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APPLYING THE THIRA TO SPECIAL EVENTS: A FRAMEWORK FOR CAPABILITIES-BASED PLANNING ADOPTION IN LOCAL GOVERNMENTS

by

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Determining preparedness across the United States' homeland security enterprise (HSE) is a complex task because the nation's overall disaster management capability is an aggregation of the independently developed capabilities of local and state agencies. In 2012, FEMA promulgated a six-step capabilities-based planning (CBP) framework, the Threat and Hazard Identification and Risk Assessment (THIRA), to standardize how states and major cities assess preparedness. CBP is a non-linear planning process used within the Department of Defense (DoD) to determine how military capabilities should develop to ensure success in future conflicts, despite uncertainty around threats, actors, and theaters.

This thesis proposes increasing CBP adoption by state and local governments through incorporating an adapted THIRA methodology into recurring, real-world interagency activities, such as mass-gathering contingency planning. An expanded THIRA framework is synthesized, which completes an initial DoD CBP sequence in the context of local government planning for a special event. Three policy options are developed that evaluate the adapted THIRA framework's implementation in these scenarios: no adoption, use in a local government-planned event, and adoption within a national special security event (NSSE). This thesis recommends implementing a THIRA framework into special-event planning to allow interagency stakeholders to perform and adapt CBP locally in real-world collaborative environments.

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APPLYING THE THIRA TO SPECIAL EVENTS: A FRAMEWORK FOR CAPABILITIES-BASED PLANNING ADOPTION IN LOCAL GOVERNMENTS

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ABSTRACT

Determining preparedness across the United States' homeland security enterprise (HSE) is a complex task because the nation's overall disaster management capability is an aggregation of the independently developed capabilities of local and state agencies. In 2012, FEMA promulgated a six-step capabilities-based planning (CBP) framework, the Threat and Hazard Identification and Risk Assessment (THIRA), to standardize how states and major cities assess preparedness. CBP is a non-linear planning process used within the Department of Defense (DoD) to determine how military capabilities should develop to ensure success in future conflicts, despite uncertainty around threats, actors, and theaters.

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TABLE OF CONTENTS

LIST OF FIGURES

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LIST OF TABLES

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LIST OF ACRONYMS AND ABBREVIATIONS

CBP	capabilities-based planning
CCTA	complex coordinated terrorist attack
CONOPS	concept of operations
CPG-101	Comprehensive Preparedness Guide 101
CPG-201	Comprehensive Planning Guide 201
DHS	Department of Homeland Security
DoD	Department of Defense
DRRM	deliberative risk ranking methodology
DSS	decision support systems
EMS	emergency medical services
EOP	emergency operation plan
ESC	executive steering committee
ESF	emergency support function
FBI	Federal Bureau of Investigation
FEMA	Federal Emergency Management Agency
FLSH	Fire Life Safety HAZMAT
GAO	Government Accountability Office
HSE	homeland security enterprise
HSPD-8	Homeland Security Presidential Directive 8
IAP	incident action plan
ICS	Incident Command System
IT	information technology
JHAT	joint hazard assessment team
MCDM	multi criteria decision making methodology
MRP	mission-ready package
NATO	North Atlantic Treaty Organization
NIMS	National Incident Management System
NPR	National Preparedness Report
NSSE	national special security event
OR	Operations Research

POETE	planning, organization, equipment, training, exercises
PPD-8	Presidential Policy Directive Eight
QDR	Quadrennial Defense Review
RODOS	real-time on-line decision support system
SEAR	Special Event Assessment Rating
SNRA	Strategic National Risk Assessment
SPR	stakeholder preparedness review
TCL	Targeted Capabilities List
THIRA	Threat and Hazard Identification and Risk Assessment
UASI	urban area security initiative
UJTL	uniform joint task list
URT	uniform reporting tool
VBIED	vehicle-borne improvised explosive device

EXECUTIVE SUMMARY

Local officials planning for disasters at the local level must make risk-informed judgments about what capability is needed to defend against known threats and hazards while remaining adaptable to address the unforeseen. However, risk assessment tools are imperfect and sometimes not available to local governments. Presidential Policy Directive 8 (PPD-8) and the THIRA process have sought to address this gap through application of a variant of military capabilities-based planning (CBP) framework to the homeland security enterprise, but implementation has been difficult. CBP is a method of system analysis that focuses on identifying and assessing the necessary elements required for a specific outcome under user-defined metrics of performance.[1] CBP applies abstraction to an array of complex threat scenarios to identify essential capabilities required to address a comprehensive range of unique operational challenges. Differing from military planning environments, local government efforts with CBP are complicated by a gap in analytical capacity and local disaster assets diffused among many different organizations. This difference has proven to be an obstacle to full adoption of CBP across governmental jurisdictions.

A. BACKGROUND

The implementation challenges for the *National Preparedness System's* Threat and Hazard Identification and Risk Assessment (THIRA) and its CBP framework are that disasters vary across the United States, and despite reducing complexity through focusing on core capabilities, risk assessment and performance measurement competencies are not widely available nor incentivized to be developed among stakeholders at the state and local level.[2] Many jurisdictions reported in a 2014 study that the THIRA is the only risk and capability assessment performed at the local level, and is done primarily because it is tied

[1] Doug Hales and Paul Chouinard, Implementing Capability Based Planning within the Public Safety and Security Sector: Lessons from the Defence Experience (Ottawa, Ontario: Defence R&D Canada – Centre for Security Science, 2011), 1.

[2] Jerome H. Kahan, "Preparedness Revisited: W(h)ither PPD-8?," *Homeland Security Affairs* 10, no. 2 (February 2014): 8, https://www.hsaj.org/articles/252.

to securing preparedness grant funds.[3] Moreover, respondents within the same study indicated a preference for less complex assessment methodologies and favored locally developed approaches.[4]

In parallel to the homeland security enterprise, military CBP applies a similar analysis framework as the THIRA, but differs in that the strategic focus of the exercise is often placed on mission-level, not full-scale conflict scenarios.[5] In applying this scaled relationship to national preparedness, disasters scenarios can be substituted for full-scale war scenarios but this relationship lacks an analog for a civilian-side equivalent to "mission."

For domestic preparedness, special events can offer an analog to the military's CBP's term, mission. The characteristics of special events: frequency of occurrence, necessity for risk-informed protection and response asset deployments, media attention, required interdisciplinary planning, and potential for real-world consequences, appear to have an analogous equivalency with mission. This equivalency suggests that FEMA's work on PPD-8 and the THIRA, challenged by the issue of low competency and incentive in practicing CBP can potentially be addressed by inculcating elements of CBP and the THIRA into special event planning.

B. ADAPTED THIRA CBP FRAMEWORK

A comparison was conducted between the FEMA THIRA methodology and the analytical architecture of a CBP framework developed for the Secretary of Defense in 2002. This assessment mapped the similarity between Paul K. Davis's CBP framework and FEMA's THIRA methodology, and found congruence, as well as options for expanding the THIRA's CBP approach. Next, special event planning processes and interagency dynamics were explored and validated as an approximation of jurisdiction-wide disaster

[3] Seung-Ho An et al., *Integrated Risk Management at the Local Level: The Gap between Theory and Practice* (College Station, TX: Texas A&M University, 2014), 16–19, http://hdl.handle.net/1969.1/154253.

[4] An et al., 16–19.

[5] Paul K. Davis, Analytic Architecture for Capabilities-Based Planning, Mission-System Analysis, and Transformation (Santa Monica, CA: RAND, 2002), 21–28.

planning environments. A THIRA special event planning framework that completes a full-CBP cycle was synthesized containing the following steps: assess threats and risks; give them context; construct capability targets; assess options and capability; choose options; and apply the results and measurement. This adapted THIRA framework completes an initial Department of Defense (DoD) CBP sequence in the context of local government planning for a special event, beginning with an initial risk assessment and concluding when deployed resources are demobilized from the mass gathering venue.

C. POLICY OPTIONS ANALYSIS

Three policy options were developed that evaluate the adapted THIRA framework's implementation in the following scenarios: no adoption, use in a local government-planned event, and adoption within a national special security event (NSSE). The metrics selected to evaluate these policy options were drawn from literature examining the best practices for CBP implementation and collaboration-enabling factors within emergency management planning. High degrees of top leader participation, substantial time for interagency collaboration on a specific mission, opportunities to partition all the required core capabilities for a mission, and integrating a CBP champion were identified to have positive effects on successfully implementing CBP. From this analysis, option three, integrate the THIRA into a NSSE planning process, was identified as the most desirable policy option for implementation, as it maximized the values of each metric more so than other options.

D. CONCLUSION

NSSE's are high-interest events that require managing large budgets, conducting substantial interagency planning, and specifying the need for large amounts of local equipment and security apparatus. NSSE planning timeframes typically operate in the 6–12-month range and draw notable media attention, both before and during the event. Additionally, the current NSSE planning framework is comprised of functional subcommittees that address specific categories of tasks, which mirror the CBP approach of decomposing scenarios into unique operational challenges and then into discrete envelopes of capability.

While NSSEs provide a notable set of enabling factors for implementing CBP for real-world events, they occur very infrequently and impact only a limited set of cities and states a year.[6] NSSEs for political conventions shift from city to city, which means that local governments may practice CBP once for a NSSE and then lack the component incentives or enabling factors to continue using CBP.

It is also likely that full adoption of CBP is not possible given the variation and diffusion of government organizations at the federal, state, local, tribal, and territorial level, which contrasts with the (slightly) less complex military organizations within the DoD.[7] This observed variation does not suggest that CBP adoption for the homeland security enterprise (HSE) should be discontinued. Davis notes that modern military planning has had decades and large conflicts to iterate and test planning approaches, whereas the HSE's experience with CBP began in 2004.[8] Despite the lack of frequency in applying the THIRA CBP framework to a NSSE, it may represent an opportunity for FEMA to study CBP application in a real-world disaster-analogous setting.

[6] Shawn Reese, *National Special Security Events: Fact Sheet*, CRS Report No. R43522 (Washington, DC: Congressional Research Service, 2017), 1–3, https://fas.org/sgp/crs/homesec/R43522.pdf.

[7] The phrase, "federal, state, local, tribal and territorial level' is drawn from FEMA planning literature and refers to federal disaster planning approaches including the whole of government. For more info, see Federal Emergency Management Agency, *NIMS Implementation Objectives for Local, State, Tribal and Territorial Jurisdictions, 2018 Update* (Washington, DC: Department of Homeland Security, 2018), 1, https://www.fema.gov/media-library-data/15278478203190c604c12c628b5a8119fb8d08c4ed07c/NIMS_Implementation_Objectives_FINAL_20180530.pdf.

[8] Sharon L. Caudle, "Homeland Security and Capabilities-Based Planning: Improving National Preparedness" (master's thesis, Naval Postgraduate School, 2009), 19–26.

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I. INTRODUCTION

Preparing for disasters is a complex undertaking. Disasters come in different sizes and from many different means. A jurisdiction must contend with natural hazards, such as extreme heat and tornados, the failure of human systems like power grids and bridges, and adversarial acts like terrorism. Some disasters provide early warning and a degree of probability, like the march of a hurricane coming up a coast, while others are instantaneous and cannot be accurately predicted, such as the bombing of the Boston Marathon.

A. DISASTERS AND RISK ASSESSMENT AT THE LOCAL LEVEL

Assessing local disaster risk is challenged by uncertainty and imperfect assessment methodologies. Emergency managers and local governments prepare for disasters by assessing the risk the jurisdiction faces from a spectrum containing any and all natural, technological, and human-caused scenarios: determining the likelihood of, vulnerability to, and consequences from each.[1] Beginning with natural hazards, forecasting, probabilistic models, and review of environmental factors can give planners a reasonable degree of confidence in assessing hazard risk.[2] Predicting system failures is more difficult than studying hurricanes, as many utilities are privately owned, structures are unable to be fully inspected, and interdependencies are often not well understood due to the infrequency of major system failures. Assessing terrorism is substantially more challenging because the behavior of an adversary cannot be fully predicted, including why and where a target is selected, how it is attacked, and when the attack occurs. From these examples, the variables involved in assessing risk can quickly become impossible to account for fully, which increases uncertainty in the conclusions reached by local governments.

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[1] Federal Emergency Management Agency, *Developing and Maintaining Emergency Operations Plans: Comprehensive Preparedness Guide (CPG) 101* (Washington, DC: Department of Homeland Security, 2010), 4–1.

[2] For national-level examples of probability and modeling for natural hazards, refer to the National Oceanic and Atmospheric Organization National Hurricane Center's hurricane track, intensity, and time-to-impact capabilities: https://www.nhc.noaa.gov/. For examples of modeling, refer to FEMA's HAZUS software, which allows for impact modeling from a variety of natural hazards, such as hurricanes and earthquakes: https://www.fema.gov/hazus.

B. THE ECONOMIES OF LOCAL DISASTER PREPAREDNESS

After risk is determined, a jurisdiction must make strategic decisions about what level of risk is acceptable, how government will organize to prepare for events deemed more likely to happen, and how much capability should be built and maintained for those types of occurrences.[3] Threats and hazards can also vary in scale, duration, and intensity, which inherently introduce more variables and uncertainty into this decision-making process. Basing investments in preparedness around the impacts of a category one hurricane when a city is at high risk from category three storms will ensure that local response fails to meet expectations.

Strategic preparedness planning at the local level competes with daily operating obligations for stakeholder time, analytical capacity, and incentives for effective participation. A city's decisions about disaster risk and preparedness must address uncertainty, but also occur within an economic framework.[4] Preparing for disasters is expensive and time consuming for a local government, which is forced to balance use of budgets and Federal Emergency Management Agency (FEMA) grant dollars, level of effort, and participation for disaster preparedness activities against the daily, essential services a city must deliver. Strategic-level planning processes compete for stakeholder and local government focus among daily, lower-order preparedness activities. In summary, local governments must decide how to expend funds and effort to increase preparedness for disasters under uncertainty, with imperfect tools, and in a limited incentive and participation environment.

Since 2003, FEMA has administered billions of dollars in preparedness grants to states and large cities with the goal of building local capability to prevent, prepare, respond, and recover from disasters.[5] FEMA has frequently testified to Congress and has been asked

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[3] Federal Emergency Management Agency, Developing and Maintaining Emergency Operations Plans, 4-15–4-16.

[4] Federal Emergency Management Agency, 4-1–4-6.

[5] Shawn Reese, *Department of Homeland Security Preparedness Grants: A Summary and Issues*, CRS Report No. R44669 (Washington, DC: Congressional Research Service, 2016), 14, https://fas.org/sgp/crs/homesec/R44669.pdf.

what the return on investment is for preparedness grants. The question in its most simplified form is that *Quantitatively, what has this funding bought in disaster preparedness capability?* The question has been a difficult one to answer, as noted in numerous Government Accountability Office (GAO) findings and other congressional read-outs.[6] FEMA has been challenged to define the current level of national preparedness in a quantifiable way. These challenges are rooted in the complexity of mapping and measuring the systems of interrelationships and interdependencies of assets, trained personnel, plans, political will, and many other factors across a spectrum including all levels of government; federal, state, local, tribal, and territorial.[7] Nevertheless, national-level actions to apply measurement to preparedness are needed to identify gaps effectively where more effort should be expended.

C. PPD-8 AND THE THIRA

President Obama's White House released Presidential Policy Directive (PPD-8) on March 30, 2011, which set new standards on the way national preparedness should be conceptualized, structured, and assessed.[8] PPD-8 established core capabilities that represented the critical tasks and functions, "necessary to prepare for the specific types of incidents that pose the greatest risk to the security of the Nation [... and a set of] prioritized objectives to mitigate that risk."[9] FEMA's implementation of PPD-8 led to the *National Preparedness Framework*, *National Preparedness Goal*, and the Threat and Hazard Identification and Risk Assessment (THIRA) process. In this implementation, FEMA introduces capabilities-based planning (CBP), which encourages developing skills that can be used in any disaster, rather than scenario-based planning, which builds capacity only from the result of detailed study on a limited number of threats and hazards.

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[6] William O. Jenkins, *Measuring Disaster Preparedness: FEMA Has Made Little Progress in Assessing National Capabilities*, GAO-11-260T (Washington, DC: Government Accountability Office, 2011), 4, https://www.gao.gov/assets/130/125853.pdf.

[7] Jerome H. Kahan, "Preparedness Revisited: W(h)ither PPD-8?," *Homeland Security Affairs* 10, no. 2 (February 2014): 2, https://www.hsaj.org/articles/252.

[8] Kahan, 2.

[9] Kahan, 2.

From PPD-8, FEMA's new capability-focused doctrine established within the *National Preparedness System* applies simplification methods to the complexity of preparing for an array of threats and hazards by focusing on the common outputs, or essential tasks, that any disaster requires, rather than the threats and hazards themselves.[10] FEMA defines capability as "the means to accomplish a mission, function, or objective based on the performance of related tasks, under specified conditions, to target levels of performance."[11] FEMA builds upon the concept of capability focused-planning in the *National Preparedness Goal,* by clarifying that from capabilities, a limited subset of further simplified *core* capabilities represent the "distinct critical elements necessary for … success" that should be possessed by every government jurisdiction.[12] FEMA's now 32 core capabilities comprehensively include both single organization specializations, such as fire suppression and more multi-organization interdependent functions, as well as sheltering a large segment of displaced persons.[13]

In 2012, FEMA introduced the THIRA process as an annual requirement for states and urban area security initiatives (UASIs) to complete.[14] FEMA then aggregates state and urban area THIRA data to complete a *National Preparedness Report*. The THIRA methodology, recently updated in 2018, consists of a six-step process that:

- Complies an array of plausible threats and hazards that could impact a jurisdiction.

[10] Federal Emergency Management Agency, *National Preparedness System* (Washington, DC: Department of Homeland Security, 2011), 1–5.

[11] Federal Emergency Management Agency, 1-5.

[12] Federal Emergency Management Agency, 1-5.

[13] Federal Emergency Management Agency, *National Preparedness Goal*, 2nd ed. (Washington, DC: Department of Homeland Security, 2015), 1–5.

[14] Federal Emergency Management Agency, Threat and Hazard Identification and Risk Assessment (THIRA) and Stakeholder Preparedness Review (SPR) Guide: Comprehensive Preparedness Guide (CPG) 201, 3rd. ed. (Washington, DC: Department of Homeland Security, 2017), 7.

- Crafts each threat and hazard into disaster scenarios where the maximum consequences are calculated and grouped as metrics relative each core capability.

- Facilitates an inter-disciplinary decision-making process where stakeholders deliberate, for each core capability, what amount of consequence metric the jurisdiction should train, equip, plan, and exercise to be able to accomplish in a set period, for any disaster. The results of this process are referred to as capability targets.

- Facilitates a process where current jurisdictional ability to perform each core capability is assessed, independent of all other capabilities.

- Identifies gaps that may exist between existing capability and the determined capability targets, and facilitates discussion of what actions to take over time to minimize capability shortfalls.

- Examines the role of local and grant contributions in building disaster preparedness by assessing investments over time relative to each core capability.[15]

The implementation challenges for the *National Preparedness System's* THIRA and its CBP framework are that disasters vary across the United States, and despite reducing complexity through focusing on core capabilities, risk assessment and performance measurement competencies are not widely available nor incentivized to be developed among stakeholders at the state and local level.[16] Additionally, many jurisdictions reported in a 2014 study that the THIRA is the only risk and capability assessment performed at the local level, and is done so only annually.[17] Moreover, respondents within the same study indicated a preference for less complex assessment

[15] Federal Emergency Management Agency, 3rd ed., 8–10.

[16] Kahan, "Preparedness Revisited: W(h)ither PPD-8?," 8.

[17] Seung-Ho An et al., *Integrated Risk Management at the Local Level: The Gap between Theory and Practice* (College Station, TX: Texas A&M University, 2014), 16–19, http://hdl.handle.net/1969.1/154253.

methodologies and favored locally developed approaches.[18] The current external incentive for states and urban areas to complete a THIRA is that it is a pre-requisite to receive FEMA preparedness grants.

In parallel to the homeland security enterprise, military CBP applies a similar analysis framework as the THIRA, but differs in that strategic focus of the exercise is often placed on mission-level, not full-scale conflict scenarios.[19] In applying this scaled relationship to national preparedness, disasters scenarios can be substituted for full-scale war scenarios but this relationship lacks an analog for a civilian-side equivalent to "mission."

For domestic preparedness, special events can offer an analog to the military's CBP's term, mission. The characteristics of special events: frequency of occurrence, necessity for risk-informed protection and response asset deployments, media attention, required interdisciplinary planning, and potential for real-world consequences appear to have an analogous equivalency with mission. This equivalency suggests that that FEMA's work on PPD-8 and the THIRA, challenged by the issue of low competency and incentive in practicing CBP can potentially be addressed by inculcating elements of CBP and the THIRA into special event planning. Planning for special events carries participation incentives and commonly occurs with greater than annual frequency. Increased practice with CBP at the local level can contribute to the goals established by PPD-8.

This thesis explores potential congruency between a DoD CBP framework and FEMA's application of CBP under PPD-8 to identify potential opportunities to apply THIRA planning approaches to special events. Policy options analysis are applied to explore the simulated performance of several options for implementing THIRA and CBP methodologies into special event planning.

[18] An et al., 16–19.

[19] Paul K. Davis, Analytic Architecture for Capabilities-Based Planning, Mission-System Analysis, and Transformation (Santa Monica, CA: RAND, 2002), 21–28.

D. RESEARCH QUESTION, DESIGN, AND SUMMARY OF FINDINGS

Thus, the research question of this thesis is: *How can the THIRA methodology be enhanced with elements of capabilities-based planning to support localized, expedient, and situation-specific decision support for special event risk and resource assessment*?

This thesis's hypothesis is that if the THIRA can be adapted to support planning for special events, which occur more frequently than the now triennially-required FEMA process, then the multidisciplinary groups involved in event planning may accrue competency in the goals of PPD-8; specifically familiarity with CBP, as well as a better understanding their organization's metrics of performance.[20] In turn, this adaptation may lead to advances in National Incident Management System (NIMS)-typing efforts and incentives at the local level to complement those undertaken by FEMA under PPD-8.[21]

E. SIGNIFICANCE OF RESEARCH

The primary consumers of this thesis are state and local governments that frequently need to assess risk in a tactical way to inform appropriate courses of action (e.g., resourcing).[22] The Department of Homeland Security (DHS) may have a strategic interest, as risk and capability assessment methodologies like the THIRA are soon conducted only triennially by states and UASIs as part of the FEMA's PPD-8 implementation.[23] Outcomes from this effort may inform policy and tool development at FEMA to support state and local jurisdictions in building further competency in CBP. Additionally, an increase in risk assessment and capability estimation at the state and local level will contribute to PPD-8's

[20] The THIRA has been an annual requirement since 2012. After 2019, the THIRA will become a triennial requirement, while stakeholder preparedness review (SPR) capability assessment will be required annually.

[21] For examples of current NIMS-typing definitions, see https://rtlt.preptoolkit.fema.gov/Public.

[22] The term "tactical" is used to indicate action performed for a specific occurrence or event, rather than the overall risk faced by the jurisdiction.

[23] Federal Emergency Management Agency, "PPD-8 Overview Presentation" (presentation, Department of Homeland Security, April 12, 2013), http://eden.lsu.edu/Conferences/SCAP/Documents/Eric Runnels.pdf.

goals, which have seen a greater emphasis from FEMA for local jurisdictions being able to articulate their own risk and defend their conclusions on how best to mitigate it.[24]

The ability to defend conclusions on the level of protection warranted for a special event is equally valuable. Mass gatherings have become targets of terrorism and local jurisdictions in most cases are responsible for determining appropriate levels of prevention, protection, and response assets. With multitudes of annual and novel events each year, establishing a standardized process to assess and reach consensus on risk and inherent event vulnerabilities can provide jurisdictions with a repeatable and objective mechanism to optimize how final resourcing is reached.

F. CHAPTER OUTLINE

Chapter II of this thesis conducts a literature review examining the current THIRA methodology, the general framework of CBP, approaches and limitations of risk assessment, the current range of decision support systems, and the role of interdisciplinary collaboration and effective organizational incentives observed in emergency management planning. Chapter III examines THIRA and CBP process frameworks to synthesize a hybrid FEMA/CBP planning process for applications in special event interagency planning. In applying this process, Chapter IV constructs policy options for the implementation of the hybrid-planning framework into two primary types of special event planning processes, local events and national special security events (NSSEs). Chapter V conducts policy options analysis, applies the methodology of Bardach and Patasknik, and assesses the simulated performance of each policy option under qualitative criteria identified to influence collaboration positively among a diverse group of planning stakeholders.

[24] Federal Emergency Management Agency, *2018–2022: Strategic Plan* (Washington, DC: Department of Homeland Security, 2010), 4–9.

II. LITERATURE REVIEW

A. THE THIRA AND QUANTIFYING CAPABILITY

The THIRA is a risk ranking and capability assessment process that is a requirement for all UASI metropolitan regions and states. It is a nationwide activity led by FEMA to execute PPD-8. The output of jurisdictional THIRAs yields capability targets and requires localities to assess what resources and abilities they possess that can be applied to meet these goals.[25]

PPD-8's critical elements of action included the formulation of a national preparedness goal, which through a Strategic National Risk Assessment (SNRA) and the *National Preparedness Goal* (NPG), identified 32 core capabilities to guide federal, state, and local stakeholders in developing resources, training, and organizational changes to meet requirements.[26] The THIRA was implemented as a jurisdictional version of the SNRA to assist states and urban areas to identify threats of concern, develop contextualized targets for the 32 core capabilities, and to prioritize what gaps in local capability should be focused on for risk reduction.[27] The results of each jurisdictional THIRA are aggregated by FEMA into an annual *National Preparedness Report* (NPR).[28]

This aggregation provides FEMA with a broad spectrum of locally identified threats and hazards of concern and geographically specific capability and resource gaps.[29] As discussed earlier, the THIRA represents a hybrid planning process that begins with threat and hazard scenarios planning but yields capabilities-based performance targets, such as

[25] Federal Emergency Management Agency, Threat and Hazard Identification and Risk Assessment (THIRA), 3rd ed., 19–30.

[26] Kahan, "Preparedness Revisited: W(h)ither PPD-8?," 2–4.

[27] Kahan, 2–4.

[28] Department of Homeland Security, *2017 National Preparedness Report* (Washington, DC: Department of Homeland Security, 2017), 101–102.

[29] Department of Homeland Security, 101–102.

having the local capability to process 250 deceased persons within a 24-hour operational period.[30]

The THIRA is a six-step process, and steps one through three have been addressed previously within Chapter I. This section reviews the current efficacy and challenges of the THIRA methodology's previous Step Four: Assess Current Capability. Within FEMA's THIRA planning guidance document, *Comprehensive Planning Guide 201*, 2nd ed., step four states:

> Communities should identify resources at a manageable level of detail. Identifying teams or 'packages' of people, equipment, and associated training allows for comparison across jurisdictions. These resources handle specific tasks within specified timeframes.[31]

The approach presented to users of this section of the guide is twofold, (1) apply NIMS typing to current assets and teams, and (2) develop packages of assets and personnel to accomplish specific types of missions, sometimes referred to as mission-ready packages (MRPs). NIMS typing is a federal effort through FEMA to create standardized descriptions of teams and other resources, such that the elements of teams and their capabilities are applied uniformly across the nation, and as such, are interoperable.[32] An example of a national NIMS typed asset is an urban search and rescue team, which has standardized roles, equipment and highly prescribed capability levels that must be maintained to remain a typed asset.[33]

While nearly every jurisdiction has become NIMS compliant in regards to the adoption of the Incident Command System (ICS), NIMS typing has not been widely

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[30] Federal Emergency Management Agency, *Threat and Hazard Identification and Risk Assessment (THIRA)*, 3rd ed., 19–20.

[31] Federal Emergency Management Agency, Threat and Hazard Identification and Risk Assessment (THIRA) and Stakeholder Preparedness Review (SPR) Guide: Comprehensive Preparedness Guide (CPG) 201, 2nd ed. (Washington, DC: Department of Homeland Security, 2013), 16.

[32] Federal Emergency Management Agency, *National Incident Management System*, 3rd ed. (Washington, DC: Department of Homeland Security, 2017), 1–3. For more background on NIMS typing details, see https://rtlt.preptoolkit.fema.gov/Public.

[33] Federal Emergency Management Agency, *Resource Typing Definition for Mass Search and Rescue Operations* (Washington, DC: Department of Homeland Security, 2014), 1–10, https://rtlt.preptoolkit.fema.gov/Public/Resource/ViewFile/8-508-1160?type=Pdf&p=17.

adopted at local levels of government.[34] Local adoption of NIMS typing does not often adhere to national qualification standards, as typing criteria include specific qualifications and training elements that lie outside of normal operational responsibilities, or the administrative burden to maintain qualification exceeds a specific department's operational capability.[35] Kahan raises this issue in "W(h)ither PPD-8," where he argues that PPD-8, and inherently the THIRA, rely on complex analytical approaches to assessing performance that require competencies not commonly found in state and local governments.[36] Paul K. Davis, the author of a highly cited monograph on applying CPB to defense planning, states that assessing disaster performance in the civilian environment is more challenging than in military contexts, due to the diffusion of disaster capability across multitudes of different organizations.[37]

NIMS forms the national, foundational basis for a standardized response to any incident in any jurisdiction by establishing adaptable command and control structures, from which NIMS typed resources can be requested or assigned to support.[38] A national review of the adoption of NIMS, specific to ICS, found that the disaster response across the United States continues to be challenged by issues in communication, coordination, collaboration, and leadership between organizations.[39] These issues identified in the study speak largely to interorganizational coordination failures in pre-event preparedness, planning, and training as root causes.[40]

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[34] Mark G. Stigler, "Strategy for Upgrading Preparedness in Small and Rural Communities to Meet National Preparedness Standards" (master's thesis, Naval Postgraduate School, 2010), 6–10.

[35] Stigler, 6–10.

[36] Kahan, "Preparedness Revisited: W(h)ither PPD-8?," 6–8.

[37] Davis, Analytic Architecture, 21–28.

[38] Federal Emergency Management Agency, *National Incident*, 1–2.

[39] Jessica Jensen and William L. Waugh Jr., "The United States' Experience with the Incident Command System: What We Think We Know and What We Need to Know More About," *Journal of Contingencies and Crisis Management* 22, no. 1 (March 2014): 6, doi: 10.1111/1468-5973.12034.

[40] Kay Sullivan Faith, Brian A. Jackson, and Henry Willis, "Text Analysis of After Action Reports to Support Improved Emergency Response Planning," *Journal of Homeland Security and Emergency Management* 8, no. 1, art. 57 (2011): 10–13, 10.2202/1547-7355.1900.

B. CAPABILITIES-BASED PLANNING

CBP is a method of system analysis that focuses on identifying and assessing the necessary elements required for a specific outcome under user-defined metrics of performance.[41] CBP focuses on organizational outputs and shifts the analytical focus when working towards an objective from "what do we have?" to "what do we need to do?"[42] The methodology focuses on building a spectrum of options that can achieve desired outputs by assessing their performance under uncertainty through qualitative and quantitative approaches including subject matter expert elicitation and parametric exploration, respectively.[43] Variants of CBP have found frequent application in corporate strategy, manufacturing efficiency assessment and information technology (IT) system design and computer architecture, including machine learning. Most notably, CBP is a prominent element within military strategic planning and this area of application is the focus of review.

CBP re-emerged as a Department of Defense (DoD) change in strategic force planning doctrine in the early 2000s, which moved from a narrower threat-specific method towards an analytical process that favors modularity, agility and adaptability.[44] Introduced formally via Defense Secretary Rumsfeld in the 2001 *Quadrennial Defense Review (QDR)*, CBP's application to force planning built on previous iterations of CBP within the DoD that supported nuclear security and North Atlantic Treaty Organization (NATO) operations

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[41] Doug Hales and Paul Chouinard, Implementing Capability Based Planning within the Public Safety and Security Sector: Lessons from the Defence Experience (Ottawa, Ontario: Defence R&D Canada – Centre for Security Science, 2011), 1.

[42] The Technical Cooperation Program, *TTCP Technical Report: Guide to Capability-based Planning* (Washington, DC: The Technical Cooperation Program, n.d.), 2, accessed October 10, 2018, https://www.acq.osd.mil/ttcp/reference/docs/jsa-tp-3-cbp-paper-final.doc.

[43] For parametric exploratory analysis, see Patrick Mills et al., *Estimating Air Force Deployment Requirements for Lean Force Packages: A Methodology and Decision Support Tool Prototype* (Santa Monica, CA: RAND, 2017). For CBP exploring SME and information system interactions, see Stephen Duhan, "A Capabilities Based Toolkit for Strategic Information Systems Planning in SMEs," *International Journal of Information Management* 27, no. 5 (2007): 352–367, doi: 10.1016/j.ijinfomgt.2007.03.001. For general business applications, see Paul Leinwand, Cesare Mainardi, and Art Kleiner, "Develop Your Company's Cross-Functional Capabilities," *Harvard Business Review*, February 2, 2016, https://hbr.org/2016/02/develop-your-companys-cross-functional-capabilities. For machine leaning applications, see Martin Pelikan and David E. Goldberg, "A Hierarchy Machine: Learning to Optimize from Nature and Humans," *Complexity* 8, no. 5 (2003): 36–45, doi: 10.1002/cplx.10103.

[44] Davis, Analytic Architecture, xi.

decades earlier.[45] Within the DoD policy and planning spaces, CBP has been inculcated into processes for a spectrum of activities that ranged from officer education to quick-response asset portfolio assessment for the Air Force.[46]

Following the 2001 QDR re-introduction of CBP, a variety of literature exists that explores how best to integrate CBP into strategic defense planning. The most cited is a monograph by Paul K. Davis titled: *Analytic Architecture for Capabilities-Based Planning, Mission-System Analysis, and Transformation.* Davis's methodology is summarized as follows since it presents a strategic method of application for the entire DoD, rather than issue- or branch-specific applications, such as *A Capabilities-Based Strategy for Army Security Cooperation*, which applies CBP methods to address international partnerships to counter asymmetrical warfare.[47]

In *Analytic Architecture for Capabilities-Based Planning, Mission-System Analysis, and Transformation,* Davis presents a general analytical framework for the entirety of defense strategic planning.[48] Plausible name-level scenarios are identified and then translated into full narratives by adding context (e.g., time of year, enemy force strength, etc.). From the fully contextualized scenarios, a list of required capabilities needed to ensure operational success is determined. Capabilities in this process represent the essential functions, actions, and competencies that combine to achieve a specific outcome, but cannot be reasonably reduced further into more sub-elements or constituent parts. A comprehensive list of every single required critical action is superfluous, as most of the more strategic capabilities will emerge naturally, such as the Navy maintaining port security in a conflict.[49] Again, the assessment is simplified to focus only on capabilities needed to overcome unique operational challenges, like halting an enemy maneuver, which

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[45] Davis, 84–87.

[46] Mills et al., Estimating Air Force Deployment Requirements for Lean Force Packages, x-xi; Margaret C. Harrell et al., A Strategic Approach to Joint Officer Management: Analysis and Modeling Results (Santa Monica, CA: RAND, 2009). 1-5.

[47] Jennifer D. P. Moroney, Adam Grissom, and Jefferson P. Marquis, *A Capabilities-Based Strategy for Army Security Cooperation* (Santa Monica, CA: RAND, 2009), 6.

[48] Davis, Analytic Architecture, xi.

[49] Davis, xi.

inherently aggregate to represent the sub-elements of activity that make up a full-scale military conflict.[50] This simplification of war fighting brings analytical focus to the required capabilities for success at the mission level.[51] Davis states, "Since missions are building blocks or modules of campaigns, they are appropriate modules on which to focus capabilities-based planning."[52]

The framework then proposes that "for a given operational challenge, consider a set of options for meeting the challenge; apply mission-system analysis methods across a wide range of circumstances to generate a comparative assessment of the options with appropriate metrics."[53] This mission-system analysis space is meant to evaluate capabilities and asset trade-offs under highly uncertain circumstances, such as warning time and capability of adversarial units, as well as economic frameworks.[54] Davis offers exploratory analysis as the main analytical approach. Exploratory analysis is a process to gain a broad understanding of the overarching problem space before shifting focus to the details of particular capabilities.[55] Ranges of uncertainty, like the performance of a public safety taskforce in a variety of scenarios, are often represented graphically. Additionally, exploratory analysis can be conducted via both qualitative and quantitative methods. The concluding result of exploratory analysis is a spectrum of options capable of accomplishing a mission that can be prioritized based on assessment results.

While Davis's framework applies simplification methods to the complexity of military strategic planning, shifts a focus towards organizational outputs versus inputs, and centers analysis on semi-independent units of capability evaluated at the mission level, its implementation has been problematic. In *Capabilities-Based Planning: How it is Intended to Work and Challenges to its Successful Implementation*, Colonel Stephen K. Walker observes that in 2005, DoD-wide integration of CBP had suffered from a lack of a common

[50] Davis, xii.

[51] Davis, 25–26.

[52] Davis, 28.

[53] Davis, 28–30.

[54] Davis, 30–38.

[55] Davis, 30–38.

analytic schema which included a master set of scenarios and standardized means of collection and representing unit performance data.[56] Walker also notes that the methodology was not fully embedded within all defense-planning organizations and that the strategic conclusions and methodology yielded from CBP were not cross-walked through budgetary plans and other fiscal documents, which generated criticism from the GAO.[57] The DoD has since developed a universal joint task list (UJTL), which contains all necessary capabilities to inform strategic planning in all military branches.[58] The Department of Homeland Security (DHS) also adopted a domestic universal task list (UTL), which was meant to compliment FEMA's national planning scenarios, between 2003 and 2005, to implement elements of Homeland Security Presidential Directive 8 (HSPD-8), eventually supplanted by PPD-8.[59] DHS' UTL has now been adapted into the *National Preparedness Goal's* core capabilities.

In the Technical Cooperation Program Joint Systems and Analysis Group's *Guide to Capability Based Planning*, highlighted implementation challenges include the related issues working in high degrees of abstraction, the need to develop new analytical tools and competencies, and that setting and measuring capability goals is inherently difficult to initially structure.[60] Davis recognizes these related challenges within his monograph stating, "the enthusiasm and focus needed to generate good ideas or to worry about problems creatively are enhanced when the scenario being considered is either real or obviously a relevant surrogate."[61] *Implementing Capability Based Planning within the Public Safety and Security Sector: Lessons from the Defence Experience* concurs with Davis on the importance of high fidelity scenarios as a starting place for CBP but notes

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[56] Stephen K. Walker, *Capabilities-Based Planning: How it is Intended to Work and Challenges to its Successful Implementation* (Carlisle, PA: U.S. Army War College, 2005), 13, http://ssi.armywarcollege.edu/pdffiles/ksil239.pdf.

[57] Walker, 14–15.

[58] "Universal Joint Task List," Department of Defense, Joint Chiefs of Staff, accessed September 26, 2018, http://www.jcs.mil/Doctrine/Joint-Training/UJTL/.

[59] Sharon L. Caudle, "Homeland Security and Capabilities-Based Planning: Improving National Preparedness" (master's thesis, Naval Postgraduate School, 2009), 24–27.

[60] The Technical Cooperation Program, *TTCP Technical Report*, 5–6.

[61] Davis, Analytic Architecture, 9.

difficulty in coordinating the disparate stakeholders that comprise domestic local practitioners in strategic analysis stating, "Real coordination—that called for by non-routine situations—tends to take place under the pressure of circumstance, of overwhelming need in the face of demanding situations."[62] The authors go on to note that coordination for CBP is most effective when small groups of key stakeholders work together on discrete operations over set timeframes with explicit lines of authority.[63]

C. RISK ASSESSMENT AND RANKING

Research has yielded a variety of differing approaches to assessing risk, and significant academic work has been done in the area. One comprehensive review of DHS risk assessment is prominent in this area, *Review of the Department of Homeland Security's Approach to Risk Analysis*, which reviews current models employed by DHS and identifies several process-based flaws. Specific issues include the application of natural hazard assessment methodologies, which rely on historical data, to adversarial evaluations where background data is often unavailable.[64] The review cites that modeling intentional acts represents a functional and probabilistic interrelationship between variables of threat, vulnerability, and consequences introduces a level of analytical complexity more suited to assessment through game theory and similar variants.[65] Concluding remarks suggest DHS develop this analytical capability and state that the baseline data available for the assessment of terrorism risk is comprised of expert opinions, analytical models, and analogs drawn from previous real-world events. Adversarial action remains inherently difficult to model quantifiably, due to gaps in sources of data and the complex behavior of individual actors. This difficulty, combined with the desire to understand both strategic (jurisdictional) and tactical (facility-based) risk of attack has led to a multitude of models

[62] Hales and Chouinard, Implementing Capability Based Planning, 41.

[63] Hales and Chouinard, 42.

[64] National Research Council, *Review of the Department of Homeland Security's Approach to Risk Analysis* (Washington, DC: The National Academies Press, 2010), 44–51.

[65] National Research Council, 46–47.

that work with differing measures and represent a variety of design priorities, such as outputs to inform prevention versus those for response.[66]

At a strategic level, significant literature is available on variants of game theory models to assess adversarial risk. Jesus Rios et al. provides a summary of common models including defend-attack and defend-attack-defend, which primarily calculate probabilities of success in defense or attack based on knowledge of each other's capabilities, vulnerabilities, and intentions.[67] Complex mathematics, analysis, and causal trees are used to arrive at probabilistic outputs. However, Gerald Brown and Louis Anthony argue that probabilistic risk assessment for terrorism can yield misleading results, specifically those that result from general uncertainty and assumptions about the level of knowledge and rationality of the adversarial actor.[68] Methods that attempt to quantify adversarial risk remain diverse and have not coalesced around a singular approach.

The interrelationship of the consequences of multiple threats and hazards and the likelihood of cascading aftereffects creates further analytical difficulty when assessments are performed at any jurisdictional level. Prioritization of one threat or hazard increases in complexity as a bombing can also cause a prolonged utility outage. A review of these complex interrelations concludes that joint hazard assessment is inherently difficult and must rely on a variety of quantitative and qualitative approaches, which most importantly must be structured based upon a set of desired outputs.[69]

That a desired output must be used as a choice to scope how an assessment is conducted or abstracted raises issues of who is making that determination and whether inherited or promulgated methodologies are appropriate for varied jurisdictions to use, rather than developing local tools. A study of utilization of risk management by

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[66] Kyungryun Cathy Pak and Lynne Genik, *Risk Assessment References: Documented Literature Search* (New Delhi, India: Defence Research and Development, 2012), 163.

[67] Jesus Rios and David Rios Insua, "Adversarial Risk Analysis for Counterterrorism Modeling," *Risk Analysis* 32, no. 5 (December 2011): 894–901, https://dx.doi.org/10.1111/j.1539-6924.2011.01713.x.

[68] Gerald G. Brown and Louis Anthony Tony Cox Jr., "How Probabilistic Risk Assessment Can Mislead Terrorism Risk Analysts," *Risk Analysis* 31, no. 2 (September 2010): 196–198, https://dx.doi.org/10.1111/j.1539-6924.2010.01492.x.

[69] Melanie S. Kappes et al., "Challenges of Analyzing Multi-Hazard Risk: A Review," *Natural Hazards* 64, no. 2 (July 2012): 1926–1929, https://dx.doi.org/10.1007/s11069-012-0294-2.

jurisdictions indicated that a majority of responding governments use internally developed non-formulaic tools, not DHS or FEMA-promulgated methodologies.[70] Further, the majority of jurisdictions view risk assessment as a means of securing funding and updates to these processes are done infrequently.[71] Where federal risk methodologies were used, jurisdictions recommended that assessment methodologies become more accessible to end-users and less of an academic exercise.[72]

Qualitative approaches to assessing and ranking risks that have been used widely include cross-disciplinary expert opinion elicitation to support the THIRA and jurisdictional natural hazard mitigation plan processes.[73] These approaches produce fact sheets on the likelihood, vulnerability, and consequences of each threat and hazard and use facilitated discussion to prioritize incidents of greatest jurisdictional concern. An example is the deliberative risk ranking method (DRRM.)

DRRM is a process that includes the participation of a diverse group of stakeholders. It uses facilitation to overcome and address organizational and personal biases that affect the perceived likelihood of a variety of risks by presenting threats and hazards as a function of their relative attributes, or consequences and frequency.[74] DRRM as an analytical process has been validated by a large sample of risk managers and has been used by many to provide additional insights on how to increase the utility of results from the decision-making process.[75] Irving Susel et al. added additional functionality to the outputs of DRRM and proposed an additional process step where the ordinal ranking of threats and hazards is converted to a ratio, which allows the comparative magnitude of a

[70] An et al., Integrated Risk Management at the Local Level, 16–18.

[71] An et al., 16–18.

[72] An et al., 16–18.

[73] Federal Emergency Management Agency, *Local Mitigation Planning Handbook* (Washington, DC: Department of Homeland Security, 2013), 5-9, https://www.fema.gov/media-library-data/20130726-1910-25045-9160/fema_local_mitigation_handbook.pdf.

[74] Russell Lundberg and Henry H. Willis, "Deliberative Risk Ranking to Inform Homeland Security Strategic Planning," *Journal of Homeland Security and Emergency Management* 13, no. 1 (January 2016): 7–15, https://dx.doi.org/10.1515/jhsem-2015-0065.

[75] Kara M. Morgan et al., "A Deliberative Method for Ranking Risks (II): Evaluation of Validity and Agreement among Risk Managers," *Risk Analysis* 21, no. 5 (October 2001): 934–936, https://dx.doi.org/10.1111/0272-4332.215162.

risk to be expressed.[76] While DRRM has been demonstrated to support the evaluation of homeland security threats, the application of this method based upon this review remains strategic (jurisdictional) in nature.[77]

D. OPERATIONS RESEARCH AND DECISION SUPPORT TOOLS

The risk assessment methods previously reviewed focus on an evaluation of jurisdictional threats to inform a variety of courses of action, and as such, represent strategic approaches to evaluating decisions. Outside the narrow context of evaluating homeland security threats, the field of Operations Research (OR) empirically studies the processes that drive both strategic and tactical decision-making.[78] Most importantly, variants of OR exist in a spectrum, which ranges from complex decision-support algorithms to constructions designed to yield insight from expert elicitation specific to a certain scenario.[79] OR has been applied throughout DHS, and further research opportunities for additional expansion into areas of emergent threats remain, such as cyber security.[80]

Salvatore Belardo and John Harrald, who researched a framework for applying OR decision support methodologies during catastrophic incidents, concluded:

> The infrequent occurrence and potentially catastrophic impacts of rare natural and technological disasters almost ensure that preplanning will be based on incomplete knowledge and that the response will be managed by unprepared and inadequately supported stranger groups. In planning and organizing for catastrophes the various constituents must engage in a uniquely divergent planning process. The process must encourage the

[76] Irving Susel et al., "Augmenting the Deliberative Method for Ranking Risks," *Risk Analysis* 36, no. 1 (July 2015): 49–52, https://dx.doi.org/10.1111/risa.12456.

[77] Russell Lundberg, "Comparing Homeland Security Risks Using a Deliberative Risk Ranking Methodology" (PhD diss., Pardee RAND Graduate School, 2013), 55–59, http://www.rand.org/content/dam/rand/pubs/rgs_dissertations/RGSD300/RGSD319/RAND_RGSD319.pdf.

[78] Richard C. Larson, "Decision Models for Emergency Response Planning," in *The McGraw-Hill Handbook of Homeland Security*, ed. David Kamien (New York: McGraw-Hill, 2005), 911–913.

[79] Larson, 911–913.

[80] Daniel P. Wright, Matthew J. Liberatore, and Robert L. Nydick, "A Survey of Operations Research Models and Applications in Homeland Security," *Interfaces* 36, no. 6 (December 2006): 523–525. https://dx.doi.org/10.1287/inte.1060.0253.

> generation of the multiple perspectives so essential to understanding and describing problems in complex decision settings.[81]

Stranger groups refer to the assemblage of a cross-disciplinary group of stakeholders, comprised of public safety representatives, government leadership and private sector partners, and specifically convened to address a potential or real-world incident. Collaboration then, among a group of varied participants, is an essential element to the success of collaborative decision-making and a means to combat issues of an organizational lack of preparation for, or complete knowledge of, how to address an incident.[82] While it is acknowledged that collaboration among organizations in a disaster scenario is an imperative, decision making for a specific department or discipline in this environment usually rests with one person, or an authorized representative individual interacting with others.[83] Recommendations to enhance group decision-making focus on the development of structured, replicable processes, known as decision support systems.[84]

Decision support systems (DSS) represent structured processes to deliver near-real-time information, or flows of knowledge, to enhance individual and facilitated group decision-making that otherwise would entirely draw from intuition.[85] Technological approaches to DSS offer the means to aggregate information across a variety of existing sources with some standardization, such as organization of information by FEMA's emergency support functions (ESFs,) but broad organizational frameworks may not be adaptable for a specific incident scenario.[86] Each disaster is inherently unique and occurs

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[81] Salvatore Belardo and John Harrald, "A Framework for the Application of Group Decision Support Systems to the Problem of Planning for Catastrophic Events," *IEEE Transactions on Engineering Management* 39, no. 4 (November 1992): 402, https://dx.doi.org/doi:10.1109/17.165425.

[82] Naim Kapucu and Vener Garayev, "Collaborative Decision-Making in Emergency and Disaster Management," *International Journal of Public Administration* 34, no. 6 (May 2011): 365–367, https://dx.doi.org/10.1080/01900692.2011.561477.

[83] Kapucu and Garayev, 365–367.

[84] Kapucu and Garayev, 365–367.

[85] Steven Thompson et al., "Improving Disaster Response Efforts with Decision Support Systems," *International Journal of Emergency Management* 3, no. 4 (2006): 251–252, https://dx.doi.org/10.1504/ijem.2006.011295.

[86] Federal Emergency Management Agency, *Emergency Support Functions Annexes: Introduction* (Washington, DC: Department of Homeland Security, 2018), 1–3, https://www.fema.gov/media-library-data/20130726-1825-25045-0604/emergency_support_function_annexes_introduction_2008_.pdf.

with decision-making, factors such as uncertainty, time-pressure, and complex interdependent lines of activity.[87] Identifying DSSs and tools to inform decision makers during in-progress emergencies presents a challenge, since an emergency represents an unstructured problem for which accurate or probabilistic models cannot be promptly established.[88] In the context of planning a mass gathering, structuring the problem may require the integration of a variety of approaches including Bayesian analysis, a statistical inference approach able to integrate both stakeholder subjective opinions and quantitative data into a probabilistic model that can be refined as opinions change over time, as informed by new data.[89]

OR mathematic modeling of emergency and crisis decision-making has been done through the construction of generic, scenario-driven information flows and decision points that represent functional characteristics of response.[90] Determining the severity of an emergency and resourcing the appropriate response can then be addressed through computer simulation and evaluation.[91]

"Factors Influencing the Selection of Decision Support Systems for Emergency Management" provides data on the current level of adoption of DSSs by type and size of government, and in what functional areas those tools are used. Within the planning and

[87] Jan Maarten Schraagen and Josine van de Ven, "Human Factors Aspects of ICT for Crisis Management," *Cognition, Technology & Work* 13, no. 3 (March 4, 2011): 177–179, https://dx.doi.org/10.1007/s10111-011-0175-6.

[88] Detlof von Winterfeldt and Barbara Fasolo, "Structuring Decision Problems: A Case Study and Reflections for Practitioners," *European Journal of Operational Research* 199, no. 3 (December 2009): 857–859, https://dx.doi.org/10.1016/j.ejor.2009.01.063.

[89] Paola Berchialla et al., Comparing Models for Quantitative Risk Assessment: An Application to the European Registry of Foreign Body Injuries in Children," *Statistical Methods in Medical Research* 25, no. 4 (2013): 1245, https://dx.doi.org/10.1177/0962280213476167.

[90] Kefan Xie et al., "Research on the Group Decision-Making about Emergency Event Based on Network Technology," *Information Technology and Management* 12, no. 2 (March 2011): 138–140, https://dx.doi.org/10.1007/s10799-011-0087-4.

[91] Siqing Shan, Li Wang, and Ling Li, "Modeling of Emergency Response Decision-Making Process Using Stochastic Petri Net: An E-Service Perspective," *Information Technology and Management* 13, no. 4 (June 1, 2012): 363–376, https://dx.doi.org/10.1007/s10799-012-0128-7.

preparedness mission area, the survey indicated some of the lowest levels of adoption.[92] Importantly, the authors note that survey respondents overwhelmingly did not use DSS tools for planning purposes.[93] In examining these results, the authors cite Turoff et al., who states, "An emergency system that is not used on a regular basis before an emergency will never be of use in an actual emergency."[94] The article also outlines the general process and supporting literature for scoping such tools and determining user requirements, such as outreach to stakeholders for discipline-specific analytical needs or success criteria prior to development.

A notable subset of OR and related DSS design is the multiple-criteria decision-making (MCDM) methodology, a structured process in which multiple decision makers evaluate selected evaluation criteria relevant to a problem (level of acceptable flooding, for example) and apply them to evaluate potential courses of action. Criteria weights can be collaboratively or mathematically determined, such as prioritizing life-saving actions over property protection and used to evaluate various courses of action. The final group consensus is represented as a mathematical aggregation of each alternative course of action by score.[95] MCDM criteria are established through problem structuring, which as stated earlier, is predisposed to be more achievable for advanced notice or simulated events than unpredictable disasters. Weighting for a model and its criteria can be constructed by collecting the institutional preferences of key stakeholders through a process called preference elicitation.[96]

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[92] Richard G. Little, Trevor Manzanares, and William A. Wallace, "Factors Influencing the Selection of Decision Support Systems for Emergency Management: An Empirical Analysis of Current Use and User Preferences," *Journal of Contingencies and Crisis Management* 23, no. 4 (September 2015): 270–272, https://dx.doi.org/10.1111/1468-5973.12097.

[93] Little, Manzanares, and Wallace, 270–272.

[94] Little, Manzanares, and Wallace, 270–272.

[95] Lean Yu and Kin Keung Lai, "A Distance-Based Group Decision-Making Methodology for Multi-Person Multi-Criteria Emergency Decision Support," *Decision Support Systems* 51, no. 2 (May 2011): 308–312, https://dx.doi.org/doi:10.1016/j.dss.2010.11.024.

[96] Valentin Bertsch et al., "Multi-Criteria Decision Support and Stakeholder Involvement in Emergency Management," *International Journal of Emergency Management* 3, no. 2/3 (2006): 117–118, https://dx.doi.org/doi:10.1504/ijem.2006.011163.

In summary, institutional preferences, such as maintaining safe crowd sizes at events, can be weighted to represent, for example, a police department's focus on safety of attendees. The benefits of MCDM include a high degree of involvement and transparency in the decision-making experience and the graphic representation and identification of factors that strongly influence decision making.[97] In addressing advanced notice event preplanning, the real-time on-line decision support system (RODOS) MCDM process designed for nuclear energy crises in Europe was able to utilize this group consensus tool to identify applicable courses of action based upon varied scenario inputs.[98] This utilization has applicability for further research on tactical DSS tools for special event planning use at the jurisdictional level.

E. COLLABORATION WITHIN EMERGENCY MANAGEMENT

Research on the emerging collaboration-enabling role of emergency management practitioners is extensive. The complexity and frequency of serious emergency incidents and special events require agile horizontal and collaboration across many different disciplines and the concept of network governance in public safety has been described in recent research.[99] Network governance is a term characterized by semi-formal collaborative structures that operate outside normal, organizationally focused (vertical) bureaucratic systems.[100] A study of the incident command structure (a vertical hierarchy) compared with the ESF framework (a close-functioning horizontal arrangement) found greater degrees of collaborative performance in the ESF environment based on betweenness centrality from social network analysis.[101]

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[97] Bertsch et al., 114–119.

[98] Bertsch et al., 127–128.

[99] Alireza Abbasi and Naim Kapucu, "Structural Dynamics of Organizations during the Evolution of Interorganizational Networks in Disaster Response," *Journal of Homeland Security and Emergency Management* 9, no. 1 (January 2012): 3–5, https://dx.doi.org/10.1515/1547-7355.1975.

[100] Keith G. Provan and Patrick Kenis, "Modes of Network Governance: Structure, Management, and Effectiveness," *Journal of Public Administration Research and Theory* 18, no. 2 (June 2007): 230–235, https://dx.doi.org/10.1093/jopart/mum015.

[101] Naim Kapucu and Vener Garayev, "Structure and Network Performance: Horizontal and Vertical Networks in Emergency Management," *Administration & Society* 48, no. 8 (July 2014): 946–947. https://dx.doi.org/10.1177/0095399714541270.

The uncertainty found within disaster environments requires that emergency managers adapt to dynamic situations, and William Waugh and Gregory Streib argue success emerges from the ability to manage interagency mission interdependencies and overlaps effectively.[102] The effectiveness of an emergency management program is largely based on this skill set instead of technical knowledge.[103] The discipline of emergency management, due to its primary interagency mission space, and hyper-focus on addressing disaster consequence severity, is often identified as the primary facilitator for large-scale interagency collaboration.[104] Despite this facilitating role, collaborative difficulties between departments can lead to weak planning products.[105]

Susan Page Hocevar's survey of homeland security enterprise (HSE) government organizations identified a variety of factors for success and barriers that characterize interagency collaborative efforts. Examples of barriers include a lack of well-defined roles and procedures for establishing collaboration, inadequate communication, and divergent goals. Success factors include an appreciation of others' perspectives, recognition of the need for collaboration, and a sharing of common goals or recognized interdependence.[106] The study recommends that lateral mechanisms be developed and formalized to support interagency information and resource exchanges.[107] Hocevar's work is built upon Jardine, who argues that incentives, such as continuing or new funding opportunities are greater

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[102] William L. Waugh and Gregory Streib, "Collaboration and Leadership for Effective Emergency Management," *Public Administration Review* 66, no. 1 (December 2006): 131–140, https://dx.doi.org/10.1111/j.1540-6210.2006.00673.x.

[103] Danny Peterson and Richard Besserman, "Analysis of Informal Networking in Emergency Management," *Journal of Homeland Security and Emergency Management* 7, no. 1 (January 2010): 8–10, https://dx.doi.org/doi:10.2202/1547-7355.1719.

[104] Michael McGuire and Chris Silvia, "The Effect of Problem Severity, Managerial and Organizational Capacity, and Agency Structure on Intergovernmental Collaboration: Evidence from Local Emergency Management," *Public Administration Review* 70, no. 2 (March 2010): 278, https://dx.doi.org/10.1111/j.1540-6210.2010.02134.x.

[105] Amy K. Donahue and Robert V. Tuohy, "Lessons We Don't Learn: A Study of the Lessons of Disasters, Why We Repeat Them, and How We Can Learn Them," *Homeland Security Affairs* 2, no. 2 (July 2006): 1, https://www.hsaj.org/articles/167.

[106] Susan Page Hocevar, Gail Fann Thomas, and Erik Jansen, "Building Collaborative Capacity: An innovative Strategy for Homeland Security Preparedness," *Advances in Interdisciplinary Studies of Work Teams*, 27: (2006): 257, https://dx.doi.org/10.1016/S1572-0977(06)12010-5.

[107] Hocevar, Thomas, and Jansen, 257.

motivating factors for collaboration than a shared-goal perspective among different parties.[108]

F. CONCLUSION

From a review of the literature, a research opportunity exists for further exploring how structured decision-making processes using CBP and the field's subset of methodologies in concert with the THIRA may enhance collaborative planning capability. Further, it has been identified that inculcating these practices into normal operational environments, such as special events, may yield collaboration efficiencies in disasters and greater competency in conducting CBP.

[108] Sheryl Jardine, "The Impact of Incentives and Requirements on Group Collaboration" (master's thesis, Naval Postgraduate School, 2010), 73.

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III. THE THIRA'S COMPOSITIONAL ELEMENTS AND OPPORTUNITIES

This chapter explores the underlying frameworks that comprise the FEMA THIRA process and argue the origins of this methodology have strong analogous ties to defense CBP. Finally, this chapter concludes with a hybrid THIRA approach that can be adapted from a jurisdictional strategic risk assessment to a special event-planning methodology.

A. COMPARISON OF CBP AND THIRA PROCESS FRAMEWORK

As stated in Chapter II, CBP is used by the DoD, which began experimentation with non-linear planning models in the early 1960s.[109] Characterized as planning under uncertainty within budgetary constraints where trade-offs must be assessed and defended, CBP focuses on identifying future needs to meet a wide array of possible challenges.[110]

In 2003, RAND developed the monograph, *Analytic Architecture for Capabilities-Based Planning, Mission-System Analysis, and Transformation* for the Secretary of Defense. Largely presented as a document to help facilitate substantial institutional change in approaching strategic planning, its author Paul Davis included the following process model (Figure 1) within the monograph's executive summary.

[109] Davis, Analytic Architecture, 67–70.

[110] Davis, xi.

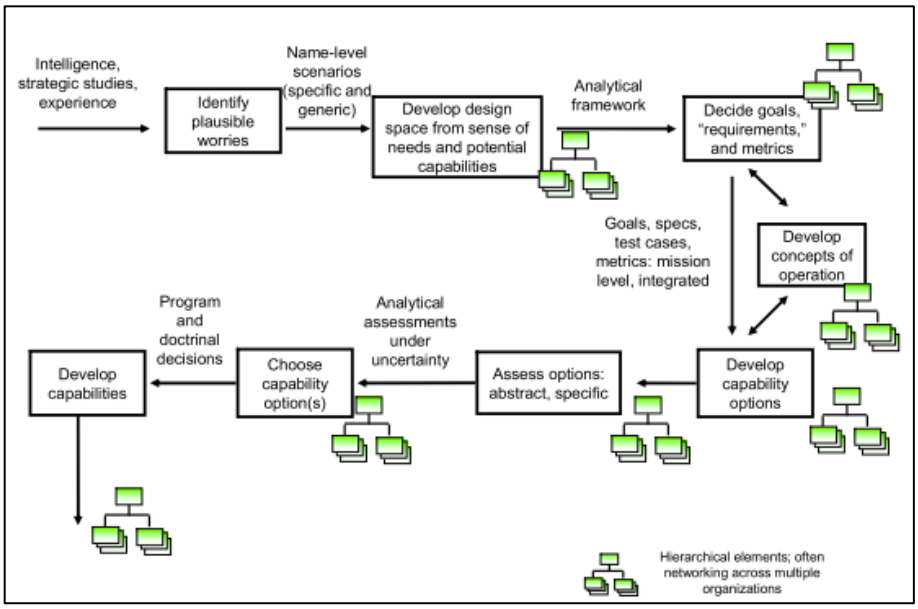

Figure 1. Davis CBP Analytical Framework[111]

In Figure 1, the "identify plausible worries" phase includes the wide range of possible threats that may necessitate some form of military action. Within the second module, the "develop design space" adds context to the either generic or specific "plausible worries" to constitute name-level scenarios. In this phase, a simple plausible worry of a North Korean invasion of South Korea would have supporting details added to inject realism to the event, such as the invasion force strength, speed of advancement, status of defending resources, etc. The added context to these name-level scenarios allows needed capabilities to be assessed.[112] The next phase, "decide goals" establishes metrics of performance for the developed capabilities, such a time-performance for specific units to accomplish certain objectives. Within "develop capability options," identified needs are considered in the context of established metrics to create targets of capability. Throughout the rest of the process, analytical processes are conducted at multiple levels of command

[111] Source: Davis, *Analytic Architecture*, 12.

[112] Davis, 21–23.

to identify what capabilities should be prioritized within budgetary and time constraints, as well as where capability overlaps occur that may indicate gained efficiencies.[113]

FEMA's implementation of PPD-8 included a list of 32 core capabilities derived from an earlier version of the targeted capability list (TCL), which was developed from the DoD UTL.[114] The current FEMA core capability list follows in Figure 2.[115]

Core Capabilities	Prevention	Protection	Mitigation	Response	Recovery
Planning	●	●	●	●	●
Public Information and Warning	●	●	●	●	●
Operational Coordination	●	●	●	●	●
Intelligence and Information Sharing	●	●			
Interdiction and Disruption	●	●			
Screening, Search, and Detection	●	●			
Forensics and Attribution	●				
Access Control and Identity Verification		●			
Cybersecurity		●			
Physical Protective Measures		●			
Risk Management for Protection Programs and Activities		●			
Supply Chain Integrity and Security		●			
Community Resilience			●		
Long-term Vulnerability Reduction			●		
Risk and Disaster Resilience Assessment			●		
Threats and Hazards Identification			●		

Core Capabilities	Prevention	Protection	Mitigation	Response	Recovery
Critical Transportation				●	
Environmental Response/Health and Safety				●	
Fatality Management Services				●	
Fire Management and Suppression				●	
Logistics and Supply Chain Management				●	
Mass Care Services				●	
Mass Search and Rescue Operations				●	
On-scene Security, Protection, and Law Enforcement				●	
Operational Communications				●	
Public Health, Healthcare, and Emergency Medical Services				●	
Situational Assessment				●	
Infrastructure Systems				●	●
Economic Recovery					●
Health and Social Services					●
Housing					●
Natural and Cultural Resources					●

Figure 2. FEMA Core Capability List[116]

In addition to in-person technical assistance provided by regional FEMA offices, *Comprehensive Planning Guide 201* (CPG-201) was issued for stakeholders as the doctrinal guidance for completing a THIRA. Within it, as seen in Figure 3, the document presents the following process chart and narrative descriptions to planners.

[113] Davis, 42–46.

[114] Caudle, "Homeland Security and Capabilities-Based Planning," 33–36.

[115] "Core Capabilities," Federal Emergency Management Agency, last updated February 7, 2018, https://www.fema.gov/core-capabilities.

[116] Source: "Mission Areas and Core Capabilities," Federal Emergency Management Agency, accessed September 2, 2018, https://www.fema.gov/media-library/assets/images/127427.

Figure 3. The THIRA Process[117]

Figure 3 is summarized by FEMA as:

> 1. Identify the Threats and Hazards of Concern. Based on a combination of experience, forecasting, subject matter expertise, and other available resources, identify a list of the threats and hazards of primary concern to the community.
>
> 2. Give the Threats and Hazards Context. Describe the threats and hazards of concern, showing how they may affect the community.
>
> 3. Establish Capability Targets. Assess each threat and hazard in context to develop a specific capability target for each core capability identified in the National Preparedness Goal. The capability target defines success for the capability.
>
> 4. Apply the Results. For each core capability, estimate the resources required to achieve the capability targets using community assets and mutual aid, while also considering preparedness activities, including mitigation opportunities.[118]

Part three of the THIRA process demonstrates the outputs-focused, methodological CBP approach: develop capability targets from the worst outcome of the scenarios of concern combined with the levels of performance established for each FEMA core capability. Figure 4 illustrates this process.

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[117] Source: Federal Emergency Management Agency, *Threat and Hazard Identification and Risk Assessment (THIRA)*, 2nd ed., 2.

[118] Federal Emergency Management Agency, 2nd ed., 2.

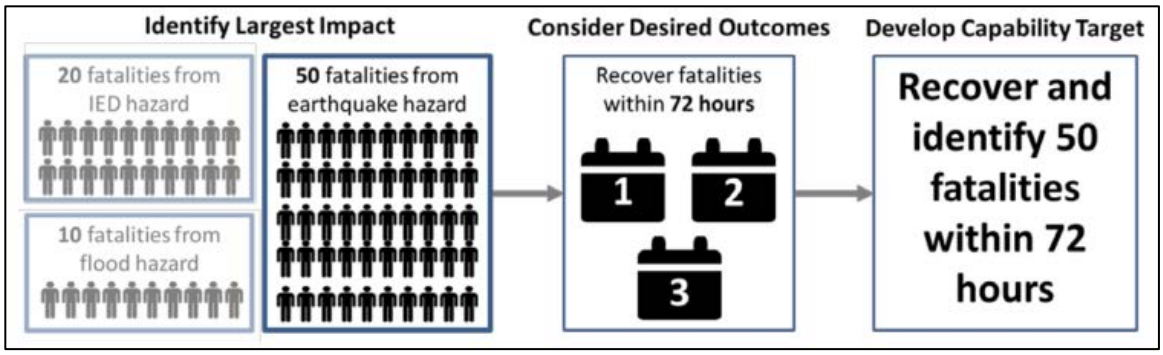

Figure 4. Example of Developing Capability Targets[119]

Step four of the THIRA was previously a multidisciplinary stakeholder process of identifying what NIMS-typed and non-typed (i.e., jurisdiction-specific) resources and personnel would be required to meet the capability target. While 2018 FEMA THIRA/SPR guidance has eliminated the original step four from updated guidance, the implicit goals of step four have been shifted to SPR step 2, "assess capability." In part two of the SPR process, jurisdictions indicate what the gap is between the established capability target and what they estimate the current capability to be. FEMA guidance then requires jurisdictions to identify what corrective actions to undertake to minimize the gap.

Table 1 provides a process-step comparison between the Davis DoD CBP process and the FEMA THIRA process maps. While the Davis CBP model does not have numerically identified "steps," elements that shared similar or related processes have been grouped together. The rightmost column assesses whether analogous or congruent practices from the CBP model can be identified within the THIRA process. Qualitative descriptors are applied that range from "very similar" to "similar" and finally to "no analogous step" and reflect levels of related, if not congruent, evaluative practices between DoD and FEMA approaches.

[119] Source: Federal Emergency Management Agency, 2nd ed., 13.

Table 1. Comparison of DoD CBP and FEMA THIRA Process Steps

Process Step	**Davis DoD CBP**	**FEMA THIRA**[120]	**THIRA's Analogous Tie to CBP process**
Step 1	Identify plausible worries	Identify threats and hazards of concern	Very similar
Step 2	Name-level scenarios/ develop design space	Give threats and hazards context	Very similar
Step 3	Develop goals/develop capability options	Establish capability targets	Very similar
Step 4	Assess options	Apply the results/Assess current capability	Similar
Step 5	Analytical assessment under uncertainty	Identify and mitigate gaps	No congruency
Step 6	Choose and develop needed capability options	Assess the impact of funds	No congruency

Table 1's analysis indicates that steps one through four of the THIRA have notable congruency with the process of the CBP objective for each step's centers of gravity. The FEMA THIRA process diverges from Davis' CBP framework at step five: conducting analytical assessments under uncertainty for a variety of capability options to achieve set outcomes.

B. APPLICATION WITHIN SPECIAL EVENT PLANNING

While the THIRA is intended to be a strategic planning process to inform jurisdictional homeland security preparedness, the following section argues that special events offer an analogous interdisciplinary planning environment to that of disaster planning where the THIRA can be applied.

In support of initial planning actions, planning guidance from federal agencies identifies options for consideration of interdisciplinary deliberative discussions. At the end of the planning cycle, the national doctrine provides a framework for summarizing operational and resource level definitions into a common command and control framework through the completion of an incident action plan, which is a series of standardized documents that form the foundation of the ICS.

[120] Federal Emergency Management Agency, 2nd ed., 2.

Functionally, special events contain planning and operational elements that occupy the spectrum of FEMA's five mission areas: prevention, protection, mitigation, response, and recovery.[121] For example, public messaging about hydrating for extreme heat outdoors equates to prevention activity, deploying garbage trucks as blocking vehicles equates to protection, alcohol sale-curtailment policies informed influenced by festival emergency medical services (EMS) contact numbers is mitigation, remotely-staged surge ambulances approximates response, and street sweepers and crowd control post-event are recovery. These assumptions and correlations are reasonable for mission areas related to actions supporting a notional 4th of July celebration. The scale and scope of the capabilities delivered in the context of a disaster in lieu of these approximations can vary greatly but are in both cases developed through a similar interagency planning process.

Special events require the deployment of personnel and resources performing missions analogous to many of FEMA's 32 core capabilities performed in a real-world environment. Medical tents, patient tracking systems, and surge ambulances at an event align with the public health, healthcare, and EMS core capability's definition, "Provide lifesaving medical treatment via emergency medical services," albeit at a smaller scale.[122] This alignment can provide opportunities to test plans and developed functions for a disaster within the context of a planned, real-world event.

The actions associated with special event and disaster-planning processes are also similar. FEMA's *Comprehensive Preparedness Guide 101* (CPG-101) defines emergency operations plans (EOPs) as the core foundational document from which tactical hazard- and function-based plans are constructed.[123] A core element of EOPs is the situational assessment, which is comprised of a threat and hazard assessment, a review of current

[121] "Mission Areas," Federal Emergency Management Agency, accessed September 2, 2018, http://www.fema.gov/mission-areas.

[122] Federal Emergency Management Agency, "Core Capabilities."

[123] Federal Emergency Management Agency, Developing and Maintaining Emergency Operations Plans, 1-1–1-7.

capability, and an overview of mitigation actions to reduce the identified risks.[124] Hazard-based plans are commonly constructed in a similar format: A situational assessment; risk assessment of the hazard; consequence analysis; capability review; roles and responsibilities in enacting the plan; current resources and other lines of support; and, implementation actions.[125] In addition to the aforementioned process, threat must be carefully considered.

Special events are also adversarial targets, which require jurisdictions to assess risk and determine steady-state public safety services and contingency plans in the event of an accident, attack, or other occurrence.[126] These contingency plans can be derived from existing hazard and function-based interagency plans, as well as departmental standard operating procedures and include both considerations for scalability and mutual aid.[127]

In general, disaster plans cover the full scope of a hazard- or threat-related incident, from notification to response, scaling-up of resources, coordinating with incident command posts and command centers, and recovery actions. In comparison, special event planning commonly begins around the parameters of an event, reviewing potential threats and hazards, assigning personnel and responses to mitigate risk, ascribing roles and responsibilities, establishing lines of command and coordination, and developing an incident-specific policy.[128]

Both disaster response and special event planning use the same NIMS framework. Within NIMS, the coordinating mechanism for structuring interagency planning is the incident action plan (IAP). The IAP "is a written plan that defines the incident

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[124] Federal Emergency Management Agency, "Developing and Maintaining Emergency Operations Plans," 3-1–3-2.

[125] Federal Emergency Management Agency, *Special Events Contingency Planning: Job Aids Manual* (Washington, DC: Department of Homeland Security, 2005), 2-1–2-5, https://training.fema.gov/emiweb/downloads/is15aspecialeventsplanning-jamanual.pdf.

[126] Christopher Bellavita, "Changing Homeland Security: A Strategic Logic of Special Event Security," *Homeland Security Affairs* 3, art. 1 (September 2007): 1–23, https://www.hsaj.org/articles/140.

[127] Bellavita, 1–23.

[128] Edward Connors, *Planning and Managing Security for Major Special Events: Guidelines for Law Enforcement* (Washington, DC: Department of Justice, Office of Community Oriented Policing Services, 2007), 100–101, https://www.hsdl.org/?view&did=482649.

objectives and reflects the tactics necessary to manage an incident during an operational period."[129] Arguably, the context of a disaster scenario can be substituted with that of a planned event. The important characteristic of developing an IAP for both a disaster and planned event is that it is a facilitated interagency planning process, which inherently requires collaboration.[130]

Planning for potential disasters and approaching special events does include differences in variables, specifically the types of participating partners and perceptions of necessity and urgency. Planning for a disaster is largely an abstract exercise compared with that undertaken for special events. For disasters, a risk assessment denotes a need to develop a response and recovery function, at a minimum, around a possible incident. Special event interagency planning, in contrast, attracts command staff and tactical staff, as well as leadership due to the high-visibility of produced events, the likelihood that incidents can occur, and the live media coverage often present. From these factors, a group-wide perceived incentive occurs "to get it right," which can be characterized as a felt-need to participate in reaching a solution, and the recognition of working towards a common goal with the involvement and support of leaders.[131] The components within this group incentive have been identified as success factors in positively affecting interagency collaboration.[132]

As previously discussed, both disaster and special event planning share many of the same planning objectives, frameworks, and stakeholders, and employ the same core capabilities sought in both planned and unplanned events, but differ only in scale. Special events differ from disaster planning in that processes contain higher-level stakeholders who can facilitate conflict resolution and ensure agency commitment. These stakeholders are focused on firm deadlines and difficult problems that provide intrinsic motivation for

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[129] Federal Emergency Management Agency, *FEMA Incident Action Planning Guide* (Washington, DC: Department of Homeland Security, 2012), 7, https://www.fema.gov/media-library/assets/documents/25028.

[130] Federal Emergency Management Agency, 20–21.

[131] Hocevar, Thomas, and Jansen, "Building Collaborative Capacity," 259–260.

[132] Hocevar, Thomas, and Jansen, 259–260.

resolution. In other words, special events may offer frequent opportunities to engage in more effective interagency collaboration in comparison to disaster planning.

In contrast, standardized FEMA approaches for assessing risk and needed resources do not exist. In the absence of a decision support system, planning participants can encounter sociological and organizational issues that can negatively impact planning outcomes. These issues include cognitive biases, a lack of full departmental commitment to the mission, and low-seniority stakeholders not escalating policy decisions to those in command.[133]

As this section has outlined, special event planning closely mirrors that of jurisdictional disaster planning: planning guidance, such as FEMA doctrinal guides and the ICS are frequently applied and scaled-down to fit the application environment.

C. APPLYING THE THIRA: A HYBRID FRAMEWORK

This section argues that a special event can occupy the mission-system analysis space in lieu of an entire jurisdiction within the FEMA THIRA process. Step one, or DoD's "plausible worries," is substituted with event-specific threats and hazards, such as a stage collapse, improvised explosive device attack, etc., in the same manner the FEMA THIRA is concerned with category five hurricane scenarios. This substitution is also represented in tables, and a selection from FEMA's 32 core capabilities (e.g., interdiction and disruption, mass care services, etc.) is adapted to reflect the operational goals of these capabilities within the context of a special event. From these examples, THIRA step three (establish capability targets) is simulated. This process yields capability targets specific to the event that demonstrate the THIRA can be effectively "scaled down" to provide outputs to support special event planning. This framework is established in a six-step sequence, analogous to both Davis' and FEMA's methodologies for CBP and THIRA. It further argues that the adaptions are based on process similarity between the two approaches in the context of special event planning doctrine.

[133] Kapucu and Garayev, "Collaborative Decision-Making," 371–375.

1. Step One: Assess Threats and Hazards

The THIRA has several inputs: threats and hazards; the consequences calculated from that list; the desired jurisdictional outcomes; and the simplified actions needed to reach those outcomes (core capabilities). A local group of stakeholders can first develop a scaled version of the national planning scenarios by using the DDRM methodology to identify and rank the significance of each type of event. Step one of the *FEMA CPG-201* document instructs state and local planners to "consult a number of sources to identify threats and hazards during the THIRA process."[134] The document provides a list of common sources of threat information available to local jurisdictions, such as data from natural hazard mitigation plans and urban area fusion centers. THIRA guidance also stresses the participation of the "whole community" in this process for threat and hazard selection, a term that includes not only those in public service but also includes critical infrastructure owners, as well as academic institutions.[135] Bringing a large, multidisciplinary group into a structured planning environment represents a challenge for facilitation. Strong opinions and biases may be present and reaching consensus on a set of selected threats and hazards can be difficult. The deliberative risk ranking methodology (DRRM), described within chapter two, can provide a structured basis for expedient group facilitation to accomplish this task.

Previously summarized in Chapter II, this section will expand further on the DRRM process. DRRM is a qualitative group consensus-reaching methodology well suited for local interagency collaborative environments, due to the focus on facilitated discussion. This facilitation is applied to overcome and address organizational and personal cognitive and judgmental biases in the perception of likelihood for a variety of risks by presenting threats and hazards as a function of their relative attributes, or consequences and frequency of occurrence.[136] The process is initially conducted by providing participants with threat

[134] Federal Emergency Management Agency, Threat and Hazard Identification and Risk Assessment (THIRA), 3rd ed., 6.

[135] Federal Emergency Management Agency, 3rd ed., 9–10.

[136] Lundberg and Willis, "Deliberative Risk Ranking to Inform Homeland Security Strategic Planning," 7–15.

and hazard briefing dossiers that allows for individual risk prioritization. A follow-on discussion provides a forum to review the aggregation of risk priorities and the DRRM proctor structures discussion around the reasoning used to determine why higher-prioritized threats have been scored as such and why others have been relegated to lower areas of concern. Following this discussion, individuals again re-prioritize threats and hazards of concern, the exercise is again aggregated, and the resulting group consensus is presented at the process conclusion. DRRM has been shown to demonstrate favorable decision transparency and studies of group participants have indicated significant levels of satisfaction with process outcomes.[137]

A notional example of this exercise is in Table 2, which demonstrates how scenarios can be scaled down from a list of jurisdictional-level events to events that can negatively impact a special event. The criteria for special event scenario selection utilize the heuristic defined within *CPG-201* that states that selections should overwhelm current capability or stress local public safety personnel and assets.[138]

Table 2. THIRA Step 1 Comparison

CBP/THIRA Step 1: Identify threats and hazards of concern	
Jurisdiction THIRA STEP 1[139]	**Special Event THIRA Step 1**
Category 3 Hurricane	Severe weather event
Hazmat-carrying train derailment	Vehicle ramming attack
Bridge collapse	Stage collapse
Complex coordinated terrorist attack (CCTA) with active shooter and vehicle-borne improvised explosive device (VBIED) attacks	CCTA with active shooter and VBIED attacks on assembled crowd of patrons
Civil unrest	Crowd stampede

[137] Lundberg, and Willis, 25.

[138] Federal Emergency Management Agency, Threat and Hazard Identification and Risk Assessment (THIRA), 3rd ed., 12–14.

[139] Federal Emergency Management Agency, 3rd ed., 12–14.

Complementing this established list from step one, planners then should map each core capability to the scenario that presents the greatest challenge to delivering that capability in a crisis.[140] For example, each of the listed scenarios generates fatalities but group deliberation can conclude that performing the fatality management core capability in the context of a stage collapse is the most difficult, given the potential need of removing structural debris first or stabilizing the scene. FEMA provides a notional mapping within *CPG-201*, which is followed by a notional example for a special event, as shown in Figure 5 and Table 3.

Community A identifies the threat or hazard that presents the **greatest challenge** to each core capability.

A single threat or hazard may most challenge **multiple** core capabilities

Earthquake	Cyber Attack	Flood	Active Shooter	Hazmat Release - Chemical
Presents the greatest challenge to:				
Operational Coordination	Intelligence and Information Sharing	Public Information and Warning	Interdiction and Disruption	Access Control and Identity Verification
Risk Mgmt. for Protection Programs and Activities	Forensics and Attribution	Planning	Screening, Search, and Detection	Physical Protective Measures
Risk and Disaster Resilience Assessment	Cybersecurity	Supply Chain Integrity and Security	Threats and Hazards Identification	Long-term Vulnerability Reduction
Critical Transportation		Community Resilience	On-scene Security, Protection, and Law Enforcement	Environmental Response/Health & Safety
Fatality Management Services		Logistics and Supply Chain Management		Public Health, Healthcare, and EMS
Fire Management and Suppression		Mass Care Services		Situational Assessment
Mass Search and Rescue Operations		Operational Communications		Health and Social Services
Infrastructure Systems		Economic Recovery		
Natural and Cultural Resources		Housing		

Figure 5. Core Capability to Scenario Mapping[141]

[140] Federal Emergency Management Agency, 3rd ed., 13.

[141] Source: Federal Emergency Management Agency, 3rd ed., 12–14.

Table 3. Core Capabilities to Scenario Mapping

CBP/THIRA Step 2b				
Severe weather event	**Vehicle ramming attack**	**Stage collapse**	**CCTA**	**Stampede**
Risk Management	On scene security and law enforcement	Critical Transportation	Community resilience	Public information and warning
Risk and disaster assessment	Infrastructur e systems	Fatality Management	Health and social services	Public Health, Healthcare and EMS
Cyber security	Physical protective measures	Mass search and Rescue	Long term vulnerability reduction	Health and Social Services,
Logistics and supply chain management	Access control and identity verification	Mass care services	Environmental health and safety	Planning
			Situational assessment	Natural and cultural resources
			Fire suppression	Housing
			Intelligence and Info Sharing	
			Threat and hazard identification	
			Screening search and detection	
			Interdiction and disruption	
			Operational coordination	
			Forensics and attribution	

This mapping of stressed core capabilities to each scenario is accomplished through interdisciplinary discussion and subject matter expert judgment, both predominantly qualitative processes that draw on tacit knowledge.

2. Step Two: Give the Threats and Hazards Context

For the second step of the THIRA process, the special event threats and hazards defined within step one are given context by creating detailed scenarios to arrive at standardized metrics for consequences, which can be applied from the THIRA

methodology, or defined by participants. An example of standardized metrics from the THIRA methodology follows in Table 4.

Table 4. Translating Jurisdictional Metrics to Special Events

CBP/THIRA Step 2a	
FEMA Standardized impact language[142]	**Special event Standardized impact language**
Number of fatalities	Number of fatalities
Number of people requiring medical care	Number of people requiring medical care
Number of people requiring rescue	Number of people requiring rescue
Number of people requiring evacuation	Number of people requiring evacuation
Number of structure fires	Number of fires within event footprint

In most cases, existing THIRA impact metrics can be carried over directly into the special event context, whereas some require adaptation. Davis argues that to identify basic capabilities and their associated metrics, planners must simplify each scenario to identify the generic operational challenges that make up each. An example of such simplification may be reducing the phrase "losing cell phone service due to a stampede where afterwards survivors overload circuits trying to reunify with loved ones" to "public safety loses cellular communication for voice and data."[143] Selecting a wide set of threat and hazard scenarios is necessary to ensure that all areas of capability, such as operational communications, are influenced by the calculated impacts from step two of the THIRA. Similarly, the process can work in reverse; by using the existing impact categories defined by FEMA, special event planners can work backward using cognitive modeling or simulation to identify the likely scenarios that can cause them. Davis's focus on comprehensive decomposition of scenarios to ensure they stress all capability areas is a primary departure from DoD scenario-specific planning due to the potential for only some

[142] Federal Emergency Management Agency, 3rd ed., 18.

[143] Davis, Analytic Architecture, 23–25.

of the capabilities to be stressed, while over-estimated conclusions are made about others.[144] FEMA THIRA guidance also recommends selecting threats and hazards that most stress each core capability. [145] Once a sufficiently large enough array of threats and hazards has been selected, constructed into detailed scenarios, scenarios modeled to yield consequences, and the scenarios decomposed into generic capabilities, target setting can occur.

3. Step Three: Construct Capability Targets

FEMA's 2018 THIRA guidance states that planning stakeholders then construct capability targets by using jurisdictional preference to determine both a timeframe metric and the specific amount of consequence that the jurisdiction believes should be addressed within it, if not the maximum consequence. An example of a FEMA-defined capability target for fatality management is:

> Within [# timeframe] of an incident, complete the recovery, identification, and mortuary services, including temporary storage services, for [# quantity] fatalities.[146]

By identifying a time frame metric and the level of consequence, the planning jurisdiction can set targets to build capability and capacity over time through investments in preparedness.[147] Setting performance targets in this way, absent scenario context, aligns with Davis's definition of CBP, which is a planning process focused on desired outcomes and how best to achieve them.[148] FEMA recommends to planners that targets should reflect a community's unique planning and investment strategies, which connects planning for future capacity to a local economic framework that requires balancing levels of risk against

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[144] Davis, 23–25.

[145] Federal Emergency Management Agency, Threat and Hazard Identification and Risk Assessment (THIRA), 3rd ed., 12.

[146] This example is drawn from FEMA's 2018 THIRA uniform reporting tool (URT).

[147] Federal Emergency Management Agency, Threat and Hazard Identification and Risk Assessment (THIRA), 3rd ed., 7-9.

[148] The Technical Cooperation Program, *TTCP Technical Report*, 2.

tradeoffs.[149] These tradeoffs are also not entirely influenced monetarily, as Davis states that a logical order exists to how even generic tasks unfold and sequence with one another that can allow for timeframe metrics to be extrapolated.[150] In the context of a terrorist attack, fatality management cannot begin until the scene is secured by law enforcement. Similarly, specific capabilities have best practices in terms of speed or rate of performance, irrespective of the context in which they must be performed, such as the Public Alert and Warning core capability, which focuses on the ability to disseminate timely and actionable emergency information to the public.[151] In applying these capability relationships, a special event capability target for Public Alert and Warning can be notionally constructed as:

> Within [15 minutes] notice of an incident, deliver reliable and actionable information to [95%] of people affected.

Through substitution of incident context, the capability target can be applicable to a notice-event, like an encroaching lighting storm or describe a goal for messaging speed following a stage collapse. To complete step three, all special event core capability targets should be adapted from the FEMA methodology to the mass gathering planning process.

4. Step Four: Assess Options/Assess Capability

FEMA's THIRA step four determines a jurisdiction's current level of performance respective to each core capability target. In this process, the objective is to obtain the baseline level of performance for each core capability to support a later gap analysis.[152] Davis states that each core capability should be assessed independent of others, or measured within its own domain, despite the tendency of similar core capabilities to have natural overlaps.[153] For Davis, this constraint is meant to encourage robust capabilities that can operate with a degree of independence or in a self-sustaining manner. Enlisting an

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[149] Federal Emergency Management Agency, Threat and Hazard Identification and Risk Assessment (THIRA), 3rd ed., 22.

[150] Davis, Analytic Architecture, 51.

[151] Federal Emergency Management Agency, "Core Capabilities."

[152] Federal Emergency Management Agency, Threat and Hazard Identification and Risk Assessment (THIRA), 3rd ed., 23–28.

[153] Davis, Analytic Architecture, 37.

example, he notionally describes the full capability of a joint-strike fighter as being a function of the aircraft but also its ground support-team, refueling ability, and joint operations planning, training, and exercising.[154] Through this example, Davis defines the term capability envelope, or the specific combination of equipment, personnel, training, exercising, and planning required to accomplish a specific task within a set time frame. This capability composition is analogous to FEMA's planning, organization, equipment, training, exercises (POETE) elements, which describe the five areas of activity through which a capability can be developed: planning, organizing, equipping, training, and exercising.[155] Applied to the context of the previously defined capability target, the assessment framework becomes:

> What combination of equipment, planning, training, exercising and organizing will allow the jurisdiction to deliver actionable information to 95% of the people affected within 15 minutes?

In some cases, capability envelopes may already exist: joint hazard assessment teams (JHATs) and EMS taskforces for special events typically include members from different disciplines, operate under joint concept of operations (CONOPS), have logistics and supply chains, and have specialized command and control elements.[156] Additionally, these capability envelopes can be assessed by simplistic metrics, such as the average perimeter that can be patrolled effectively by one JHAT or the number of crowd extractions an EMS task force can make in a period of time, on average. Acknowledging that jurisdictions may not readily have a catalog of assets or an understanding of interdependencies, initial capability envelopes are inherently constructed by conducting the capability target assessment framework. Despite this simplification, it is possible that performance measurement can only fully be possible over time as real-world events are benchmarked. Davis provides syntax for this process stating, "Who does what, in pursuit

[154] Davis, 10–11.

[155] Federal Emergency Management Agency, Threat and Hazard Identification and Risk Assessment (THIRA), 3rd ed., 6.

[156] Dan Kaszeta, *CBRN and Hazmat Incidents At Major Public Events* (Hoboken: John Wiley & Sons, 2013), 29–37, doi: 10.1002/9781118529713.

of what goals, according to what concept, using what assets?"[157] Understanding the estimated metrics of performance and the assets, people, planning, and equipment comprising each capability envelope is necessary for operating effectively within budgetary constraints.[158]

5. Step Five: Choose Options

All protection and contingency planning for mass gatherings occurs within an economic framework that inherently requires assessing resource tradeoffs. Local budgets, grant funds, and event producer fees naturally determine a ceiling for the level of assets and personnel that can support a mass gathering, despite the level of assessed risk. With the focus of CBP on outputs, not asset inventories (inputs), the ability to assess potential tradeoffs can be enhanced. Participants with capability envelopes can instead seek more cost-effective types of capability enablers through lower hourly rate personnel or rented equipment alternatives, rather than negating the use of that capability due to cost limitations. Once tradeoffs are identified, all capability options can be documented in a single interagency plan or through an ICS IAP.[159]

6. Step Six: Apply the Results and Measurement

In this final step, local stakeholders determine initial metrics of performance that can be assessed during the mass gathering, specific to each type of capability being delivered. Collecting performance and effectiveness data for novel and annual events establishes a foundation for quantitative after-action reviews to inform future planning.

D. CONCLUSION

This chapter assessed the similarity between Paul K. Davis's CBP framework and FEMA's THIRA methodology and found congruence, as well as options for THIRA improvement at the local level. Next, special event planning processes and interagency

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[157] Davis, Analytic Architecture, 52.

[158] Davis, 28–37.

[159] Federal Emergency Management Agency, *FEMA Incident Action Planning Guide*.

dynamics were explored as a scale model for approximating jurisdiction-wide disaster planning. A THIRA special event planning framework was established containing the following steps: assess threats and risks; give them context; construct capability targets; assess options and capability; choose options; and apply the results and measurement. The next chapter constructs and explores several potential implementation scenarios for this framework by using assessment criteria identified from CBP local government implementation literature.

IV. DESIGN OF POLICY OPTIONS FOR THIRA ENHANCEMENT

This chapter describes the method of research used in this thesis, details identified policy options, and establishes the evaluation criteria to be applied in Chapter V.

A. OVERVIEW AND BOUNDARIES OF INQUIRY

Policy options analysis is the method of research applied in this section, specifically the approach developed by Eugene Bardach in *A Practical Guide to Policy Analysis: The Eightfold Path to More Effective Problem Solving*. The eight-part process consists of the following steps: define the problem; construct alternate solutions; select criteria for judging success; project outcomes; analyze trade-offs; evaluate options; select an option; and explain the best outcome.[160]

The THIRA, as a mechanism of implementing PPD-8, is intended to define required levels of capability to constitute an appropriate degree of national preparedness.[161] The focus of this research effort is to explore how this widely adopted approach can be augmented to provide more tactical, situation-specific preparedness insight to local jurisdictions, by applying it to special event planning.

B. POLICY OPTIONS AND CRITERIA FOR ASSESSMENT

Three policy options are presented to examine approaches to integrating the proposed THIRA framework into a special event multidisciplinary planning processes. These policy options represent enhancements to the THIRA process to inculcate CBP further into normal, frequent, and stakeholder-accessible planning methodologies. The options are listed and briefly summarized in this section before assessment criteria are identified.

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[160] Eugene Bardach and Eric M. Patashnik, *A Practical Guide for Policy Analysis*, 5th ed. (Washington, DC: SAGE Publications, 2016), xv–xvi.

[161] Department of Homeland Security, *Presidential Policy Directive/PPD-8: National Preparedness*, Presidential Policy Directive-8 (Washington, DC: Department of Homeland Security, 2011), https://www.dhs.gov/presidential-policy-directive-8-national-preparedness.

- Policy Option A: Do not integrate the THIRA CBP framework within a special event planning process at the local level; maintain the status quo.
- Policy Option B: Integrate the THIRA CBP framework within a special event planning process at the local level.
- Policy Option C: Integrate the THIRA CBP framework within a NSSE.

These policy options are described in detail and potential outcomes explored within the following section.

- Policy Option A: Do not integrate the THIRA CBP framework within a special event planning process at the local level; maintain the status quo.

This policy option reflects no incorporation of the THIRA into special event planning. It assumes a locally planned special event for a notional 4th of July celebration with a pre-planning window of 90 days.[162]

- Policy Option B: Integrate the THIRA CBP framework within a special event planning process at the local level.

In this policy option, the THIRA is scaled down for use in special event planning to support initial event scoping, including threat and hazard assessment and resource estimation within the context of a local government effort. For the purposes of this policy option, a notional outdoor 4th of July festival of 250,000 attendees with a Level 2 DHS special event assessment rating (SEAR) is used as the evaluative scenario construct.[163] A SEAR 2 rated event is selected for this policy option because the rating denotes a large-scale mass gathering that requires substantial security and contingency planning. A level 2 SEAR rating represents an event that DHS has concluded has major significance, notable

[162] This time frame is an annual best practice for the City of Philadelphia and is drawn from the author's experience.

[163] The DHS SEAR methodology ranks special events based on a non-public assessment process that considers the number and concentration of attendees, venue type, duration, dignitary attendance, perimeter security, weapon screening, associated cause or symbolism, etc. SEAR rating outputs range from 5 (Ex. minor league baseball games) to 1, the highest (Ex. Super Bowl.)

national or international relevance, and requires some level of federal support.[164] Examples of other SEAR 2 rated events include the Boston Marathon, Kentucky Derby, and Washington, DC's 4th of July celebrations.[165] Under a SEAR 2 rating, the event remains locally managed and planning participants include public safety, security, and administrative stakeholders commonly found in smaller-scale local event planning.[166]

- Policy Option C: Integrate the THIRA CBP framework within a NSSE.

This option presents THIRA integration into the planning framework of a NSSE. NSSE's are defined under Presidential Decision Directive 62 as "a designated event that, due to its political, economic, social, or religious significance, may be the target of domestic/international criminal activity (terrorism) as a result of national significance and high visibility, requiring the lead of Secret Service."[167] NSSEs are less frequent than local government-managed occurrences but include large events, such as the Presidential Inauguration, political conventions, and some dignitary visits. A local government can request a NSSE designation once gubernatorial approval is secured, and the Secretary of Homeland Security makes the final determination. Once designated a NSSE by the Secretary, the Secret Service is assigned as the protection and planning lead, the Federal Bureau of Investigation (FBI) is assigned to counterterrorism planning, and FEMA leads contingency planning. It is important to note that during a NSSE, the local government plays a supporting role to the lead federal departments, who establish planning criteria, event security performance levels, and other desired outcomes. The NSSE framework is comprised of federal, state, and local stakeholders engaged in planning across many functional subcommittees, which address topics, such as venue protection and

[164] Bay Area Urban Area Security Initiative, *Bay Area Large Special Events Planning Guide and CONOPS Template* (San Francisco: Bay Area UASI, 2016), 3–3, http://www.bayareauasi.org/sites/default/files/resources/NEW%20COVER%20-%20Bay%20Area%20Large%20Special%20Event%20Planning%20Guide%20and%20CONOPS%20Template_Final.pdf

[165] Bay Area Urban Area Security Initiative, *Bay Area Large Special Events Planning Guide and CONOPS Template*, 3-3–3-7.

[166] Federal Emergency Management Agency, S*pecial Events Contingency Planning*, 1-2–1-4.

[167] "Protection," Secret Service, accessed October 23, 2018, https://www.secretservice.gov/protection/.

transportation.[168] FEMA chairs planning efforts across several subcommittee topic areas including mass care, health and medical, and life safety that typically culminate in subcommittee CONOPS and IAPs for the event. This policy option examines the THIRA framework applied to the FEMA-led NSSE subcommittee planning process.

C. SELECTION OF EVALUATION METRICS

This section outlines the criteria used to assess the performance of each policy option, which have been drawn from CBP implementation literature and best practices for emergency management collaboration. Again, this thesis explores how inculcating elements of the THIRA into more frequent, locally focused special event planning activities can contribute to familiarity with CBP principles and subsequently greater use of the methodology.

Chapter III explored the analogous doctrinal, procedural, and interdisciplinary stakeholder engagement elements of activity shared between planning for disasters and planning for mass gatherings. This exploration identified that conducting a THIRA CBP sequence can replace a traditional hazard-specific or all-hazard planning and mitigation sequence, which is conducted with interdisciplinary stakeholders. The chapter concluded with an adapted THIRA CBP framework drawn from FEMA's focus on jurisdictional risk and preparedness evaluation, then scaled down to inform special event risk assessment and resourcing decision support. However, initial adoption and implementation of CBP by local jurisdictions relies on a variety of factors beyond methodological validation or planning process congruencies.

- **Top leader participation:** Sharon Caudle asserts that senior level leadership participation is necessary for successful CBP implementation both through ownership of the jurisdiction's CBP process and conducting executive-level decisions around which capability options should be developed based on mission-system analysis.[169] This decision-making

[168] Connors, Planning and Managing Security, xvi.

[169] Caudle, "Homeland Security and Capabilities-Based Planning," 47.

function still inherently relies on imperfect analytical tools, but Paul Davis states that the assessment of CBP outputs "'should combine hard analysis with judgment and with qualitative, value-laden tradeoffs across goals—matters that are in the province of top decision makers."[170] In the context of local special event planning, top leader participation is defined as the direct engagement of executive-level public safety agency commanders, office and agency directors, and senior appointed executive branch officials in the CBP process. The length and frequency of CBP process engagement by top leadership is assessed by each policy option's average event planning time horizon and common vertical reporting process. The metric assessment's ordinal values include "low participation," "medium participation," and "high participation."

- **Time for collaboration:** Hocevar identified that interagency planning participants who possessed shared goals or objectives that operate within established frameworks positively contribute to collaboration.[171] The TCP "Guide to Capabilities Based Planning" highlights that a top, initial requirement for CBP implementation is interagency collaboration, since each organization independently possesses the existing information, assets, staff, and authorities necessary for CBP.[172] Further, Canada's Centre for Security Science concludes that CBP is best practiced locally when key stakeholders work collaboratively on a discrete mission or objective with well-defined lines of authority.[173] Despite a jurisdiction's developed planning efficiencies, the novelty of applying a divergent CBP planning framework is initially less time-efficient than current methods. The Centre for Security Science concludes that the enhanced collaboration required by CBP comes with notable transactional costs, primarily

[170] Davis, Analytic Architecture, xxiii.

[171] Hocevar, Thomas, and Jansen, "Building Collaborative Capacity," 74–79.

[172] Caudle, "Homeland Security and Capabilities-Based Planning," 47–48.

[173] Hales and Chouinard, Implementing Capability Based Planning, 41.

stakeholder participation time.[174] Considering this temporal cost to collaboration for CBP, this metric assesses each policy option's common planning time horizons by the ratings, "six or more months," "three to six months," and "less than three months."

- **Partitioning:** Another requirement for successful CBP implementation is full-mission scope coverage, defined within a domestic context as a CBP process inclusive of all required capabilities across the protection, prevention, mitigation, response, and recovery FEMA missions.[175] Davis clarifies that decompositions of threat and hazard scenarios should be inclusive of every unique operational challenge that may emerge to ensure comprehensive planning. Further, this decomposition should group similar elements together that contribute to the delivery of a capability within a capability envelope.[176] Also referred to as partitioning, this grouping together of similar assets, personnel, and vehicles within a mission-system analysis allows for capability options and tradeoffs to be synthesized and assessed based on desired outcomes.[177] This metric evaluates the policy option for opportunities within existing local and NSSE planning frameworks for similar or mission-aligned organizations to conduct mission-system analysis in functional or topical groups. This metric's ordinal values are "high partitioning opportunities," "moderate partitioning opportunities," and "low partitioning opportunities."

- **Integrating a CBP champion:** Paul Davis' monograph on a DoD CBP analytical architecture envisioned the end user of the process as a combatant commander, but no singular analog exists for local government's public safety and emergency organizations. This scenario

[174] Hales and Chouinard, Implementing Capability Based Planning, 10.

[175] Caudle, "Homeland Security and Capabilities-Based Planning," 71–72.

[176] Davis, Analytic Architecture, 24–26.

[177] Hales and Chouinard, Implementing Capability Based Planning, 15–18.

complicates identifying a key decision maker or process leader for CBP at the local government level.[178] CBP also employs variants of exploratory analysis, a divergent and holistic process of problem-structuring, and critical thinking for which the Center for Security Science recommends a form of orientation, or eased entry for new participants. This process mediation requires a champion to adapt CBP approaches to fit local expectations and existing analytical capacity. Literature also suggests that the champion be proficient in large group facilitation.[179] This metric examines the existing special event planning frameworks in each policy option for opportunities to integrate a CBP champion. This metric's ordinal values are "high integration opportunities," "moderate integration opportunities," and "no integration opportunities."

These criteria are used to evaluate the three policy options considered by this thesis, which are detailed within the following chapter.

[178] Hales and Chouinard, Implementing Capability Based Planning, 4–6.

[179] Hales and Chouinard, 10.

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V. POLICY OPTIONS ANALYSIS AND OUTCOMES

This chapter applies the previously established evaluation criteria to each policy option along with justifications for the qualitative measure assigned. The chapter concludes with an evaluation matrix and the policy option identified for implementation consideration.

A. EVALUATION OF POLICY OPTIONS

- Policy Option A: Do not integrate the THIRA CBP framework within a special event planning process at the local level; maintain the status quo.

Summary: This policy option reflects no incorporation of the THIRA into special events planning. It assumes a locally planned special event for a notional 4th of July celebration with a pre-planning window of 90 days.

Top leader participation: Since this policy option does not integrate the THIRA into special event planning, frequent top leader participation is not essential to any CBP process being initially implemented. Therefore, the metric assigned is "low participation."

Time for collaboration: Since the notional special event has been defined with a pre-planning time horizon of 90 days, the metric value assigned is "three to six months."

Partitioning: Contingency planning for a special event inherently includes some forms of partitioning, such as the formation of a public safety planning subcommittee to allow for more detailed plans to be developed with a more-specialized group of participants.[180] Since this policy option does not seek to implement a CBP process that explicitly calls for full mission-scope portioning for all capabilities, full core capability partitioning planning with interdisciplinary stakeholders will likely not self-initialize. Therefore, the metric value "low partitioning opportunities" has been selected.

CBP champion: As this scenario does not attempt to implement a CBP process, the metric value assigned is "low integration opportunities" for a CBP champion.

[180] Federal Emergency Management Agency, S*pecial Events Contingency Planning,* 1-2–1-3.

- Policy Option B: Integrate the THIRA CBP framework within a special event planning process at the local level.

Summary: In this policy option, the THIRA is scaled down for use in special event planning for a notional outdoor 4th of July festival of 250,000 attendees with a Level 2 DHS SEAR, which indicates an event requiring some level of federal support but planned and executed by a local government.

Top leader participation: FEMA's *Special Events Contingency Planning Job Aids Manual* recommends that local jurisdictions adopt the ICS and NIMS as planning and organizational frameworks when planning for a special event.[181] Within NIMS, the final product of interdisciplinary planning is an IAP.[182] The process outlined by FEMA is revised for each new operation period as incident information changes over time and the planning unit within the ICS structure leads this iterative process.[183] Each planning process involves the participation of interdisciplinary stakeholders, but IAP development and planning guidance do not indicate where political or senior leadership is engaged in the process. Within the *National Response Framework* and ICS guidance, leadership interface with ICS planning structures is a vertical reporting relationship between officials and the jurisdiction's emergency manager.[184] Edward Conors, author of *Planning and Managing Security for Major Special Events,* recommends that law enforcement form an executive leadership committee to allow for tactical planning to occur at lower levels and that the committee holds final decision-making authority.[185] However, this guidance does not provide a best practice on how frequently an executive leadership committee should convene. While locally managed special event planning frameworks indicate the need for

[181] Federal Emergency Management Agency, 3.

[182] Federal Emergency Management Agency, 3–3.

[183] Federal Emergency Management Agency, 13–18.

[184] Federal Emergency Management Agency, *FEMA Incident Action Planning Guide* (Washington, DC: Department of Homeland Security, 2012), 5–8, https://www.fema.gov/media-library-data/20130726-1822-25045-1815/incident_action_planning_guide_1_26_2012.pdf.

[185] Connors, Planning and Managing Security, vii.

senior level interaction, they do not provide further details on how to structure those interactions, and therefore, the metric value assigned is “medium participation.”

Time for collaboration: Planning horizons for a notional, annual 4th of July celebration in a local government setting range from 120 to 90 days.[186] Therefore, the metric value assigned is “three to six months.”

Partitioning: FEMA special event guidance recommends conducting tactical planning meetings with interdisciplinary stakeholders, which indicates that the operations branch within the ICS framework determines tactics.[187] However, law enforcement special event planning guidance indicates that functional subcommittees should be formed based upon the scale and perceived threat level of the event.[188] While the implementation of this guidance varies from one jurisdiction to another, the guide recommends that subcommittees should contain specialized units and tactical teams that conduct more sensitive planning in parallel. Additionally, the Department of Health and Human Services recommends conducting medical triage and treatment planning through functional subcommittees for a range of events, from inaugurations to 4th of July celebrations.[189] While FEMA and other federal special event guidance do recommend partitioning activities, these recommendations come specific to the disciplines that the federal agencies represent, and do not constitute a holistic partitioning of all core capabilities. Additionally, a local government planning for a SEAR 2 event must request that these federal agencies provide this special event planning guidance and support. Thus, engagement of federal resources and support for additional partitioning planning processes is left to local government preference. Therefore, the metric value assigned is, “moderate partitioning opportunities.”

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[186] Drawn from the author’s experience managing dozens of large-scale events.

[187] Federal Emergency Management Agency, *FEMA Incident Action Planning Guide*, 24–30.

[188] Connors, Planning and Managing Security, 61.

[189] “Healthcare Coalition Involvement in Mass Gatherings,” 20, ASPR TRACIE, accessed November 11, 2018, https://www.jointcommission.org/assets/1/6/aspr-tracie-hcc-webinar-2-mass-gatherings.pdf.

CBP champion: FEMA special event planning frameworks encourage engaging all stakeholders when conducting contingency planning.[190] Since the problem statement of this thesis identified low-adoption of the THIRA and other forms of CBP in local government, the policy option assumes a local CBP champion does not likely exist within local government. However, under a SEAR 2 event designation, a local jurisdiction can request federal support for planning or event operations. Since a local government can request FEMA support for applying CBP to mass-gathering contingency planning, the metric value assigned is "moderate integration opportunities."

- Policy Option C: Integrate the THIRA CBP framework within a NSSE.

Summary: This option presents THIRA integration into the planning framework of a NSSE, which is defined as "a designated event that, due to its political, economic, social, or religious significance, may be the target of domestic/international criminal activity (terrorism) as a result of national significance and high visibility, requiring the lead of Secret Service."[191] Under a NSSE designation, the Secret Service is assigned as protection and planning lead, the FBI is assigned to counterterrorism planning, and FEMA leads contingency planning. Overall authority for the event is placed under the Secret Service and local government plays a supporting role.[192]

Top leader participation—The Secret Service utilizes an executive steering committee (ESC) and topical subcommittee-planning framework for NSSEs.[193] The Secret Service ESC is comprised of high-level officials from all levels of government; safety and security disciplines are considered; this body approves and guides operational planning development throughout the planning process.[194] Given this continued engagement and decision-making authority assigned to the NSSE ESC, the metric value assigned for top leader engagement is "high participation."

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[190] Federal Emergency Management Agency, S*pecial Events Contingency Planning*, 1-2–1-5.

[191] Secret Service, "Protection."

[192] Reese, National Special Security Events, 2.

[193] Connors, Planning and Managing Security for Major Special Events, 13.

[194] Connors, 13.

Time for collaboration: Law enforcement NSSE planning guidance recommends that planning begin 12–18 months ahead of the event. Other federal departments, like those supporting medical care, recommend emergency medical support planning begin nine to six months prior to a major event or NSSE.[195] Therefore, the metric value assigned is, "six or more months."

Partitioning: The Secret Service NSSE planning framework includes, on average, 20 functional planning subcommittees ranging from dignitary protection, transportation, airspace security, consequence management, to critical infrastructure.[196] These groups can be comprised of federal, state, and local government representatives and be expanded to include private sector stakeholders.[197] NSSEs also require substantial local resources that often necessitate engaging other jurisdictions through mutual aid agreements, and peer organizations must plan how to integrate those varied types of assets.[198] Based upon the large amount of discipline-specific and functional planning groups comprised of stakeholders from all levels of government, the metric value assigned is "high partitioning opportunities."

CBP champion: FEMA chairs several planning subcommittees within a NSSE framework including fire life safety HAZMAT (FLSH) and consequence management.[199] Since FEMA assumes a leadership role of several committees that engage federal, state, and local government stakeholders, FEMA's strategic position allows the opportunity to engage subject matter experts in CBP to assist with interagency planning. Due to this FEMA leadership role within a NSSE planning construct, the metric value assigned is "high integration opportunities" for a CBP champion.

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[195] The Joint Commission, *Healthcare Coalition Involvement in Mass Gatherings* (Oak Brook, IL: The Joint Commission, 2016), 18, https://www.jointcommission.org/assets/1/6/aspr-tracie-hcc-webinar-2-mass-gatherings.pdf.

[196] Connors, Planning and Managing Security for Major Special Events, vii.

[197] The Joint Commission, Healthcare Coalition Involvement in Mass Gatherings, 19–29.

[198] "Anatomy of a National Special Security Event," Domestic Preparedness, June 7, 2017, https://www.domesticpreparedness.com/preparedness/anatomy-of-a-national-special-security-event/.

[199] Federal Emergency Management Agency, *FEMA Presidential Transition Records* (Washington, DC: Department of Homeland Security, n.d.), 68–70, accessed November 12, 2018, https://www.dhs.gov/sites/default/files/publications/FEMA%20Presidential%20Transition%20Records%201%20of%203.pdf.

B. POLICY EVALUATION MATRIX AND OPTION SELECTION

Table 5 summarizes the output of the proceeding policy options analysis using the previously defined criteria.

Table 5. Policy Options Evaluation Matrix

	Top leader participation	**Time to collaborate**	**Partitioning opportunities**	**CBP champion integration opportunities**
Policy Option A: Do not integrate the THIRA CBP framework within a special event planning process at the local level; maintain the status quo	Low	3–6 months	Low	Low
Policy Option B: Integrate the THIRA CBP framework within a special event planning process at the local level	Moderate	3–6 months	Moderate	Moderate
Policy Option C: Integrate the THIRA CBP framework within a National Special Security Event planning process (NSSE)	High	Greater than six months	High	High

The metrics selected to evaluate the proposed policy options are drawn from literature examining the best practices for CBP implementation and collaboration-enabling factors within emergency management planning. Section C of the previous chapter defined these metrics and indicated that high degrees of top leader participation, substantial time for interagency collaboration on a specific mission, opportunities to partition all the required core capabilities for a mission and integrating a CBP champion have positive effects on successfully implementing CBP. Therefore, as all metric rating values seek to be maximized in this evaluative schema to achieve successful CBP implementation, the assigned metric values are represented in Table 6 with a stoplight color scheme. Red shading indicates the lowest value of the respective metric, yellow represents the median metric value, and green denotes the maximum metric value. To compliment this color-

coding, numerical scores (1–lowest metric value, 2–median metric value, 3–greatest metric value) have been assigned to each metric's three potential ordinal rankings. These numerical rankings are indicated within parentheses in each table cell. A summation column can be found to the right of the Table 6.

Table 6. Policy Option Evaluation Matrix with Stoplight and Numerical Coding

	Top leader participation	**Time to collaborate**	**Partitioning opportunities**	**CBP champion integration opportunities**	**Score**
Policy Option A: Do not integrate the THIRA CBP framework within a special event planning process at the local level; maintain the status quo	Low (1)	3-6 months (2)	Low (1)	Low (1)	**4**
Policy Option B: Integrate the THIRA CBP framework within a special event planning process at the local level	Moderate (2)	3-6 months (2)	Moderate (2)	Moderate (2)	**8**
Policy Option C: Integrate the THIRA CBP framework within a national special security event planning process (NSSE)	High (3)	Greater than six months (3)	High (3)	High (3)	**12**

From the analysis and evaluation tables, option three, integrate the THIRA into a NSSE planning process, is the most desirable policy option. The following chapter further discusses these findings, methods of potential implementation, and options for further research.

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VI. CONCLUSION

This thesis has explored how to inculcate CBP concepts at the local level by applying a modified THIRA planning process to mass-gathering contingency planning. Since DHS CBP implementation at the disaster planning level has not been optimal, practicing it in a lower-order but analogous environment, such as a mass gathering (special event) planning can allow for the adoption of mission-system analysis concepts at the local level.

A. SUMMARY

When planning for disaster preparedness at the local level, local officials must make risk-informed judgments about what level of capability is needed to defend against known threats and hazards and how to remain adaptable to address the unforeseen. However, risk assessment tools are imperfect and sometimes not available. PPD-8 and the THIRA process have sought to change this situation through the application of a variant of the military CBP to the homeland security enterprise, but implementation has been difficult. CBP is a method of system analysis that focuses on identifying and assessing the necessary elements required for a specific outcome under user-defined metrics of performance.[200] Differing from military planning environments, local government efforts are complicated by a gap in analysis competency and local resources and assets are diffused among many organizations. This complication has proven to be an obstacle to the full adoption of CBP across governmental jurisdictions. Like criticism that DoD's implementation of CBP initially suffered from lack of a common analytical schema, FEMA's implementation suffers from lack of an adaptability schema to account for variations in levels of governance across the United States. This insufficiency has resulted in a reluctance to apply top-down national capability assessment frameworks.

Synthesizing best practices from federal-level CBP efforts and effective collaboration approaches from emergency management, an adapted THIRA framework

[200] Hales and Chouinard, Implementing Capability Based Planning, 1.

was developed. The THIRA special event framework and special event planning processes were explored for points of congruency in jurisdictional disaster planning. This exploration concluded that the THIRA framework could function as a substitute process in lieu of the standard NIMS linear planning framework for a mass gathering. The framework was then evaluated via three policy options: taking no action, applying the framework to local events, and applying the framework to a NSSE. These options were simulated through three scenarios of the THIRA CBP planning application. The outcomes were assessed by opportunities for top-leader participation, time for agencies to collaborate, opportunities for partitioning, and opportunities to integrate a CBP champion. This policy-options analysis has indicated that incorporating the THIRA into FEMA contingency planning functional subcommittees for NSSEs is a potential way to foster the adoption of CBP at the local level.

NSSE's are high-interest events that require managing large budgets, conducting substantial interagency planning, and specifying the need for large amounts of local equipment and security apparatus. NSSE planning timeframes typically operate in the 6–12-month range and draw notable media attention, both before and during the event. Additionally, the current NSSE planning framework is comprised of functional subcommittees that address specific categories of tasks, which mirror the CBP approach of decomposing scenarios into unique operational challenges and then into discrete envelopes of capability.

While NSSEs provide a notable set of enabling factors for implementing CBP for real-world events, they occur very infrequently and impact only a limited set of cities and states a year.[201] NSSEs for political conventions shift from city to city, which means that local governments may practice CBP once for a NSSE and then lack the component incentives or enabling factors to continue using CBP. As Chapter II noted, emergency planning systems not inculcated into daily or frequent activities through decision support tools does yield diminishing results in a crisis.

[201] Reese, National Special Security Events, 19–29.

It is also likely that full adoption of CBP is not possible given the variation and diffusion of government organizations at the federal, state, local, tribal, and territorial level, which contrasts with the (slightly) less complex military organizations within the DoD. This observed variation does not suggest that CBP adoption for the HSE should be discontinued. Davis notes that modern military planning has had decades and large conflicts to iterate and test planning approaches, whereas the HSE's experience with CBP began in 2004.[202] Despite the lack of frequency in applying the THIRA CBP framework to a NSSE, it may represent an opportunity for FEMA to study CBP application in a real-world disaster-analogous setting.

B. IMPLEMENTATION

Considering the variety of interdisciplinary stakeholders, applying the THIRA framework as a decision support tool for a special event should be limited to occurrences that are larger in scale and represent a notable degree of planning complexity. While integration into a NSSE is assessed to be favorable, implementation at the local level should still be explored. The DHS SEAR can provide a prompt for when the THIRA may add value.[203]

As part of an annual data call by DHS, states and UASIs submit special events that have an estimated attendance of greater than 20,000 participants.[204] Events are submitted in a database format with characteristics of each mass gathering broken down into common criteria and entered into specific fields to support risk analysis. Data requested by DHS include the participation of dignitaries, number of persons anticipated to attend, whether the event is enclosed within a perimeter or open to all persons, whether the event venue has iconic significance, etc. DHS uses a proprietary numerical evaluation of the submitted

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[202] Caudle, "Homeland Security and Capabilities-Based Planning," 19–26.

[203] G. B. Jones, "Towards a Strategic Approach to Special Events Management in the Post-9/11 World" (master's thesis, Naval Postgraduate School, 2005), 64–65.

[204] Bay Area Urban Areas Security Initiative, *Bay Area Large Special Events Planning Guide and CONOPS Template* (San Francisco: Bay Area UASI, 2016), 3–3, http://www.bayareauasi.org/sites/default/files/resources/NEW%20COVER%20-%20Bay%20Area%20Large%20Special%20Event%20Planning%20Guide%20and%20CONOPS%20Template_Final.pdf

data to provide a ranking score from five (lowest) to one (highest below a national special security event designation.) Federal partners use the SEAR rankings assigned to events to determine the level of involvement and resources that should be committed to assist state and local jurisdictions.[205] For example, a large open-air holiday festival with an expected attendance of 500,000 people throughout the duration of the event is typically scored by DHS to be a SEAR 2. With prior FEMA approval, SEAR 1–3 events allow the utilization of homeland security grant program funds to cover operational costs for personnel supporting the event.[206]

NSSE and local implementation initiatives can also be incentivized by FEMA through a new and specific preparedness grant that provides planning funds for initial CBP for a major special event. FEMA has recently incentivized active threat preparedness across the nation through a competitive CCTA planning grant.

C. AREAS FOR FURTHER RESEARCH

This thesis explored how CBP competency and adoption could be increased by applying it to tasks jurisdictions perform frequently, like preparing for special events. CBP was applied within the DoD as a means to increase military performance in highly uncertain and quickly changing environments, like terrorism. Davis simplifies the concepts of CBP into an approach seeking modularity, where envelopes of capability can be combined quickly to address a mission. The mission-system analysis process requires metrics of performance for the capabilities currently possessed by a jurisdiction, and defensible metrics remain a gap. CBP implementation can benefit from further research exploring how machine learning and Bayesian decision support tools can enhance capability estimation and decision support.

[205] Department of Homeland Security, "Special Event Assessment Rating Methodology Background Information."

[206] Federal Emergency Management Agency, *Notice of Funding Opportunity: Fiscal Year 2018 Homeland Security Grant Program* (Washington, DC: Department of Homeland Security, n.d.), 61–67, accessed October 23, 2018, https://www.fema.gov/media-library-data/1526578809767-7f08f471f36d22b2c0d8afb848048c96/FY_2018_HSGP_NOFO_FINAL_508.pdf.

This thesis also calls for further research into strategic and tactical planning frameworks and stakeholder engagement methods at the local government level. Establishing descriptive models and sets of empirical data can lead to a greater understanding of how to improve planning processes across all levels of government.

Finally, this thesis recommends research into mass gathering planning and security operations dynamics at the federal, state, and local level. ICS and NIMS do not fully account for the non-disaster planning environment and additional stakeholders. Further, Department of Justice and FEMA special event guidance takes the form of checklists that do not yet provide an adaptable organizational architecture for interdisciplinary planning.

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