</p> <ul style="list-style-type: none"> • In the FD-PD relationship, there isn't the trust you see on the task force; trust in abilities, training and qualifications. This comes from a lack of knowledge regarding SOP's and tactics. Often times we are unsure what strategy a discipline is using, offensive or defensive. • Our department procedures don't match up at times. We tend to locate command posts differently. From a PS perspective, putting a CP inside a building doesn't work. • Territoriality works against FD-PD cooperation. 	<p>Organizational Designs</p> <ul style="list-style-type: none"> - Common identity / perspective. - Operational definition. - Division of labor. <ul style="list-style-type: none"> - Functional Complimentary Resources - Role Clarity. <p>Barriers to interdisciplinary synergy:</p> <ul style="list-style-type: none"> - Agency competition. - Territoriality. - Discipline paradigms. <ul style="list-style-type: none"> - Uncertainty / unfamiliarity. - Personnel turnover. <p>Collaboration Gaps</p> <ul style="list-style-type: none"> - independent departmental SOP - Political influences - Personality conflicts. - Operational isolation.

Interview Transcripts	Text Coding
<ul style="list-style-type: none"> • Department perspective has a big factor in FD-PD synergy. Most PD incidents don't progress to the point where a formal incident command structure on scene is necessary. FD is use to establishing an operational dynamic command and control element. <p>P-2:</p> <ul style="list-style-type: none"> • There are political pressures in the general FD-PD relationship that hurt team collaboration. Department senior leaders at times don't see past historic rivalries and influence how the two agencies work in the streets. • The media-cycle drives how emergencies are managed. It's important how the PD, and FD, are perceived in public. This sometimes works to the disadvantage of departmental collaboration. <p>P-3:</p> <ul style="list-style-type: none"> • At times we work against ourselves. It's not that one agency wants to out-do the other, but it's sometimes the pro-active nature of firefighters and police. Everybody "wants to do the job," get somebody out of danger, rescue someone. We just don't want to watch. • Personalities can solve this problem or make them worse. <p>O-1:</p> <ul style="list-style-type: none"> • From an outsider observation, there are problems when a department operates "outside" of their position. On NY-TF1 that doesn't happen. • The separation and divisions between the FD and PD block a collaborative effort; separate communications and competitiveness limits cooperation. 	<p>Systemic Process:</p> <ul style="list-style-type: none"> - Personal interaction. <ul style="list-style-type: none"> - Familiarity. - Trust. - Shared decision rights. - Information exchange. - Command screening. - Unified leadership. <p>Organizational Designs</p> <ul style="list-style-type: none"> - Common identity / perspective. - Operational definition. - Division of labor. <ul style="list-style-type: none"> - Functional Complimentary Resources - Role Clarity. <p>Barriers to interdisciplinary synergy:</p> <ul style="list-style-type: none"> - Agency competition. <ul style="list-style-type: none"> - Territoriality. - Discipline paradigms. <ul style="list-style-type: none"> - Uncertainty / unfamiliarity. - Personnel turnover. <p>Collaboration Gaps</p> <ul style="list-style-type: none"> - Independent departmental SOP - Political influences - Personality conflicts. -Operational isolation.
<p>3. What barriers to collaboration / synergy does NY-TF1 overcome?</p> <p>F-1:</p> <ul style="list-style-type: none"> • There is some difference in expertise regarding USR operations on NY-TF1. Not everyone has the same level of experience operating at collapsed structures. NY-TF1 overcomes this by pairing FD and PD together. • Training together, deploying together and living with each other increases interaction and leads to team synerg. • Familiarity from training with each other helps reduce distrust between fire and police. <p>F-2:</p> <ul style="list-style-type: none"> • That defined assignment on the task for is key. Each member and team knows what they're responsible to do and how to do it. They don't exceed their role. • Leadership keeps the task force focused on specific missions without distraction. • The incident command system used during USR training and operations forces shared command. • Common FEMA qualifications standards put everybody on the same page. <p>F-3:</p> <ul style="list-style-type: none"> • Personal relationships overcome synergy barriers. • Leadership structure is well defined and instills a common purpose need for cooperation. • Defined roles and responsibilities limit competition. 	

Interview Transcripts	Text Coding
<p>P-1:</p> <ul style="list-style-type: none"> • There are no [interdepartmental] politics involved in NY-TF1. • The team has one mandate. There's one mission that applies. In the FD-PD relationship there are sometimes conflicting mandates; search and safety verses security and investigation. • Positions are specific and understood by each member of NY-TF!. At times this is a little vague in the real world. <p>P-2:</p> <ul style="list-style-type: none"> • The team overcomes synergy barriers that department identities bring. The common task force mentality that a shared team identification has overcomes departmental divisions. <p>P-3:</p> <ul style="list-style-type: none"> • Interactions build bonds on the team that overcome challenges to the collaboration needed. FD-PD collaboration is significantly better between SOC and SOD because of the experience and team building in NY-TF1. <p>O-1:</p> <ul style="list-style-type: none"> • The separate agency mentality is a barrier to cooperation that is not present in NY-TF1. Common team identification helps to eliminate competition and territoriality found between FD and PD. • NY-TF1 works because of its leaders. Strong commanders and leaders prevent issues from becoming problems. 	<p>Systemic Process:</p> <ul style="list-style-type: none"> - Personal interaction. <ul style="list-style-type: none"> - Familiarity. - Ttrust. - Shared decision rights. - Information exchange. - Command screening. - Unified leadership. <p>Organizational Designs</p> <ul style="list-style-type: none"> - Common identity / perspective. - Operational definition. <ul style="list-style-type: none"> - Division of labor. <ul style="list-style-type: none"> - Functional Complimentary Resources - Role Clarity. <p>Barriers to interdisciplinary synergy:</p> <ul style="list-style-type: none"> - Agency competition. <ul style="list-style-type: none"> - Territoriality. - Discipline paradigms. <ul style="list-style-type: none"> - Uncertainty / unfamiliarity. - Personnel turnover. <p>Collaboration Gaps</p> <ul style="list-style-type: none"> - Independent departmental SOP - Political influences - Personality conflicts. - Operational isolation.
<p>4. Describe examples of synergy found on the NY-TF1 team during deployments?</p> <p>F-1:</p> <ul style="list-style-type: none"> • Hurricane Rita and the deployment was a good example of NY-TF1 synergy of effort. NYPD task force command was supported by the second TFL, an FDNY officer. Technical rescue issues and tactical decisions were backed-up with FDNY know-how. FD experience was used in making critical decisions by PD command commanders. • Training together, deploying together and living with each other increases interaction and leads to team synergy. • Familiarity from training with each other helps reduce distrust between fire and police. <p>F-2:</p> <ul style="list-style-type: none"> • That defined assignment on the task for is key. Each member and team knows what they're responsible to do and how to do it. They don't exceed their role. • Leadership keeps the task force focused on specific missions without distraction. • The incident command system used during USR training and operations forces shared command. • Common FEMA qualifications standards put everybody on the same page. <p>F-3:</p> <ul style="list-style-type: none"> • Personal relationships overcome synergy barriers. • Leadership structure is well defined and instills a common purpose need for cooperation. • Defined roles and responsibilities limit competition. 	

Interview Transcripts	Text Coding
<p>P-1: (Participant declined to answer having not deployed with NY-TF1)</p> <p>P-2:</p> <ul style="list-style-type: none"> • During the Haiti mission, the separate teams operated within their assigned roles. At the MHQ / Christopher hotel, the search guys found the victim, rescue team removed him and the medical team kept the victim stable until transport. This division of labor was important. The teams did not work outside their scope. • Inclusion is important, shutting guys out of contributing causes more trouble. <p>P-3:</p> <ul style="list-style-type: none"> • At Hurricane Katrina, we were able to accomplish missions outside of normal USR operations because we had everyone trained as a rescue technician. A common skills requirement strengthened the task force and enabled us to reorganize the team to a specific mission. This aligns everybody; we're all on one page. Familiarity with SOP's helped all teams and members work together. <p>O-1: (Participant declined to answer having not deployed with NY-TF1)</p>	<p>Systemic Process:</p> <ul style="list-style-type: none"> - Personal interaction. <ul style="list-style-type: none"> - Familiarity. - Trust. - Shared decision rights. - Information exchange. - Command screening. - Unified leadership. <p>Organizational Designs</p> <ul style="list-style-type: none"> - Common identity / perspective. - Operational definition. <ul style="list-style-type: none"> - Division of labor. <ul style="list-style-type: none"> - Functional Complimentary Resources - Role Clarity.
<p>5. What elements / factors contribute to the collaborative success of the NY-TF1 model?</p> <p>F-1:</p> <ul style="list-style-type: none"> • Respecting the roles and responsibilities that NY-TF1 practices is important to getting along and working together. • Using one command structure is a key to unified effort. • The ICS system and the operational "art" that USR ops need does factor into the synergy that you see in NY-TF1. <p>F-2:</p> <ul style="list-style-type: none"> • Common team identity is first, the task force is not an FD thing or PD thing; it has its own ID. This builds the team concept. • Personal interaction and relationships built on the task force are key to achieving the collaboration of FD and PD. This isn't a factor for the rest of the FD-PD community. • Role definition and responsibilities and observing these boundaries is the foundation everything builds on. <p>F-3:</p> <ul style="list-style-type: none"> • It's the personal relationships we have with guys on the team that everything relies on. I know who's good at certain things and who isn't. That helps me decide how to approach a situation and where to use individuals. It comes down to the familiarity and comfort level we have with each other. <p>P-1:</p> <ul style="list-style-type: none"> • The common mandate [search & rescue] that NY-TF1 has is important. There's only on mission, one objective and this unites the FD-PD members. <p>P-2:</p> <ul style="list-style-type: none"> • Knowing your role [discipline] and your function is a factor in how your contribution to the team is measured. There's a common need to support the task force operation, nobody wants to let everyone else down. 	<p>Barriers to interdisciplinary synergy:</p> <ul style="list-style-type: none"> - Agency competition. <ul style="list-style-type: none"> - Territoriality. - Discipline paradigms. <ul style="list-style-type: none"> - Uncertainty / unfamiliarity. - Personnel turnover. <p>Collaboration Gaps</p> <ul style="list-style-type: none"> - independent departmental SOP - Political influences - Personality conflicts. - Operational isolation.

Interview Transcripts	Text Coding
<p>P-3:</p> <ul style="list-style-type: none"> • The unified command structure and ICS is critical to combining the FD and PD members. There isn't one dominant agency, leadership is shared. This creates buy-in from the task forced members. <p>O-1:</p> <ul style="list-style-type: none"> • Tasking groups together builds a synergy from the FD and PD. They have to collaborate to get the job done. They can't finish alone. • SOP's force the task force to work together and eventually results in a collaborative product. Logistics managers are not only FD or PD they are the LOG-guys with the same mission. This is lacking between the FD and PD you see in the street. • These guys take pride in what they are doing. It's not just a job, they want to be here. 	<p>Systemic Process:</p> <ul style="list-style-type: none"> - Personal interaction. <ul style="list-style-type: none"> - Familiarity. - Trust. - Shared decision rights. - Information exchange. - Command screening. - Unified leadership. <p>Organizational Designs</p> <ul style="list-style-type: none"> - Common identity / perspective. - Operational definition. <ul style="list-style-type: none"> - Division of labor. <ul style="list-style-type: none"> - Functional Complimentary Resources - Role Clarity.
<p>6. Are the collaborative dynamics found in the NY-TF1 model applicable to a Complex Endeavor event like the Mumbai Terror attack?</p> <p>F-1:</p> <ul style="list-style-type: none"> • NY-TF1 deployments, like similar technical rescue emergencies, are fluid and need an approach that uses an "operational art". ICS and a common tactical plan are required. <p>F-2:</p> <ul style="list-style-type: none"> • Personal relationships that are in the task force are the key to mission accomplishment. It's going to be the same for a big thing like a Mumbai attack. That patrolman and sergeant and that firefighter and lieutenant are going to have to be able to trust each other. <p>F-3:</p> <ul style="list-style-type: none"> • I can see the way we do things on the team as beneficial to the NYC approach to a Mumba-style event. The FD and PD do their thing really well because we do it every day, but we need to work on a plan for the what we don't do every day; catastrophic incidents verses ordinary operations. The Haiti earthquake was similar to 9/11 in scale. The devastation forced the FDNY and NYPD to bond together. We can't wait for an event to do that. <p>P-1:</p> <ul style="list-style-type: none"> • A Mumbai incident is going to be huge, but you can't really make one specific plan for it that applies to every aspect. Like the [NYPD] Patrol guide does not spell out everything the police do and how they do it, we need more of an understanding and relationship between the departments. • Preparing for a similar incident will require [interdepartmental] education. We need more knowledge and trust between the departments. <p>P-2:</p> <ul style="list-style-type: none"> • We can't have two separate approaches. NY-TF1 has one operational plan and one command. Our [FDNY & NYPD] SOP's don't have an interagency focus; they only see one side or the other. • Smaller drills and training exercises need to include the "regular" guys; fire lieutenants and police sergeants. <p>P-3:</p> <ul style="list-style-type: none"> • The unified command in NY-TF1 is applicable to a Mumbai event. 	<p>Barriers to interdisciplinary synergy:</p> <ul style="list-style-type: none"> - Agency competition. <ul style="list-style-type: none"> - Territoriality. - Discipline paradigms. <ul style="list-style-type: none"> - Uncertainty / unfamiliarity. - Personnel turnover. <p>Collaboration Gaps</p> <ul style="list-style-type: none"> - Independent departmental SOP - Political influences - Personality conflicts. - Operational isolation.

Interview Transcripts	Text Coding
<p>We need to be more comfortable working with each other, like the task force, for a response to an active-shooter like Mumbai or we won't do The things that are necessary together.</p> <p>O-1:</p> <ul style="list-style-type: none"> • NY-TF1 has a common knowledge of capabilities (knowledge) that fosters collaboration. This is required for any complex event. • The exercises and deployments the NY-TF1 do prepares it to work together effectively. An understanding of tactical procedures and how individuals adapt those to specific situations forms. The same thing is required for a Mumbai incident. 	<p>Systemic Process:</p> <ul style="list-style-type: none"> - Personal interaction. <ul style="list-style-type: none"> - Familiarity. - Trust. - Shared decision rights. - Information exchange. - Command screening. - Unified leadership.
<p>7. Is the synergy of the NY-TF1 team unique, or can it be replicated in the greater FDNY-NYPD dynamic?</p> <p>F-1:</p> <ul style="list-style-type: none"> • The way the FD and PD guys work together on NY-TF1 is not unique, but it's hard to carry over to two organizations as large as the FDNY and NYPD. • Personnel turnover in the firehouses and precincts works against collaboration building. • What is fundamental to working together as one team is training together. The more you interact, the more you find ways to work better as a unit; like NY-TF1. <p>F-2:</p> <ul style="list-style-type: none"> • I think you need that strict definition of job assignment; no confusion. There's enough of that as it is during emergencies. • Unifying the command sections at emergencies isn't enough, the operations sections need to be aligned. NY-TF1 does this. • You need one plan at incidents, not two plans that don't deal with each other. • The personal relationships on NY-TF1 make team synergy. <p>F-3:</p> <ul style="list-style-type: none"> • Part of what makes guys work together is the "trial by fire" experience. A traumatic event bonds guys together and that can't be replicated. • NY-TF1 SOP's are specific. CIMS needs to be tightened to build FD-PD collaboration. ICS needs to be specific and enforceable. • Can't tolerate egos. They work against synergy. <p>P-1:</p> <ul style="list-style-type: none"> • NYC needs a controlled (assignments, liaisons) response to big events. The FD and PD need to get together and decide how we are going to approach interagency emergencies jointly. NY-TF1 has achieved this at USR incidents. • Personal relationships on NY-TF1 are not replicable to the FDNY-NYPD dynamic. <p>P-2:</p> <ul style="list-style-type: none"> • Just like the ESU and FDNY SOC relationship has improved, the greater FD-PD relationship can improve, but it will take longer. • Personal interaction and relationships need to be encouraged through training and education. • The firehouse and precincts in NYC have the same goals, but different ways to achieve them. We need to get on the same ops page. 	<p>Organizational Designs</p> <ul style="list-style-type: none"> - Common identity / perspective. - Operational definition. - Division of labor. <ul style="list-style-type: none"> - Functional Complimentary Resources - Role Clarity. <p>Barriers to interdisciplinary synergy:</p> <ul style="list-style-type: none"> - Agency competition. - Territoriality. - Discipline paradigms. <ul style="list-style-type: none"> - Uncertainty / unfamiliarity. - Personnel turnover. <p>Collaboration Gaps</p> <ul style="list-style-type: none"> - Independent departmental SOP - Political influences - Personality conflicts. - Operational isolation.

Interview Transcripts	Text Coding
<p>P-3:</p> <ul style="list-style-type: none"> • The [FDNY and NYPD] HAZ-MAT units and FDNY Fire Marshals are at a similar collaborative level as far as FD-PD synergy that NY-TF1 currently sees. There is no reason we can't get better at working together. • ICS helps NY-TF1 integrate the FD and PD {disciplines}. • Just being on the team builds relationships that improve collaboration. Turnover in staff is negative for synergy to build. That's a problem for the greater FD and PD. <p>O-1:</p> <ul style="list-style-type: none"> • The greater FDNY and NYPD relationship needs organization and leadership similar to the practices found on the task force. • You need one boss that both agencies follow at emergencies. • Interagency operations need one perspective. NY-TF1 forces one perspective; there isn't an FD part and PD part. This is not present in NYC and can be instilled by leaders above. • NY-TF1 works because of leaders. • Military "joint-ness" is where NYC needs to go. A command structure similar to the U.S. Military Joint Chiefs of Staff is key. That is something NY-TF1 does and may help the FDNY-NYPD relationship. 	<p>Systemic Process:</p> <ul style="list-style-type: none"> - Personal interaction. <ul style="list-style-type: none"> - Familiarity. - Trust. - Shared decision rights. - Information exchange. - Command screening. - Unified leadership. <p>Organizational Designs</p> <ul style="list-style-type: none"> - Common identity / perspective. - Operational definition. <ul style="list-style-type: none"> - Division of labor. <ul style="list-style-type: none"> - Functional Complimentary Resources - Role Clarity. <p>Barriers to interdisciplinary synergy:</p> <ul style="list-style-type: none"> - Agency competition. <ul style="list-style-type: none"> - Territoriality. - Discipline paradigms. <ul style="list-style-type: none"> - Uncertainty / unfamiliarity. - Personnel turnover. <p>Collaboration Gaps</p> <ul style="list-style-type: none"> - Independent departmental SOP - Political influences - Personality conflicts. - Operational isolation.

APPENDIX B. DATA ANALYSIS

This research study collected data through an interview process to ascertain common themes describing the NY-TF1 command and control model. Data was divided into two categories: fundamental elements of N-TF1 synergy and challenges to NY-TF1 synergy. The commonalities that run through the study participant answers to the seven formal research questions are the evidence for the conclusions and recommendations in this thesis. There were eleven characteristics of NY-TF1 synergy and nine challenges to interdisciplinary synergy identified by interview subjects. The strength of a synergy characteristic or challenge is dependent on the number of common answers found in the interview pool. For example, if all study participants referenced a synergy element, then that is considered to be a strong indicator that the specific synergy element is true. Synergy elements or characteristics that are not universally common are less conclusive evidence. Those characteristics or challenges that are not common to both emergency service disciplines were excluded as evidence for this study.

A. DATA INTERPRETATION

The data drawn from this thesis's interview questions and answers can be summarized in Table 4, NY-TF1 Synergy Matrix. From this table, the following interpretations are made from the analysis of the collected data:

1. Core Components of NY-TF1 Synergy

All study subjects considered that *personal interaction*, *operational definition*, *unified command*, *common identification* and *functional complimentary resources* as important factors that foster synergy in the NY-TF1 model. This supports the conclusion that these five characteristics of task force synergy are central factors in NY-TF1's collaborative relationship between the FDNY and NYPD. This indicates that recommendations that promote interdepartmental exposure, specifying departmental

assignments, establishing joint incident command, developing a common inter-service perspective and leveraging unique departmental expertise at interagency operations should be explored.

2. Major Challenges to Interdepartmental Synergy

All study subjects brought up interdepartmental *uncertainty*, *unfamiliarity* and *operational isolation* as the biggest barriers to synergy between the FDNY and NYPD. Each SME agreed that these two issues prevent NYC firefighters and police from realizing the collaborative framework found in NY-TF1. This conclusion suggests that reducing their influence on the greater FDNY-NYPD dynamic relationship would foster inter-service synergy in NYC.

3. Role Clarity and Shared Decision Rights Strongly Support Inter-Service Synergy

All study subjects, with one exception each, identified *role clarity* and *shared decision rights* as significant factors that foster FDNY-NYPD synergy on NY-TF1. Both exceptions in this commonality came from the same interview subject and can be attributed to a deviation in the interview process. These two particular synergy elements were not mentioned by that respondent.

Although not unanimously considered as pertinent to promoting FDNY-NYPD synergy, they can be reasonably accepted as influential to emergency service collaboration. Recommendations that resolve emergency service operational ambiguity and incorporate incident management of interagency emergencies need to be examined.

4. Departmental Paradigms Prevent Service Collaboration

All uniformed SMEs identified that organizational missions and departmental priorities are divisive in terms of agency collaboration. FDNY and NYPD approaches at interagency operations are divergent; all uniformed SMEs considered this influence. Fire service objectives focus on search and evacuation whereas law enforcement objectives emphasize investigative and security approaches. The only SME exception to this

finding was civilian, not necessarily a source fluent in inter-service dynamics. This synergy challenge can be reasonably accepted as problematic as far as interagency synergy development.

5. FDNY-NYPD Synergy Areas of Interest

The remaining identified synergy fostering elements and challenges were not uniformly discovered in the interview pool. Consequently, these characteristics are not considered as conclusive evidence; however, there is significant reference of these factors in the interview pool to encourage further study of these factors.

B. DATA CONSOLIDATION

The interpretations summarized in the preceding section were drawn from observing the collected data. Once the interview transcripts were reviewed and pertinent themes were identified, the strength of the theme commonalities could be measured. For the purposes of this study, a theme was concluded to be reliable evidence if all interview participants independently referenced that theme. If a commonality theme was found in all but one interview, then that theme was considered reasonable evidence for this study. The remaining themes discovered in this study are considered to be worthy of further research. These themes were independently identified by three or more study participants. In the view of this thesis, these themes cannot be conclusive evidence for making recommendations, but they are interesting influences on the interdisciplinary relationship between the FDNY and NYPD.

Table 4 contains the identified eleven positive influences and nine negative influences on synergy that study participants referenced in the NY-TF1 model.

Table 4. NY-TF1 Synergy Matrix

<u>Synergy Elements</u>		<u>NYTF-1 Synergy Matrix</u>						<u>Synergy Challenges</u>
<u>Participant</u>	<u>FD Staff</u> F-1	<u>FD-Operations</u> F-2	<u>FD Tactical</u> F-3	<u>PD Staff</u> P-1	<u>PD Operations</u> P-2	<u>PD Tactical</u> P-3	<u>OEM</u> O-1	
<i>Personal interaction</i>	X	X	X	X	X	X	X	
<i>Familiarity</i>	X		X		X	X	X	
<i>Trust</i>			X	X	X	X		
<i>Role clarity</i>		X	X	X	X	X	X	
<i>Operational definition</i>	X	X	X	X	X	X	X	
<i>Information exchange</i>	X		X		X	X		
<i>Unified Command</i>	X	X	X	X	X	X	X	
<i>Shared Decision Rights</i>		X	X	X	X	X	X	
<i>Common ID / perspective</i>	X	X	X	X	X	X	X	
<i>Division of Labor</i>	X		X		X	X		
<i>Functional Complimentary Resources</i>	X	X	X	X	X	X	X	
<i>Agency Competition</i>	X		X	X	X	X		
<i>Territoriality</i>	X		X			X		
<i>Discipline paradigms</i>	X	X	X	X	X	X		
<i>Uncertainty / unfamiliarity</i>	X	X	X	X	X	X	X	
<i>Personnel turnover</i>	X			X	X			
<i>Independent department SOP's</i>	X	X	X	X		X	X	
<i>Political Influence</i>	X		X	X	X	X		
<i>Personality conflicts</i>		X	X	X				
<i>Operational isolation</i>	X	X	X	X	X		X	

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