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Chapter 1

A THEORY OF HOMELAND SECURITY

Richard White

Abstract Homeland security is a recognized practice, profession and field without a unifying theory to guide its study and application. The one previous attempt by Bellavita [2] acknowledges its own shortcomings and may be considered incomplete at best. The failure may be attributed to the lack of an underlying correlating factor. This chapter demonstrates that “domestic catastrophic destruction” is the correlating factor that unites key historical homeland security incidents and this observation is leveraged to propose a theory of homeland security that is descriptive, prescriptive and predictive. The proposed theory is descriptive because it can differentiate between what is and what is not homeland security. The theory is prescriptive because it can suggest an optimum homeland security strategy. It is predictive because it renders homeland security into a technical problem and demonstrates how its effects may eventually be blunted through the technological evolution and revolution of the critical infrastructure. Accordingly, the proposed theory embodies a set of foundational principles to guide the study and application of the practice, profession and field of homeland security.

Keywords: Homeland security, theory, foundational principles

1. Introduction

Homeland security is a recognized practice, profession and field that only recently emerged in the context of national security, which is itself a well-established practice, profession and field. Partly because of its “newness,” homeland security – unlike national security – does not yet have a theory and foundational set of principles that could guide its study and application. The absence of a theory and foundational principles may also be the result of a lack of consensus on what constitutes homeland security. This chapter proposes a theory of homeland security and a set of foundational principles to help bring about consensus and guide the study and application of the practice, profession and field of homeland security.

Situation	Stage 1 Pre-Event	Stage 2 Event	Stage 3 Alarm	Stage 4 Demand	Stage 5 Difficult	Stage 6 Priorities	Stage 7 Post-Event
Simple	X				X	X	X
Complicated	X		X	X	X	X	X
Complex		X	X	X	X		
Chaotic		X					

Figure 1. Bellavita’s opportunities matrix [2].

2. Previous Work

Perhaps unsurprisingly there have been few attempts to develop a theory of homeland security and the one treatment by Bellavita [2] is considered to be incomplete. Bellavita suggested that the dearth of literature may be attributed to a view by many that homeland security is a subset of existing theories and does not warrant independent status. Such a view is not unprecedented and has close parallels with computer science, which, in its early years, was considered to be a subset of mathematics and engineering. While mathematics and engineering remain integral to computer science, it eventually gained independent status due to its own distinctiveness. Bellavita felt that such distinctiveness may yet elude homeland security. However, he kickstarted the process by setting down an initial set of principles, incomplete as they may be, and letting the theory evolve from there.

Bellavita’s theory of homeland security is based on an “issue-attention cycle.” According to this theory, homeland security is the culmination of a series of issue-attention cycles that began with the September 11, 2001 (9/11) terrorist attacks and continued with Hurricane Katrina, the H1N1 pandemic, the merging of homeland security and national security policy by the Obama administration, and leading up to the Great Recession. Bellavita observes that each cycle proceeds in seven stages, providing an opportunity to evaluate and respond appropriately at each stage. Bellavita subsequently introduced an “opportunities matrix” for which “one could fill in the chart for a variety of decisions that have to be made during the cycle: decisions about communication, strategy, planning, technology, leadership, and so on.” For example, the opportunities matrix might recommend different leadership styles during different stages depending on the type of incident. Citing the 2010 Deepwater Horizon catastrophe, Bellavita claims that an opportunities matrix could make it clear that leaders who applied complex strategies would be more effective than those who followed routine procedures. Figure 1 presents the opportunities matrix of Bellavita [2]

Bellavita’s proposal satisfies two important aspects of a theory. The first is that is descriptive, offering an explanation of homeland security. The second

is that it is prescriptive, offering insights on responding to homeland security incidents. However, by his own admission, Bellavita's theory fails in one important purpose – prediction. Without prediction there can be no direction and, therefore, no guide for the study and application of the practice, profession and field of homeland security. Because of the absence of the predictive characteristic, Bellavita's proposed theory must be considered incomplete at best. But, in fact, it can be proved wrong.

In his proposal, Bellavita claims that the 9/11 attacks was the initiating event for the string of issue-attention cycles that comprise homeland security. This is not the case. Homeland security did not begin in the aftermath of the 9/11 attacks. Instead, it began with the 1995 Tokyo subway attacks. On March 20, 1995, Aum Shinrikyo, a quasi-religious cult, attempted to overthrow the Japanese government and initiate an apocalypse by releasing the deadly Sarin nerve agent in the Tokyo subway system during the morning rush hour. Tragically, twelve people lost their lives, but experts believe it was sheer luck that prevented thousands more from being killed.

The 1995 Tokyo subway attacks were the first deployment of a weapon of mass destruction (WMD) by a non-state actor [8]. Before this incident, weapons of mass destruction were the exclusive domain of nation-states. The implications for national security were profound. The diplomatic, economic and military instruments of national power that kept the use of weapons of mass destruction by nation-states in check were shown to be useless against non-state actors.

Concerns about a similar attack in the United States prompted a flurry of Congressional investigations [3, 6, 7, 14–16]. In a series of reports, the Gilmore Commission, the Hart-Rudman Commission and the Bremer Commission separately agreed that the United States was unprepared for weapons of mass destruction threats involving non-state actors. Accordingly, in December 2000, the second report of the Gilmore Commission [7] recommended that the next President establish a National Office for Combating Terrorism in the Executive Office of the President. In February 2001, the third report of the Hart-Rudman Commission [16] recommended creating a new National Homeland Security Agency. In March 2001, Representative William Thornberry (R-TX) introduced House Resolution 1158 to create a National Homeland Security Agency within the Executive Branch of the U.S. Federal Government. House Resolution 1158 was still sitting in Congress when the nation was attacked six months later on September 11, 2001 [17].

Does this mean that all that is needed is to reset Bellavita's issue-attention cycle to begin with the 1995 Tokyo subway attacks? But this will not salvage the theory because it would still not have any predictive power. The reason why Bellavita's theory will not gain any predictive power – and the reason it lacks any to begin with – is that the theory does not offer any correlating factor that explains the relationship between selected events that make up homeland security. It is the absence of a correlating factor that deprives Bellavita's theory of predictive power. This does not mean there is no correlating factor that

unites homeland security events. There is a correlating factor, but it just has nothing to do with issue-attention cycles. Indeed, it is the correlating factor that enables the formulation of a theory of homeland security that is descriptive, prescriptive and predictive.

3. Correlating Factor

If homeland security began with the 1995 Tokyo subway attacks, then the correlating factor that underpins homeland security must reside in some similarity between this incident and the 9/11 attacks. On September 11, 2001, nineteen hijackers gained control of four passenger jets and flew three of them into icons that represented the economic and military strength of the United States. In just two hours, the hijackers utterly destroyed the Twin Towers in New York City, and severely damaged the Pentagon outside Washington, DC. Alerted to these suicide attacks, passengers aboard the fourth aircraft rose up against their hijackers, forcing them to abort their mission against the nation's capital and crash in an empty field outside Shanksville, Pennsylvania. Altogether, the attacks left nearly 3,000 dead and caused \$40 billion in direct damage. Cross-referencing the passenger manifests against CIA databases quickly revealed the hijackers to be members of Al Qaeda, a known terrorist group led by Osama bin Laden that was operating out of Afghanistan. Enraged by the presence of U.S. military forces in Saudi Arabia to protect it from aggression by Iraqi dictator Saddam Hussein, bin Laden issued an edict in 1996 that declared war on the United States. The 9/11 Commission Report [1] states that the attacks were staged to force U.S. military forces out of Saudi Arabia.

At first glance it might appear that the correlating factor is terrorism. The 1995 Tokyo subway attacks and the 9/11 attacks were terrorist attacks as defined by Title 18 Section 2331 of the United States Code [20]. Under this definition, terrorism is a crime distinguished by motive, specifically violent acts calculated to coerce government. The many commission reports stemming from the 1995 Tokyo subway attacks and the seminal 2004 9/11 Commission Report [1] clearly branded both attacks as acts of terrorism. While the Tokyo subway attacks raised the issue of homeland security in the United States, the 9/11 attack brought homeland security to the forefront of U.S. policy concerns.

Terrorism, however, is not the correlating factor underpinning the two homeland security incidents. If terrorism was, indeed, the founding principle of homeland security, then it would have become a U.S. priority policy long before the 1995 Tokyo subway attacks, because in one form or another, the United States had been the target of terrorist attacks, some would say as far back as the founding of the nation.

Hurricane Katrina provides the strongest evidence that terrorism is not the correlating factor that underpins homeland security. On August 29, 2005, Hurricane Katrina made landfall in Louisiana and crossed directly over the city of New Orleans. The wind damage was minimal, but the eight to ten inches of rain filled Lake Pontchartrain to overflowing and the canals designed to channel its waters began to fail. The levee system built to protect New Orleans breached

in 53 places, rendering 80% of the city under fifteen feet of water. The extensive flooding stranded numerous residents in their homes. Many made their way to their roofs using hatchets and sledgehammers. House tops across the city were dotted with survivors; others were unable to escape and remained trapped in their homes. According to the Louisiana Department of Health, 1,464 citizens died in the storm; across the Gulf Coast, Hurricane Katrina caused nearly 1,500 deaths and \$108 billion in damage [21].

Hurricane Katrina had a profound impact on the United States similar to the 9/11 attacks – both are recognized as homeland security incidents [13]. But where the 9/11 attacks was a terrorist incident, Hurricane Katrina was not. By definition, terrorism is a violent act distinguished by motive, but nature has no motive. The correlating factor between the 1995 Tokyo subway attacks, the 9/11 attacks and Hurricane Katrina in 2005 is not terrorism. The correlating factor is domestic catastrophic destruction.

Homeland security began with the 1995 Tokyo subway attacks over concerns of domestic catastrophic destruction precipitated by weapons of mass destruction in the hands of non-state actors. It was brought to the forefront of U.S. policy concerns by the 9/11 attacks, where nineteen hijackers achieved effects similar to those of weapons of mass destruction by subverting the nation's transportation infrastructure and turning passenger jets into guided missiles to inflict domestic catastrophic destruction. Hurricane Katrina was a harsh reminder that domestic catastrophic destruction can be natural as well as man-made. Although the means were different in the three incidents, the potential and the real consequences were the same for all three incidents – domestic catastrophic destruction.

4. Unique Mission

Domestic catastrophic destruction is nothing new to the United States. From its inception, the U.S. has suffered from domestic catastrophic destruction of the natural and manmade varieties. An estimated 6,000 people were killed in the 1900 Galveston Hurricane, more than twice as many as in the 9/11 attacks [22]. More than 22,000 soldiers were killed or wounded in a single day during the Battle of Antietam in the Civil War, making it the “bloodiest day in U.S. history” [24]. So what is new about domestic catastrophic destruction that makes homeland security a unique mission?

As indicated previously, the new twist in domestic catastrophic destruction is the unprecedented ability for it to be inflicted by non-state actors. The 1995 Tokyo subway attacks demonstrated the ability of a small group to acquire and deploy weapons of mass destruction. The 9/11 attacks demonstrated the ability of a small group to create weapons of mass destruction effects by subverting the critical infrastructure (CI). Because these attacks were perpetrated by non-state actors, unsanctioned by any government, the acts constituted crimes. The crimes were unprecedented in their scope – indeed, they had national and international repercussions. Because of their scope and consequences, the

crimes were not ordinary and would not have been contained by traditional law enforcement alone.

As was pointed out in the many reports following the 1995 Tokyo subway attacks, the threat of domestic catastrophic destruction by a non-state actor requires an unprecedented level of coordination across all levels of government. It was also recognized that no amount of effort could ever eliminate the threat – it is impossible to always stop a determined attacker. In this regard, the threat of domestic catastrophic destruction by a non-state actor is similar to that of a natural disaster in that neither can be stopped completely. Since safety cannot be guaranteed, the best that can be accomplished is to reduce the risk of the likelihood and consequences of domestic catastrophic destruction. This requires actions across the four disaster phases – prevent, protect, respond and recover – to effectively cope with domestic catastrophic destruction.

In summary, homeland security is a unique mission because never before in human history have small groups and individuals demonstrated the ability to inflict domestic catastrophic destruction. This uniqueness makes homeland security sufficiently distinct to warrant recognition as an independent practice, profession and field.

5. Proposed Theory

Given the preceding discussion, the theory of homeland security is formulated by specifying a set of axioms that establish a firm foundation:

- **A1.0:** Domestic catastrophic destruction from natural and manmade sources is a historical threat to organized society.
- **A2.0:** Domestic catastrophic destruction perpetrated by non-state actors represents a new and unprecedented threat to organized society.
- **A3.0:** Domestic catastrophic destruction perpetrated by non-state actors is similar to that caused by natural disasters in that neither are completely stoppable.
- **A3.1:** There can be no guarantee of safety from domestic catastrophic destruction.
- **A3.2:** The best that can be accomplished is to mitigate the likelihood and consequences of domestic catastrophic destruction.
- **A3.3:** Mitigating the risks of domestic catastrophic destruction entails actions across the four disaster phases – prevent, protect, respond and recover.
- **A4.0:** It is a purpose of government to safeguard its citizens from domestic catastrophic destruction.

This set of axioms leads to the following theory of homeland security:

- **Theory:** Homeland security encompasses actions designed to safeguard a nation from domestic catastrophic destruction.

6. Descriptive Theory

The proposed theory of homeland security is descriptive because it helps identify what is and what is not homeland security. First, it tells us that homeland security is international because all nations are at risk of domestic catastrophic destruction. Consequently, any nation that engages in actions to safeguard against domestic catastrophic destruction is conducting homeland security.

The theory of homeland security thus leads to the following proposition or corollary:

- **C1.0:** Homeland security is a concern to every nation.

The theory specifies what constitutes a homeland security concern: anything that can create domestic catastrophic destruction. As stipulated by Axiom 1.0, domestic catastrophic destruction stems from two sources, natural and human (manmade). The natural sources are broadly classified as: (i) meteorological; (ii) geological; (iii) epidemiological; and (iv) astronomical. Meteorological threats encompass all types of extreme weather, including floods, heat, hurricanes and tornadoes. Geological threats cover all tectonic incidents, including earthquakes, volcanoes and tsunamis. Epidemiological threats include all forms of pandemic disease stemming from highly contagious and virulent pathogens. Astronomical threats encompass all forms of celestial phenomena, including extreme solar activity and large-body collisions. Note that large-body collisions may not necessarily include incidents such as the 1908 Tunguska event in Siberia, which experts believe was an air burst of a small asteroid or comet with the explosive equivalent of 10-15 megatons of TNT.

All these threats share the property that they may precipitate domestic catastrophic destruction in the form of a natural disaster. As noted by Axiom 3.0, they also share the property that they are unstoppable, and it is not a matter of if they will occur, but when they will occur. The inevitability of natural disasters makes it necessary to invest in emergency preparedness, actions designed to promote rapid response and recovery to catastrophic events. This presupposes two caveats: (i) the disasters are transient events of short duration; and (ii) they do not necessarily threaten human extinction. The first caveat addresses the apparent perception that threats such as climate change and cardiopulmonary disease are not immediate crises, although billions of dollars are spent every year to deal with extended droughts and floods, and cardiopulmonary disease is the leading killer of Americans. The second caveat concedes that there are no practical solutions at this time for dangers such as asteroid impacts and super volcanoes, but it also recognizes that such dangers are fortunately rare in the human time-scale.

Based on these observations, the following corollaries are derived:

- **C2.0:** Homeland security threats are transient events of a specific, short-term duration.

- **C2.1:** Emergency preparedness is a necessary investment against the inevitability of natural disasters.

With regard to manmade domestic catastrophic destruction, the threats may be broadly grouped as those committed by: (i) state actors; and (ii) non-state actors. As noted previously, manmade domestic catastrophic destruction has historically been perpetrated through warfare. Warfare is waged between sovereign nations. Like the United States, most nations have national security establishments to assert their sovereignty and defend themselves from hostile nations. National security has thus evolved to maintain a nation's sovereignty in the community of nations. However, the instruments that help maintain a nation's sovereignty are practically useless against small groups or individuals that are categorized as non-state actors. In general, non-state actors are subject to the laws of the nations in which they reside, whether or not they are citizens. Although nations use different means to enforce their laws, they were not prepared to cope with the threat of domestic catastrophic destruction posed by small groups or individuals; certainly not before the 9/11 attacks, and in some cases, not yet. This is why, according to Axiom 2.0, domestic catastrophic destruction by non-state actors constitutes a new and unprecedented threat that cannot be contained by law enforcement alone.

In the case of manmade domestic catastrophic destruction, a distinction should be made between the actions that are deliberate versus those that are accidental. While the containment of deliberate acts of manmade domestic catastrophic destruction fall in the realm of criminal justice, the containment of accidental acts of manmade domestic catastrophic destruction are the domain of safety engineering. This does not mean that an accident cannot be prosecuted as a crime. A chemical release from a pesticide plant that killed 3,787 in Bhopal, India in 1984 was ruled an accident; even so, seven ex-employees, including the former company chairman, were convicted of negligent homicide and sentenced to two years imprisonment and a fine of about \$2,000 each, the maximum punishment allowed at that time under Indian law [25].

Based on these observations, the following corollaries are derived:

- **C3.0:** Homeland security and national security are related through a common objective: to safeguard a nation from manmade domestic catastrophic destruction.
- **C3.1:** National security is distinct from homeland security in that it addresses the threat of manmade domestic catastrophic destruction by recognized state actors.
- **C3.2:** Homeland security is distinct from national security in that it addresses the threat of manmade domestic catastrophic destruction by non-state actors.
- **C3.3:** Manmade domestic catastrophic destruction stemming from the actions of non-state actors may be deliberate or accidental.

- **C3.4:** Manmade domestic catastrophic destruction deliberately perpetrated by non-state actors is a crime subject to criminal justice within the jurisdiction where the act was committed.

With regard to natural and manmade disasters, as neither is completely stoppable, both require actions across the four disaster phases: prevent, protect, respond and recover. The inevitability of disasters places first responders such as police, firefighters and emergency medical services on the front-line of emergency response. By definition, since the consequences are catastrophic, local first responders are most likely to be overwhelmed. Therefore, by necessity, local first responders must have the means to quickly call for assistance and rapidly integrate capabilities from other jurisdictions to mount an efficient and effective emergency response.

Based on these observations, the following corollaries are derived:

- **C4.0:** The inevitability of disasters places first responders at the front-line of emergency response.
- **C4.1:** Efficient and effective emergency response requires the means to quickly call for assistance and rapidly integrate capabilities from other jurisdictions.

Finally, it is important to discuss what does not constitute homeland security under the proposed theory. The central property of the theory is domestic catastrophic destruction. Domestic catastrophic destruction has not been defined aside from indicating that the 9/11 attacks and Hurricane Katrina are recognized homeland security incidents. As potential benchmarks, it has been noted above that the 9/11 attacks resulted in nearly 3,000 deaths and \$40 billion in damage whereas Hurricane Katrina caused about 1,500 deaths and \$108 billion in damage. In March 2002, a few months after the 9/11 attacks, Williams [28] proposed a threshold of 500 deaths and/or \$1 billion in property damage for catastrophic incidents. Can there be a defined threshold? Perhaps.

The more important point is that the consequences of criminal acts can far exceed those encountered previously. Title 28 §530C of the United States Code defines a mass killing as three or more killings in a single incident. In October 2017, 58 people attending a concert in Las Vegas were killed, the worst shooting incident in U.S. history [23]. Despite the horrific number of casualties, the Las Vegas shooting does not approach even the lowest threshold suggested for a catastrophic incident. The Las Vegas shooting, therefore, is not a homeland security incident; absent a motive, it cannot even be classified as a terrorist incident.

The same holds true for the 1995 Oklahoma City bombing, the worst bombing incident in United States history. The bombing killed 168 men, women and children, and inflicted \$652 million in damage [26]. Still, its scope does not measure up to catastrophes such as the 9/11 attacks and Hurricane Katrina. Under the proposed theory, the Oklahoma City bombing does not constitute a homeland security incident. By the same token, the motive is inconsequential

compared with the means. In fact, none of the incidents examined so far have a common motive, and nature harbors no motive at all.

Based on these observations, the following corollaries are derived:

- **C5.0:** Homeland security incidents are distinguished by catastrophic consequences.
- **C5.1:** Homeland security incidents are not distinguished by motive.
- **C5.2:** Mass killings, although tragic, are not necessarily homeland security incidents.
- **C5.3:** Terrorist incidents are not necessarily homeland security incidents.

Based on the preceding discussion, all the components constituting homeland security can be compiled into the map shown in Table 1.

7. Prescriptive Theory

The proposed theory of homeland security is prescriptive, providing a means to guide national homeland security strategy. In November 2002, the Homeland Security Act created the U.S. Department of Homeland Security to coordinate homeland security efforts across federal, state and local agencies. The department's homeland security functions were organized into critical mission areas. The original mission set was derived from the 2002 National Homeland Security Strategy and comprised the following six critical mission areas [10]:

- Intelligence and warning.
- Border and transportation security.
- Domestic counterterrorism.
- Protecting critical infrastructure.
- Defending against catastrophic terrorism.
- Emergency preparedness and response.

During the ensuing years, the mission set of the U.S. Department of Homeland Security evolved due to internal reorganizations, external events, Presidential priorities and Congressional legislation. One of the changes was instituted by the Implementing Recommendations of the 9/11 Commission Act of 2007, which mandated a systematic review of the U.S. Department of Homeland Security mission set and organization every four years starting in 2009 [18]. The first Quadrennial Homeland Security Review was released in 2010. The most recent Quadrennial Homeland Security Review, which was completed in 2014, identified the following mission set [19]:

- Prevent terrorism and enhance security.

Table 1. Homeland security map.

Theory	Actions to Safeguard a Nation from Domestic Catastrophic Destruction					
	Natural			Manmade		
Type	Meteorological	Geological	Epidemiological	Astronomical	State Actor	Non-State Actor
Forms	Extreme Weather	Tectonic Event	Pandemic Disease	Celestial Phenomenon	Warfare	Criminal Act
Means	Flood, Heat, Hurricane, Tornado	Earthquake, Volcano, Tsunami	Contagious Pathogen	Solar Activity, Earth Strike	Conventional, Nuclear, Asymmetric	WMD, Critical Infrastructure Subversion
Subclass	Emergency Preparedness	Emergency Preparedness	Emergency Preparedness	Emergency Preparedness	National Security	Criminal Justice
Prevent	Early Warning	Early Warning	Public Health	Early Warning	Deterrence Measures	Law Enforcement
Protect	Sheltering and Evacuation	Building Codes	Vaccinations	Sheltering and Evacuation	Defensive Measures	Security Measures
Respond	Emergency Response	Emergency Response	Health Measures	Emergency Response	Emergency Response	Emergency Response
Recover	Disaster Recovery	Disaster Recovery	Disaster Recovery	Disaster Recovery	Disaster Recovery	Disaster Recovery
						Safety Engineering
						Safety Design
						Safety Practices
						Emergency Response
						Disaster Recovery
						Disaster Recovery

- Secure and manage our borders.
- Enforce and administer our immigration laws.
- Safeguard and secure cyberspace.
- Strengthen national preparedness and resilience.

When the current U.S. Department of Homeland Security mission set is superimposed on top of the homeland security map shown in Table 1, the map shown in Table 2 is obtained. Note that the italicized items in the last five rows of Table 2 comprise the U.S. Department of Homeland Security mission set.

Based on the map in Table 2, a number of observations regarding the application of homeland security in the United States can be made:

- **Observation 1.0:** Homeland security is a team sport; the U.S. Department of Homeland Security cannot do it alone. As can be seen by the italicized items in Table 2, the U.S. Department of Homeland Security mission set does not encompass the entire mission space corresponding to the last five rows of the table. It is, therefore, incumbent upon the U.S. Department of Homeland Security to play a coordinating role across public and private agencies in what is called the “homeland security enterprise.”
- **Observation 2.0:** Failure is an inevitable outcome. Nobody wants to fail. Typical strategies attempt to avoid failure at all cost. However, no amount of investment in the prevent and protect mission areas will preclude failure. Emergency preparedness, response and recovery are an inseparable part of homeland security. Accepting failure and investing in the respond and recover mission areas are essential to reducing the consequences.
- **Observation 3.0:** Unprecedented responses to unprecedented threats. Most U.S. Department of Homeland Security missions are concentrated on securing the nation from the unprecedented threats of domestic catastrophic destruction by non-state actors (i.e., security measures marked with an asterisk in Table 2). Whereas law enforcement agencies remain responsible for preventing these particularly heinous form of crimes, the U.S. Department of Homeland Security has taken the lead in protecting against the means for committing them. Aviation security, for example, keeps passenger jets from becoming guided missiles.
- **Observation 4.0:** Cyber security is essential to homeland security. Following the 1995 Tokyo subway attacks, a 1997 Presidential Commission Report examining the vulnerability of U.S. critical infrastructure to a similar attack first raised concerns about cyber security [12]. The report noted that infrastructure owners and operators were increasingly resorting to remote monitoring and control using commercial networking products to reduce costs and increase efficiency across their geographically-

distributed systems. The report warned that commercial network products were making critical infrastructure increasingly vulnerable to external cyber attacks [12]. In 2007, Project Aurora demonstrated the ability to potentially destroy an electricity generator over the Internet [9]. In December 2016, the Ukrainian capital of Kiev was plunged into darkness by a cyber attack on its electric power grid [11]. If critical infrastructure provides the means for non-state actors to achieve weapons of mass destruction effects, then cyber attacks provide the opportunity.

- **Observation 5.0:** The threats from within. Keeping hostile agents and their weapons from entering the United States underpins the U.S. Department of Homeland Security's immigration and border security missions. The problem is that the weapons are already here, and the enemy need not come to the United States to set them off. The critical infrastructure, which is everywhere, is the means of destruction, and the chemical, biological, radiological and nuclear agents that comprise weapons of mass destruction are readily accessible. Cyber attacks have global reach. Physical proximity is not necessary to attack a target. Thus, an enemy can subvert the critical infrastructure or release a weapon of mass destruction by typing on a keyboard or clicking on a mouse anywhere in the world.

Based on these observations, the following prescriptive corollaries are derived:

- **C6.0:** The broad scope of the homeland security mission set exceeds the authority of the U.S. Department of Homeland Security and requires the coordinated efforts on the part of the homeland security enterprise.
- **C7.0:** Because failure is inevitable, emergency preparedness, response and recovery are also essential to homeland security.
- **C8.0:** Cyber security is essential to homeland security.
- **C8.1:** Whereas weapons of mass destruction and critical infrastructure provide the means for non-state actors to inflict domestic catastrophic destruction, cyber attacks provide the opportunity.
- **C8.2:** Cyber attacks can be launched from anywhere in the world.

8. Predictive Theory

The proposed theory of homeland security is also predictive in that it provides insights into the future of homeland security. Among its lesser predictions, Observation 2.0 indicates there will always be domestic catastrophic disasters. The case can certainly be made for natural disasters in the form of Hurricane Sandy in 2012 and Hurricane Maria in 2017. A similar case cannot be made for manmade domestic catastrophic destruction by non-state actors. But, when such a catastrophe does occur, Observations 4.0 and 5.0 make the case that

it could well be the result of coordinated cyber attacks. However, the most profound prediction of the theory may be that the current concerns about homeland security will one day become irrelevant.

The worst concerns related to homeland security today are the threats of manmade domestic catastrophic destruction posed by non-state actors. The threats are predicated on the abilities of non-state actors to deploy weapons of mass destruction or to subvert the critical infrastructure. These threats provide the means and cyber attacks provide the opportunity for inflicting domestic catastrophic destruction. The means and opportunity in this case are mere technical challenges. Therefore, depriving non-state actors of the means and opportunity to inflict domestic catastrophic destruction are simply technical challenges. The word “simply” is used because technical problems are easier to solve than social problems. Technical problems take years to solve; social problems take generations to address. Eliminating the motive is a social problem. Because the proposed theory reduces homeland security to a set of technical problems, it is conceivable that the worst threats may be eliminated. The only question is how.

Can non-state actors be deprived of the opportunity to inflict domestic catastrophic destruction? Not entirely. Whereas cyber security can blunt cyber attacks, it cannot completely stop them. Like the flu, there is no cure for cyber attacks and new strains are constantly emerging. And even if cyber attacks could somehow be halted, there is still no way to halt physical attacks.

Could a non-state actor be deprived of the means to inflict domestic catastrophic destruction? Possibly. With respect to weapons of mass destruction, it is simply a matter of sequestration, keeping products and materials out of the hands of unauthorized actors. Indeed, this concept forms the foundation of the national strategy to counter weapons of mass destruction, which involves nonproliferation and counterproliferation [5]. But what about the critical infrastructure? Although most of the critical infrastructure is not designed to withstand deliberate attacks, this situation will eventually change. Through technological evolution and revolution, the critical infrastructure that sustains contemporary society will become less susceptible to deliberate attacks and less likely to incur catastrophic effects if and when failures occur.

An example of technological evolution is the U.S. telephone system. In the early decades, when human operators were replaced by computer switches, the in-band signaling system was found to be vulnerable to a form of subversion called “phreaking.” So-called phreakers exploited the in-band signaling system to make free phone calls. Service providers lost millions until the phone switches were upgraded and the signaling system was taken out-of-band [27].

In a similar manner, technological evolution may eventually render cyber attacks harmless. A potential solution is the microgrid approach, which subdivides large components of the North American electric grid into much smaller, self-contained units. An attack on one unit would then be less likely to cascade across the grid and create regional outages such as the northeast blackout that affected 50 million people in 2003 [4]. Using various means, other infrastruc-

tures may similarly become immune to attacks or the consequences of their failures could be greatly reduced.

Although the need for homeland security will never be completely eliminated, the proposed theory suggests that the worst threats from non-state actors may be rendered irrelevant.

9. Implications

The proposed theory can help the practice and profession of homeland security in three ways: (i) by lending support to certain current practices; (ii) by offering justification for reducing other practices; and (iii) by providing a framework for developing a measurable strategy.

The proposed theory lends support to current practices that reinforce national emergency management. As made clear by Corollaries 4.0 and 4.1, the inevitability of natural and manmade disasters requires strong investments in first responder capabilities. One of the most significant victories that may be claimed by homeland security is the promulgation of national standards and procedures in the National Incident Management System. Before the 9/11 attacks, there was no national coordination of first responder standards. After the attacks, the U.S. Department of Homeland Security assumed the role of coordinating national standards, which has improved the ability of the nation to respond and recover to domestic catastrophic disasters.

The proposed theory justifies the reduction of practices focused on finding and apprehending potential terrorists. Corollaries 5.0 through 5.3 make it clear that homeland security is about means not motive. The current preoccupation with motive, specifically, terrorism, detracts from more productive pursuits that go after the means. In addition to terrorism, there are many potential motives for non-state actors to commit acts of domestic catastrophic destruction. However, the means for non-state actors to commit acts of domestic catastrophic destruction are limited to weapons of mass destruction and critical infrastructure subversion. Cyber attacks provide the opportunity to getting at both. This change in focus implies a greater emphasis on technical capabilities and research and development activities to cut off these avenues of attack.

Finally, the theory provides a framework for a measurable homeland security strategy. If homeland security is not a social problem but a technical problem as the theory implies, then the potential for developing a measurable strategy is within reach. As a social problem focused on terrorism, a strategy is impossible to formulate because the potential motives are unlimited and unmanageable. As a technical problem focused on weapons of mass destruction and critical infrastructure subversion, a strategy is possible because the potential means are limited and manageable. Reducing the scope of the problem to a finite set of risk factors makes a measurable risk strategy feasible. With a measurable risk strategy, it is possible to determine the current status as well as the path forward and the cost. This capability has eluded the U.S. Department of Homeland Security from its inception, but the proposed theory makes it feasible.

10. Conclusions

Developing a theory of homeland security is a daunting task, as evidenced by the dearth of literature on the topic. Bellavita [2], the only researcher who tried to do this, found it to be an overwhelming task. The resulting theory is incomplete, offering some descriptive and prescriptive analyses, but no predictive capability. Moreover, the theory could not find the correlating factor that ran through all the disparate components that claim to fall in the domain of homeland security.

The proposed theory makes the case that the correlating factor is domestic catastrophic destruction, natural and manmade. Domestic catastrophic destruction is the central concern of homeland security. Although domestic catastrophic destruction is a concern as old as civilization, the ability for it to be inflicted by non-state actors is new and unprecedented. Too large for law enforcement alone, the new threat requires a new approach that coordinates actions across the four phases of disasters – prevent, protect, respond and recover. Homeland security arose out of the 1995 Tokyo subway attacks and was brought to the forefront of U.S. policy concerns by the terrorist attacks of September 11, 2001. Correspondingly, the theory contends that homeland security encompasses actions designed to safeguard a nation from domestic catastrophic destruction.

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