Coordination in Crises: Implementation of the National Incident Management System by Surface Transportation Agencies

by Nicholas B. Hambridge, Arnold M. Howitt, & David W. Giles
Abstract

For more than a decade, the National Incident Management System (NIMS) has served in the United States as the mandated framework for coordinated organization, operational command, and implementation of response to emergencies nationwide. This article examines whether surface transportation agencies are developing the capabilities necessary to fit effectively into NIMS. It reviews the literature on NIMS, focusing on its implementation in “second and third circle responder” professions, including transportation, rather than in traditional first responder fields such as police, fire, EMS, and emergency management. The article also reports on exploratory interviews with city, metro, state, and federal transportation officials about the extent of NIMS implementation and the factors that facilitate or impede its use. Finally, we present a consolidated conceptual model of factors influencing NIMS implementation and make recommendations about how to enhance NIMS use in the transportation sector.

Suggested Citation


Introduction

As a consequence of the September 11, 2001, terrorist attacks, the Homeland Security Act of 2002 mandated the creation of the National Incident Management System (NIMS) to be the standard method for managing emergency response operations at all levels of government regardless of incident type, size, or complexity. The intent of NIMS, including its key component, the Incident Command System (ICS), is to provide a consistent system for managing incidents – no matter the agencies, organizations, or jurisdictions involved. In more than a decade since the federal mandate, every state government has officially adopted NIMS through executive order or other policy mechanism, and many agencies and organizations nationwide (e.g., fire, police, hospitals, private industry) have worked to incorporate NIMS concepts and principles into their methods of operation, with varying levels of success.

In many studies of NIMS implementation, analysts have focused on first response organizations – e.g., police, firefighters, and emergency medical services – the organizations and professions typically in the forefront of emergency response. But NIMS is intended for broader use than just by first responders. If emergency response is to operate as a substantially integrated system in major crises, it is crucial that not only first responders but others that will be involved should be ready and able to use NIMS effectively.

In this article, we inquire whether NIMS is penetrating the practices of agencies and organizations that are not primarily emergency response entities but would nonetheless play critical roles in response to a very large-scale emergency such as a major terrorist attack,
natural disaster, infrastructure failure, or public health crisis. We think here of agencies such as transportation, public works, social services, public health, or others having crucial skills, resources, and personnel that would need to be deployed effectively in collaboration with traditional first responders to cope with a severe event. These agencies may be considered as part of a second circle of emergency responders integrating with traditional first response organizations. A third circle of agencies, less directly involved, provides additional support.

Our article asks whether surface transportation agencies – one example of these second circle agencies – are developing and mastering the organizational practices that NIMS is intended to foster. This is by no means a given. As committed to public welfare as these and other second circle agencies may be – and notwithstanding the formal federal mandate – we might expect such agencies to be less attuned to NIMS implementation than first response organizations. The former have many more concerns and priorities than emergency preparedness. For second circle agencies, emergency response is a secondary mission in potential competition with the demands of their primary and other secondary missions. Devoting people, funds, time, and managerial attention – all scarce organizational resources – to emergency preparedness imposes opportunity costs on such agencies and thus is not necessarily a priority relative to other mission imperatives. Yet in a major emergency, the ability of such agencies to mobilize, operate effectively, and – crucially – work in tandem with other responders is essential. America's preparedness would fall far short if such entities were not able to contribute and collaborate in a crisis.

Transportation fits the description of a second circle organization well. It does play a significant role in the emergency management system – the US Department of Transportation is the co-lead in the “Critical Transportation” Core Capability under the National Preparedness Goal⁴, and the lead agency in “Emergency Support Function #1 – Transportation” under the National Response Framework.⁵ Many of its sister agencies lead their states' equivalents, but transportation does not regard emergency response as its primary mission and therefore may engage NIMS in different ways or regard it as a less significant requirement than traditional first response organizations.

There has been limited previous study about whether second circle entities are adopting and using NIMS. In an effort to lay the groundwork for systematic inquiry on this topic, we have conducted an exploratory study of state transportation agencies and metropolitan mass transit agencies – the functions and resources of which are often crucial to crisis response. We first review the NIMS statutory requirement and the professional literature on NIMS implementation. Then, to highlight current issues in NIMS implementation by transportation agencies, we review findings from a series of semi-structured interviews we conducted with city, metro, state, and federal transportation agency officials.⁶ We asked our respondents to describe the extent to which NIMS had been implemented in their organizations, how it was used, and what factors had facilitated or impeded that implementation.

As will be reported in more detail, these interviews revealed that all agencies in our sample have implemented some form of NIMS. Each of the interviewees saw benefit to using NIMS' common response structure, terminology, and principles when involved in multi-agency response operations. At the same time, the interviews highlighted varying philosophies and approaches to implementing NIMS and show variation in the degree to which NIMS has diffused through these agencies and is used in practice. Importantly, they also revealed factors which respondents felt help or hinder successful NIMS implementation. Overall, the research indicates that NIMS aligns with the cultures and organizational practices in transportation but that continued work is needed to fully embed and institutionalize NIMS within the sector.
Background and Literature Review

The underlying logic of developing and deploying an emergency response system like NIMS/ICS rests on the need for coordination of resources, particularly in major events. Ideally, a robust emergency response, especially when involving multiple organizations and jurisdictions, requires effective collaboration so that the tasks of response can be carried out with necessary urgency, maximum feasible substantive effectiveness, and cost-effectiveness, with minimal duplication of effort or unmet response needs. Responders in a large-scale emergency often do not know each other and have not worked together before; yet they have to work together as smoothly as possible. The lives of affected populations – and their own – may depend on that. If that coordination depends to a large degree on ad hoc improvisation, however, it is likely to be slow to take hold or fall short of what is needed. Responders would have to figure out how to divide responsibilities, establish common procedures, and mutually adjust operations – all under the intense pressures of disaster conditions. By contrast, NIMS can reduce these frictions and improve the speed and effectiveness of emergency operations that involve diverse response organizations by serving as a common system that response organizations of all types adopt, train for, exercise, and use.

The congressional mandate for NIMS, however, did not in itself ensure success in diffusing NIMS practices broadly, let alone universally. The United States has more than 89,000 units of subnational government: states, counties, municipalities, school districts, and special districts. To achieve the potential benefits of a standardized emergency management system that fosters effective coordination, NIMS must be diffused across levels of government and jurisdictions, must be accepted by diverse professions, must take root in hundreds of thousands of individual agencies and organizations, and must spread through the public, private, and non-profit sectors. Unlike many other kinds of innovation, responsibility for NIMS cannot be assigned to a special organizational unit in each of these entities; rather it requires full engagement by all agency personnel at the operating level. The broad sweep and depth of the NIMS requirement entails a massive implementation process – one that is still going on nearly 15 years after the congressional mandate.

The Evolution of NIMS

The NIMS mandate in the Homeland Security Act of 2002 was amplified in 2003 through Homeland Security Presidential Directive-5 (HSPD-5), which underscored the use of NIMS as the nation’s single, comprehensive incident management system.

The Incident Command System (ICS) is fundamental to NIMS as a framework for managing operations at or near the scene of an emergency. It provides responders a way to coordinate emergency efforts through a common, flexible, and scalable command structure that organizes response under four major sections: operations, planning, logistics, and finance/administration. As the scale of response expands, responders may organize sub-units of the four core sections, either by functional specialization (e.g., fire suppression operations group and emergency medical operations group) or by geographic sector, called divisions. (See Figures 1 and 2, respectively, for depictions of a basic ICS structure and an expanded structure for complex events.)
Figure 1. Basic Incident Command System (ICS) Structure

Figure 2. Expanded Incident Command System (ICS) Structure
Overseeing and coordinating these functions is either a single Incident Commander (IC) or a collaborative Unified Command (UC). An integrated command structure under a single IC is typically employed when emergency responders come from a single agency or jurisdiction or in mutual aid situations where there is no ambiguity about lines of authority over all responders. Unified command, by contrast, is employed when no single hierarchy of authority exists (as when responders come from multiple political jurisdictions) to connect the full set of deployed responders who must collaborate. Unified Command then provides a potentially effective voluntary means of integrating decision making and allocation of resources.

To seek to ensure that ICS is used as universally as possible, the federal government issued NIMS implementation requirements starting in FY 2005 which gave jurisdictions two years to comply with the full array of NIMS implementation standards. NIMS compliance was made a precondition for any agency or organization to receive homeland security preparedness funding – a potentially powerful incentive for adopting and implementing the system. However, the impact of actually withholding funds from jurisdictions that did not comply with the NIMS mandate may have seemed too strong or even counter-productive to those developing the regulations for NIMS compliance. Withholding funds would have removed resources that those entities needed to improve emergency response systems, and that action would undoubtedly have caused political reaction by local, state, and federal officeholders representing those jurisdictions. Therefore, states and sub-state jurisdictions, when applying for homeland security grants, have only been asked to self-certify, with minimal documentation, that they are NIMS compliant.

States also provide additional documentation, outside the grant funding process, to the Federal Emergency Management Agency (FEMA) on an annual basis attesting to their NIMS compliance; but, again, this process allows for self-certification by each state. And, although states may choose to do so, the federal government does not require them to track and enforce NIMS compliance by individual jurisdictions (e.g., counties or municipalities). Nor does the federal government track NIMS implementation in specific disciplines (e.g., transportation, fire, police).

Although it has only lightly enforced NIMS compliance, FEMA has fostered NIMS implementation by issuing guidance documents to all levels of government, as well as to private industry and nonprofit organizations, to describe in general form what would constitute compliance. In addition, FEMA has created NIMS training resources for specific disciplines, including healthcare, hospitals, higher education, schools, public works, public health, and volunteer organizations. It has also collaborated with the Federal Highway Administration (FHWA) to develop a customized workbook for frontline transportation workers as a replacement for the introductory ICS 100 training. FEMA’s attention to the variation among emergency response groups is important to the success of NIMS writ large because it makes a seemingly monolithic system adaptable to the variety of cultures, missions, needs, and capabilities present across emergency response disciplines. Tailoring NIMS guidance and resources to different groups may also reduce resistance to NIMS implementation within organizations that have not previously used NIMS and may be wary of changing their routines or adopting systems developed outside.

It is worth noting that the federal government has recently prioritized engagement of a broader cross-section of American society in emergency management efforts. Presidential Policy Directive-8 (PPD-8), issued in 2011, calls on federal departments and agencies to work...
with the “Whole Community,” including private citizens, private enterprise, the nonprofit sector, faith-based organizations, and all levels of government, to improve collective emergency preparedness, response, and resiliency. This emphasis on a Whole Community approach to emergency management can be found in multiple federal documents, including the National Preparedness Goal, the National Preparedness System, and National Preparedness Report. However, there are very few references to NIMS in general or, more specifically, on how to integrate NIMS into the new Whole Community approach or vice versa.

PPD-8 did, however, lead to adjustments in NIMS training requirements. Under PPD-8, the new NIMS Training Program, issued in 2011, gives federal, state, tribal, local and private sector stakeholders greater flexibility than did the 2008 Five-Year NIMS Training Plan in determining which of their employees need to take NIMS training. According to Edwards and Goodrich, “While the 2011 Training Program continues to define the curriculum and required course elements...the onerous list of mandated personnel has been modified to provide some latitude to local emergency management leaders to select those employees who need to be trained” (36 – 37).

Emergency Responder Circles

Understanding the differences among professions that participate in emergency response, particularly the contrast between first responders and other disciplines, is critical to evaluating the success of NIMS implementation thus far and improving NIMS moving forward.

The term “first responder” has been used popularly or colloquially to refer most often to fire, police and emergency medical disciplines. Somewhat more broadly, the U.S. government’s statutory term for individuals and organizations involved in emergency response is “emergency response provider” as defined in the Homeland Security Act of 2002 and subsequently amended twice in 2006 to mean “federal, state, and local governmental and nongovernmental emergency public safety, fire, law enforcement, emergency response, emergency medical (including hospital emergency facilities) and related personnel, agencies, and authorities.”

But other public and non-public agencies may become crucial actors in emergencies. Howitt and Makler (2005) use the imagery of concentric circles where the inner circle is occupied by agencies whose principal mission is emergency management and the outer circles contain all the other organizations with potential involvement in emergency-related activities. Several other researchers (i.e., Lutz and Lindell [2008]; Robinson and Gerber [2007]; and Robinson [2012]) have subsequently focused on institutional mission as a way of determining which organizations fall within the first responder category and which do not. They assert that agencies whose primary purpose is to respond to emergencies should be deemed first responders; and other organizations, whose roles in emergency response are not usually part of their core missions, should fall outside this category.

Figure 3 adapts Howitt and Makler’s construct to further define and differentiate their circles of responders and the types of organizations that occupy them. The inner circle contains traditional first responders (fire, police, and emergency medicine) and emergency management agencies. The second circle contains organizations whose primary missions are not emergency-focused but which often find themselves directly involved in emergency response efforts alongside first responders. This category includes disciplines such as
transportation, public health, public works, and utilities. The third circle is comprised of entities that play support roles to first and second circle response agencies during emergency response. Private businesses, religious institutions, and schools typically provide support services and resources to frontline responders in the emergency response phase of an incident, while taking on a greater share of direct service delivery to disaster victims in the recovery phase.

![Diagram of emergency response circles]

**Figure 3. Centrality of Emergency Response to Organizational Mission**

**NIMS Implementation in the Transportation Sector**

September 11th led to a flurry of emergency preparedness initiatives within the transportation sector. A leader in these efforts, the Federal Transit Administration (FTA) conducted “security assessments at 36 transit agencies, emergency response planning with the 60 largest transit agencies, grants for emergency preparedness drills to 80 transit agencies, security training to staff and first responders, R&D for security-related technology, [an] MOU [Memorandum of Understanding] with DHS, and development of the protective measures to support the Homeland Security Advisory System (HSAS)” (xii - xiv). The newly created Transportation Security Administration (TSA) and state Departments of Transportation (DOTs) came together to form the American Association of State Highway and Transportation Officials’
(AASHTO) Security Task Force (now the Special Committee on Transportation Security and Emergency Management – SCOTSEM) and created a number of guidance documents related to preparedness for terrorist events. During the time between the 9/11 attacks and the official release of NIMS in 2004, emergency management efforts within transportation – as in many other sectors – focused primarily on security preparedness and response to terrorist attacks.

When Hurricane Katrina struck the Gulf Coast in August of 2005, NIMS was still new to many in the emergency management community, having been released only in March of the previous year as part of the National Response Plan. There had not been sufficient time to integrate NIMS fully into emergency response procedures prior to the storm; and the transportation sector struggled in its emergency response efforts, especially with respect to inadequate pre-positioning of transportation assets for evacuation needs and incomplete assistance to special needs populations. The problems witnessed during Hurricane Katrina shed even more light on the country’s need for a fully functional incident management system that could meet the demands of disasters of this scale and complexity.

The transportation sector thus began moving further toward an “all hazards” approach to emergency management. Guidance documents began emphasizing general emergency preparedness over terrorism-specific preparedness, and references to the National Incident Management System (NIMS) began to emerge. At the same time, to ensure broad understanding and acceptance of NIMS within transportation agencies, USDOT and TSA also promoted NIMS-focused trainings (IS/ICS 100, 200, 300, 400, 700 and 800) and exercises. FHWA, in coordination with FEMA, developed the publication The National Incident Management System – A Workbook for State Department of Transportation Frontline Workers as a replacement for ICS 100 training, and the Transportation Research Board funded the creation of ICS training for field level transportation staff through the Mineta Transportation Institute in conjunction with the California Department of Transportation (Caltrans). These are just a sample of the many initiatives that have taken place within the transportation sector to try to institutionalize NIMS.

However, the transportation sector must cope with the fact that transportation-specific NIMS compliance standards are not available, and where guidance has been issued, it is not consistent. For example, the USDOT and Transportation Research Board (TRB) have issued guidance documents with NIMS compliance recommendations. However, the recommendations vary. And in both documents, transportation agencies are advised to consult with their states’ emergency management agencies for specific NIMS compliance requirements for the sector because the federal government has delegated creation of discipline-based standards to state governments.

NIMS Implementation Factors

In the literature, several factors are consistently identified as having an impact on NIMS implementation or emergency preparedness in general. These factors were subsequently used as a starting guide for our interviews with transportation agency representatives.

1. **Compliance** requirements and enforcement – Federal preparedness funding for states and localities, as discussed above, is now contingent upon NIMS compliance, although FEMA has required only state-level self-certification. Moreover, while federal grant funding could be a strong incentive to compel NIMS compliance for first response
organizations, many second and third circle responder groups – for example, private industry and the NGO community – do not rely on this funding.

2. **Comprehension** of risk – The literature also identifies an organization’s or individual’s level of perceived risk of experiencing a severe emergency as another factor influencing whether they have adequately prepared for a crisis.\(^{46}\) When the level of perceived risk is low, the chances of a person or group doing something to prepare for or mitigate that risk are also low. Conversely, when persons or groups believe that a risk is likely to affect them, they are more likely to take action to prevent or prepare for it. Therefore, helping organizations in the outer circles better understand their risks is a primary step in influencing action. The Federal Government has begun to put greater emphasis on risk assessments as part of the National Preparedness Goal\(^{37}\) and National Preparedness System.\(^{48}\)

3. **Commitment** of resources – For second and third circle organizations, diverting resources (time, money, and staff) away from their own “mission-critical” activities and into emergency management programs has proved problematic, especially because of shrinking budgets resulting from the recession of 2008-2010 or the limited size and financial and administrative resources of many of these agencies.\(^{49}\) Agency leadership has been critical. Without the commitment of executive leadership within these organizations to fund and support emergency planning and preparedness initiatives, NIMS implementation is much less likely.

4. **Customization** of NIMS – Researchers have noted that some outer circle organizations may perceive NIMS/ICS as overly prescriptive and rigid and hence unsuitable for organizations that do not primarily function as command and control hierarchies.\(^{50}\) These researchers have argued for flexibility in customizing NIMS in ways that are relevant to each individual organization’s needs, structure, and culture, while maintaining sufficient fidelity to the basic system so that collaboration with other organizations remains feasible. While there are varying opinions on whether or not NIMS is designed to accommodate this flexibility, adaptation of NIMS at the organizational level seems to be an important condition for successful NIMS implementation by second and third circle organizations.

5. **Collaboration** with first responders – A number of articles discuss the benefits that pre-incident collaboration between emergency response groups brings, whether it be in planning, training, exercising, etc.\(^{51}\) Robinson talks specifically about the need for organizations in the outer circles to partner with first responders in order to have a seat within the inner circle of emergency planning and response. Those second and third circle groups that are able to maintain these close linkages are more likely to be successful in emergency planning and NIMS implementation efforts.

6. **Consistency** of use – Infrequent utilization of NIMS is another obstacle to full implementation by outer circle responders. While first responders usually have opportunities to use NIMS/ICS on a frequent – often daily – basis as part of their normal work activities, second and third circle responders encounter emergency situations much less frequently and are therefore more likely to be uncomfortable using NIMS when they do respond to emergencies. In their article on organizations involved in Emergency Operations Center (EOC) activities during Hurricane Katrina, Neal and Webb (2006) observe that “[o]rganizations that use some form of ICS on a regular basis (e.g., fire departments, medical related organizations) did appear to use ICS and NIMS during the response to the hurricane. On the other hand, most of the other organizations at
both the federal and local level that did not use ICS on a daily basis generally did not use ICS or NIMS during the hurricane response" (272). Finding ways to embed NIMS into day-to-day processes; using NIMS during smaller, more routine incident responses; and increasing the frequency of NIMS use through regular trainings and exercises will improve NIMS proficiency.

Interview Method & Discussion of Findings

To explore how NIMS implementation is progressing in transportation agencies, we conducted in-depth, semi-structured interviews by phone or in person with agency emergency management and security officials. A set of open-ended questions about NIMS implementation guided all interviews at the start. These questions were based on findings and conclusions from the existing literature on NIMS implementation, adapted and extended for a focus on second circle agencies rather than first response organizations. (See appendix 1 for a list of these questions.) Depending on the answers provided by interview subjects, we asked a series of additional questions that were customized to a specific interview. Such an approach allowed us to follow the general questions with more specific, interactive discussions tailored to each agency's specific circumstances as revealed in responses to the initial queries. As seemed appropriate for a topic that had not been previously much studied, we purposefully traded the potential breadth of a broadly based, random-sample survey for the depth of longer, more intensive, more customized interviews. To provide variation in our non-random sample, we focused our interviews on city and metro transportation agencies that would afford a view of a geographically diverse mix of transportation agencies in large metropolitan areas (the sample includes agencies on the East and West coasts, the Midwest, and the Southwest). We also interviewed the corresponding state-level transportation agencies for these metro areas in order to understand the interplay between these two levels, as well as to learn if there were differences in NIMS implementation results at the state and metropolitan agency levels. Finally, we interviewed officials from the US Department of Transportation (USDOT) and the US Department of Homeland Security (DHS), including FEMA, to provide a federal-level perspective. In all, the research team conducted interviews with twelve city, metro, or state-level transportation agencies in five states and with two federal agencies between October 2013 and February 2016. All interviewees held leading roles in their agencies’ security and/or emergency management departments. A list of agencies participating in this study is presented in Figure 4.

A shortcoming of this interview approach is that our relatively small sample size does not permit confident generalizations. However, we hope this exploratory research will serve as a starting point for broader investigation and analysis of NIMS implementation in transportation and other second and third circle response organizations in the future.
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**Figure 4:** Transportation and Emergency Management Agencies Participating in this Study

**NOTE:** The Massachusetts Bay Transportation Authority (MBTA) and MassDOT are separate legal entities under the same governing board. A central emergency management department supports both the MBTA and MassDOT, so one interview was conducted covering both entities.

**Patterns of Implementation: Facilitating and Impeding Factors**

While in most of the transportation agencies interviewed NIMS implementation efforts began soon after the official NIMS framework was issued in 2004, some agencies had been using the ICS-component of NIMS much earlier. The Illinois Department of Transportation (IDOT) representative noted that transportation agencies in Illinois were using ICS at least as far back as 1994. California, the birthplace of ICS in the 1970’s, developed the Standardized Emergency Management System (SEMS) and mandated its use in 1993 for all multi-agency and multi-jurisdictional responses. SEMS includes ICS and, as the Caltrans representative described it, “SEMS has all the NIMS guidance and goes a level higher because it incorporates California’s specific emergency response structure and procedures.” Therefore, California agencies like Caltrans and the Los Angeles County Metropolitan Transportation Authority (LA Metro) were already familiar with ICS when NIMS came into being. Overall, the interviewed transportation agencies that had experience with components of NIMS, most notably ICS, prior to the NIMS mandate generally found NIMS implementation easier than those that did not.

In terms of actual use of NIMS, the interviews revealed a range of practices and experiences. At one end of the spectrum, the Florida Department of Transportation’s (FDOT) central
Emergency Management (EM) office aligns itself as closely as possible with NIMS/ICS’s command structure at all times, both during incident responses as well as in day-to-day, non-emergency activities. This is reflected in the organizational structure of the FDOT Emergency Management office, which follows ICS, and in the regular position titles of its staff, which also correspond to ICS position titles – e.g., Operations Chief and Logistics Chief. While FDOT’s central office strictly follows ICS, decentralized authority among its seven districts and turnpike authority creates varying levels of adherence to ICS. In contrast to FDOT’s central EM office, the Emergency Management group that serves both the Massachusetts Department of Transportation (MassDOT) and its metro Boston transit service, the Massachusetts Bay Transportation Authority (MBTA), indicates less stringent adherence to NIMS/ICS by using the “philosophy of ICS” (e.g., the principle of unity of command and common terminology) but not necessarily the exact ICS structure during emergency responses or day-to-day activities.

For the most part, the transportation agencies interviewed did not use NIMS on a day-to-day basis but almost always used it during incident responses that required engagement with first responders and other external organizations. For emergency incidents that did not require interaction with external responders, there was a mixed response (roughly split evenly) on whether or not the transportation agencies used NIMS/ICS. Those that did not use NIMS/ICS in these situations presumably used internally-developed structures and procedures until outside agencies became involved. At that point, the transportation agencies indicated they were able to transition to NIMS/ICS, although some noted difficulty in this transition. As the representative from VIA Metropolitan Transit in San Antonio, Texas stated, “[w]hen there is an emergency, shifting that gear from our regular operations to an emergency operation can sometimes be a sticky clutch...but once we come together under [an ICS] unified command, we do it very well.”

The interview respondents most often cited a state or locality’s Emergency Operations Center (EOC) as the location where their agencies utilized NIMS – more often than saying that they used NIMS/ICS at the actual scene of incidents. An EOC is typically activated during an emergency by the affected municipality at a location, away from the incident scene, where multiple agencies and organizations come together to provide coordinated support to the operations occurring at the scene(s) of the incident. It is important to reiterate that EOCs provide support to on-scene operations. Under NIMS and ICS, the Incident Commander at the scene of the emergency maintains command and control of response decisions and actions even when an EOC is activated.

This on-scene command principle of NIMS/ICS is in tension with typical practices in the transportation sector, particularly in mass transit agencies. During routine, non-emergency operations, these agencies usually function under a quite different model. A central Transit Control Center is in active command of the entire transit system instead of this authority being decentralized to in-the-field personnel. As the MassDOT/MBTA representative describes it,

> Transit control centers tell everyone in the field what to do...100% command and control. So, if operational management typically occurs within transit control centers, then transportation agencies tend to be more cautious about transitioning their agency's command to the scene during emergencies, preferring to maintain the transit control center management model and supplementing it with support from the EOC, when needed. Given the complex transit operating environment (e.g., overhead and third rail power, vehicle movement, etc.), concerns over safety factor heavily into this approach.
Transit control centers’ dual role of managing incidents and simultaneously keeping the rest of the transit system running is an important insight that transit agencies and their emergency response partners should consider as part of their emergency planning, training and exercising efforts.

With a better understanding of when, how and where NIMS is being utilized in selected surface transportation agencies/organizations, we next reviewed which factors have facilitated and which have impeded the adoption and use of NIMS by transportation agencies. Figures 5 and 6 provide an overview of the perspectives of our interview respondents. Each factor identified by interviewees is connected back to the factor(s) identified in the literature review (in parentheses in Figures 5 and 6).

**Figure 5. Factors Facilitating NIMS Implementation in Transportation Agencies**

**Figure 6. Factors Impeding NIMS Implementation in Transportation Agencies**
When asked what had been most important to the success of their NIMS implementation efforts, many interviewees first referenced commitment and support for NIMS from their agencies’ executive leadership, especially their chief executives. The executives’ motivations for this support tended to come from two main sources: (1) a perceived need to comply with state or federal legal/regulatory requirements and/or (2) a perception that their agency was sufficiently vulnerable to risks or threats to warrant strengthening its system for responding to and recovering from hazards and disruptions. Several interview respondents highlighted the added benefit of having a formal statement of support from their leadership which helped to achieve greater acceptance of and involvement in the NIMS implementation effort agency-wide. Examples include a memorandum from the Director of Caltrans, a policy statement from VIA’s President & CEO, and a resolution adopted by the Board of Directors of the Metropolitan Transit Authority of Harris County (METRO) in Houston, TX.

In addition, external collaboration with first circle response organizations is also critical to transportation agencies, especially to the city and metro transportation agencies. These transportation agencies rely most heavily on local and state emergency management agencies for support with NIMS implementation since these agencies typically provide guidance and monitor overall NIMS compliance within their respective jurisdictions. Emergency management agencies also typically provide a significant number of free, classroom-based NIMS trainings to area emergency responders. These training opportunities were highly valued by the transportation agencies interviewed because most did not have the internal resources to conduct the trainings themselves. Furthermore, emergency management agencies typically oversee their jurisdictions’ EOC operations, and EOCs were the most frequently cited location where transportation agencies utilized NIMS. For all these reasons, strong relationships with emergency management agencies were perceived as very important for successful NIMS implementation by transportation organizations.

Transportation agencies also referred to a number of other external groups with whom they collaborated on NIMS-related activities. Those most often cited, aside from emergency management agencies, were law enforcement (police, sheriff, highway patrol), fire departments, FEMA, the federal Transportation Security Administration (TSA), other transportation agencies, hospitals, and EMS, in that order. The most beneficial collaborations with these and other groups, in terms of improving NIMS proficiency, were multi-agency drills and exercises. Among the examples cited were Florida’s annual hurricane exercise in which FDOT participates, Texas’ annual contraflow exercise in which TxDOT participates, hospital and airport-based exercises in which METRO (Houston, TX) participates, and annual nuclear power station exercises in which IDOT participates.

While simulated incidents – i.e., drills and exercises – give responders a glimpse of the situations in which NIMS would be needed, actual emergencies tend to make the point more dramatically. Many interviewees talked about how their agencies tended to take emergency preparedness and NIMS implementation more seriously after being involved in large-scale incident responses. From the Texas agencies recounting their experiences during hurricanes Katrina and Rita (2005) and Ike (2008), to IDOT and the Chicago Transit Authority (CTA) describing Illinois’ harsh winter storms, to the MassDOT/MBTA remembering the traumatic events surrounding the 2013 Boston Marathon bombings, many interviewees explained how the perception of their agencies’ exposure to disasters pointedly increased in the face of a major emergency – and with it came a revitalized dedication to the agency’s emergency management program overall.
Funding issues also loomed large during the interview discussions. In the years closely following 9/11, when homeland security grant funding was more readily available than it has been more recently, transportation agencies were able to use federal emergency preparedness funding primarily through the TSA’s Transit Security Grant Program (TSGP) for NIMS implementation activities. Transportation agencies used this funding predominantly for training and exercises, specifically to cover overtime costs or “backfilling” costs – i.e., having other employees cover the work that the trainees/exercise participants would have done. However, grant funding has diminished significantly in recent years, and transportation agencies have not been able to make up for this loss through internal budgets. As an example, the MBTA’s security and emergency preparedness funding from DHS dropped by more than half from $6.6 million in 2012 to $3.25 million in 2013. Funding constraints were cited by many agencies as the primary obstacle to better, more sustainable NIMS execution.

Interviewees also frequently mentioned that getting high-level commitment for NIMS has proven difficult because neither NIMS nor the agency’s overall emergency management program are seen as mission-critical by others within the organization. Dedicating funding, staff, and other assets to emergency preparedness rather than to core operational tasks like transporting customers and maintaining equipment has proved a hard-sell for these resource-constrained agencies. As the VIA representative put it, “It’s hard to justify bringing [personnel] off the street for NIMS training and exercising when our number one job is to move people and serve our customers.” This tension or conflict between emergency-related priorities and core mission needs can be quite strong for agencies in the outer circles, but not something with which first response groups must grapple because of the primacy of emergency response among their goals.

Interview respondents noted that understanding this tendency and developing strategies to overcome it are critical to successful NIMS implementation in their organizations. One strategy mentioned is how VIA in San Antonio, realizing the difficulty it was facing finding funding for NIMS training, succeeded in embedding NIMS training into its mission-critical Operations Refresher training, thereby not incurring the additional backfill and overtime costs it would have if NIMS training was conducted separately from the Operations Refresher training. Similarly, Texas Department of Transportation (TxDOT) requires ICS 100, 200 and 700 trainings as homework for supervisors during the National Highway Institute (NHI) Maintenance Leadership Academy.

Even for agencies committed to implementing NIMS and having the resources to do so, attainment of this goal can prove elusive when compliance standards are unclear or unavailable. All the agencies interviewed stated that they had implemented NIMS, but there was wide variation in the criteria by which each agency judged itself to be “NIMS compliant.” As mentioned earlier, FEMA has developed NIMS implementation guidelines, beyond just training compliance, for different levels of government (federal, state, tribal, local) and for the NGO and private sectors as a whole. It has also developed guidelines specific to healthcare, but it has not developed NIMS specific standards – i.e., specific requirements necessary for compliance – for the transportation sector or other outer circle disciplines. FEMA, moreover, only tracks NIMS compliance at the state level; and only some states have developed or track compliance standards at the discipline or agency level. With no authoritative set of compliance standards to follow, transportation agencies are implementing standards derived from various outside sources or deciding on their own what it means to be NIMS compliant, as shown in Figure 7.
Agency | Adhere to Externally / Internally Developed NIMS Compliance Standards?
--- | ---
California DOT | External (FEMA / State)
LA Metro (CA) | External (FEMA / State)
Illinois DOT | External (FEMA / State)
Texas DOT | External (FEMA / State)
SunTran (FL) | External (FEMA)
VIA (TX) | External (FEMA)
SunRail (FL) | External (FTA)
CTA (IL) | External (City)
Florida DOT | Internal
Massachusetts DOT / MBTA | Internal
Houston METRO (TX) | Internal

**Figure 7.** Sources Providing NIMS Compliance Standards

It should also be noted that DHS/FEMA rather than USDOT oversees NIMS compliance – and then not specifically for transportation agencies at the state or city levels. Several transportation agencies interviewed (MassDOT/MBTA, SunRail, SunTran, Houston METRO and VIA) did note, however, that the Federal Transit Administration (FTA) and Federal Railroad Administration (FRA), both sub-agencies of USDOT, include some NIMS compliance criteria in their initial certification and periodic assessment programs of transit agencies. Overall, however, NIMS oversight, guidance, and support come mostly from DHS/FEMA and state emergency management agencies, which most interviewees seemed to feel was the appropriate model.

The DHS/FEMA-sponsored NIMS training program was the measure of compliance most often raised by the transportation representatives during the interview discussions. The NIMS core curriculum is made up of a series of online and in-class courses designed to provide emergency response personnel with key information on all components of NIMS with an emphasis on ICS. Baseline trainings provide preliminary information and are intended for all responders, while advanced courses are intended for responders in leadership positions or responders in jurisdictions at greater risk for complex incidents based on hazard/threat analyses. Some interviewees saw the trainings, especially the online courses, as valuable resources in their NIMS implementation toolkits. Others saw them as too generic and instead developed internal courses customized to the field of transportation and/or to their specific agencies. The vast majority of interviewees, whether having positive or negative impressions of the DHS/FEMA training program, saw it as the primary activity for and measure of NIMS compliance. Therefore, they generally dedicated more time and financial resources to their NIMS training programs than any other NIMS-related activities. Due to this, many interviewees voiced a strong desire to see more specific guidance as to which NIMS courses are required for transportation workers and which level of workers are recommended/required to take these courses. As seen in Figure 8, there is currently significant variation in the types of workers that transportation agencies require to take NIMS trainings.
<table>
<thead>
<tr>
<th>Agency</th>
<th>Baseline Training</th>
<th>Additional / Advanced Training</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IS-700</td>
<td>ICS-100</td>
</tr>
<tr>
<td>California DOT</td>
<td>Office Staff &amp; Executives</td>
<td>Field Staff</td>
</tr>
<tr>
<td>Florida DOT</td>
<td>Personnel w/ Emergency Mgmt Responsibilities</td>
<td>Personnel w/ Emergency Mgmt Responsibilities</td>
</tr>
<tr>
<td>SunRail (FL)</td>
<td>All Staff</td>
<td>All Staff</td>
</tr>
<tr>
<td>SunTrans (FL)</td>
<td>General Manager &amp; Operations Managers</td>
<td>None</td>
</tr>
<tr>
<td>Illinois DOT</td>
<td>All Staff</td>
<td>All Staff</td>
</tr>
<tr>
<td>CTA (IL)</td>
<td>Frontline Staff, Supervisors &amp; Management</td>
<td>Frontline Staff, Supervisors &amp; Management</td>
</tr>
<tr>
<td>Massachusetts DOT / MBTA</td>
<td>Transit Police</td>
<td>Transit Police &amp; EOC Staff</td>
</tr>
<tr>
<td>METRO (TX)</td>
<td>Transit Police, Ops Supervisors, EOC Staff, Management</td>
<td>Transit Police, Ops Supervisors, EOC Staff, Management</td>
</tr>
<tr>
<td>VIA (TX)</td>
<td>All Staff</td>
<td>All Staff</td>
</tr>
</tbody>
</table>

**Figure 8.** Personnel within Transportation Agencies taking NIMS Trainings

**NOTE:** This table does not include position-specific or function-specific courses that are part of the NIMS core curriculum.
Figure 9. Factors Affecting Transportation Agencies’ NIMS Implementation
Conclusions

The preceding pages have covered the factors that affect NIMS implementation in the transportation sector. Figure 9 presents a graphical representation of inter-relationships revealed both by the review of literature about NIMS implementation and by the exploratory interviews conducted for this study. This diagram characterizes the variables as internal and external factors and shows how they affect NIMS implementation. Future research should test whether this representation holds for a broader sample of transportation agencies and if it could extend to other second and third circle professions and agencies.

The National Incident Management System (NIMS) has been the United States’ framework for managing incidents for nearly a decade and a half. The fact that all agencies interviewed have implemented NIMS to some degree and have plans to or expressed an interest in further developing their NIMS programs are indications that NIMS is becoming embedded in the transportation sector and will help it contribute to the multi-disciplinary incident management system that the nation needs to respond to complex disasters. At the same time, the research points to several issues within these agencies as well as with NIMS itself that, if not addressed, could slow or block NIMS’ progress within the sector.

Quite importantly, the lack of clarity in NIMS compliance standards for transportation agencies – and the consequent uncertainty for those agencies about which compliance-related areas to focus their time and resources on – has led to inconsistent implementation efforts, most notably with respect to training. To mitigate this, the federal government, namely FEMA and USDOT, should work together to develop more specific NIMS standards adapted for the transportation sector and integrate them into the statewide NIMS implementation tracking process. Doing so would provide more authoritative support for the transportation-tailored training and guidance documents already in existence and would send clearer signals to transportation agencies at the city, metro, and state levels, making it easier for emergency management specialists in these agencies to advocate for enhanced agency-wide commitment to NIMS. Clearer standards for transportation might also increase the degree to which transportation agencies are integrated with first response agencies in NIMS implementation.

In designing NIMS implementation programs, policy makers should take account of the differences between first, second, and third circle response agencies, particularly the non-emergency-focused missions of second and third circle groups. These affect the time and resources these organizations devote to NIMS implementation. FEMA has recognized the need to simplify the NIMS doctrine and is in the process of doing so, not only due to second and third circle concerns but also to a general perception of NIMS’ over-complexity. The updated doctrine is expected to focus more on the concepts of incident management and EOCs, areas most relevant and useful to response groups, while downgrading other content that is already covered in complementary, overarching national preparedness doctrine. FEMA is also considering revisiting and simplifying the NIMS core curriculum so that students are not overwhelmed with content that is irrelevant to their expected level of involvement in emergency response operations. These are productive steps on the part of FEMA to sharpen NIMS, which should, in turn, allow transportation agencies to more efficiently focus their NIMS implementation efforts.
Simplifying NIMS may also have the added benefit of increasing the frequency with which it is utilized by transportation agencies. For transportation agencies to use NIMS as effectively as possible during incident responses, they must engage with it on a regular basis to develop and sustain proficiency. Many fire departments, for example, use ICS on all responses, whether minor or major, in order to build proficiency and confidence in using the system. Employing NIMS only during multi-agency incident responses, as some of the transportation groups interviewed reported, may be insufficient for second and third circle agencies to develop proficiency and be truly ready to mesh with other response organizations under the severe pressures of a major emergency. It should be the goal of these organizations to use NIMS on all incident responses and as consistently as possible when emergencies are not occurring through drills, exercises, and other mechanisms.

Simplification is one way of increasing the likelihood that second and third circle responders will use NIMS. But flexibility to customize NIMS – to adapt it to the operating circumstances of particular professions or services – is also important to second and third circle responders. Transit agencies, in particular, which tend to maintain command within their transit control centers during incidents instead of on-scene as espoused by NIMS, rely on this flexibility to carry out their emergency response operations effectively. With that said, over-customization of NIMS by agencies can lead to an inability to integrate with others during incidents.

The issue of customization thus creates a major tension. At its root, NIMS makes sense in order to prepare responders in all of the circles for major emergencies that require them to operate effectively in concert. That level of collaboration requires common systems that allow personnel from different organizations and professional disciplines to interact under great pressure when the stakes are very high. But under ordinary circumstances, that level of collaboration is frequently unnecessary; response organizations often can operate independently or with relatively low need for integrated action. The greatest need for NIMS proficiency comes under truly extraordinary conditions. Thus, on one hand, thoughtful customization allows NIMS to adapt to the operating requirements of different agencies and professions and makes the system more palatable, particularly to second and third circle organizations; on the other hand, sufficient standardization across professions is required to ensure that the basic premise of NIMS – collaboration through a common incident management framework – is achieved. There is no simple resolution to this dilemma, but it should be explicitly confronted by local and state emergency management agencies and their collaborators such as transportation agencies.

A key challenge for those responsible for NIMS implementation within second and third circle organizations is to find ways of showing the link between NIMS and their agencies’ mission priorities. If that link is not apparent, agency leaders are not likely to commit time, energy, and internal political capital to building NIMS capacity, and agency staff are much less likely to treat NIMS proficiency as a significant personal or organizational goal, resulting in incomplete penetration of NIMS within the agency, which was the case in some of the transportation agencies interviewed. In a major emergency, would those agencies’ personnel be genuinely prepared to collaborate with other responders more deeply experienced with NIMS? Minimal commitment is highly likely to result in reduced capability in times of stress.

While actual emergency incidents highlight the link between NIMS and an agency’s mission priorities most effectively, agencies must not wait for disaster to strike before taking serious action. But this requires emergency managers within transportation agencies to manage up (by convincing senior leadership of the risks their agencies face) and to manage across
(by finding ways to persuade managers in other divisions of the agency of the importance and priority of emergency preparedness). Drills, exercises, after action reviews, threat and hazard vulnerability assessments, and perhaps other initiatives can clearly illustrate the costs of inaction and, as importantly, the benefits to mission continuity that come from investments in NIMS implementation. But these are not self-evident propositions in agencies whose major mission is not emergency preparedness and response.

Finally, transportation agencies must find alternative ways of funding their NIMS-related efforts. It is unlikely that homeland security grant funding will, in the near-term, return to the levels witnessed in the years directly following the 9/11 terrorist attacks. Nor is grant funding intended to be a permanent solution to the sustainability of NIMS within the transportation sector. Transportation agencies must dedicate internal funding; and, since internal funding is likely to be limited, they must also find creative, low-cost ways to maintain NIMS proficiency through cost-sharing activities like conducting joint exercises with external partners and combining NIMS trainings with other professional training programs.

Transportation agencies have made important strides in NIMS implementation. But more work remains. Institutionalization of NIMS in transportation depends on addressing funding issues, improving transportation executives’ understanding of agency risk, increasing the frequency of NIMS utilization within agencies, simplifying the NIMS doctrine and curriculum, developing transportation-specific compliance standards and allowing agencies some flexibility in customization of NIMS to work effectively with the cultures and organizational practices within the sector. These challenges and opportunities can also be extended beyond transportation to other second and third circle response agencies; and they are important considerations as the country continues to strive to develop ever more robust and effective emergency response capabilities and systems across the “Whole Community.”
About the Authors

Nicholas B. Hambridge is Associate Director of Risk & Compliance Services at Harvard University and previously served as Harvard's Associate Director of Emergency Management where he oversaw the University's emergency planning, preparedness, response, and recovery activities. He is also a research affiliate of the Program on Crisis Leadership at Harvard Kennedy School where he conducts research on implementation of the federal government's National Incident Management System (NIMS) as well as best practices for emergency training, drills and exercises. Nicholas received his B.A. in international affairs from the University of Georgia and his M.B.A. in public & nonprofit management from Boston University. He is currently an M.P.A. candidate at Harvard Kennedy School. He may be reached at nick_hambridge@harvard.edu.

Arnold M. Howitt is Faculty Co-Director of the Program on Crisis Leadership (PCL) at the John F. Kennedy School of Government, Harvard University. PCL conducts research, executive education programs, and action projects. He is also Senior Adviser at the Kennedy School's Ash Center for Democratic Governance and Innovation. He has recently researched Nepal's emergency response to the 2015 earthquakes, lessons from the emergency response to the 2015 Paris terrorist attacks, the 2013 Boston Marathon bombing, Japan's response to and recovery from the 2011 earthquake/tsunami/nuclear accident, and China's emergency air pollution control measures. Among other writings, Dr. Howitt is co-author/editor of Public Health Preparedness: Case Studies (2017), Natural Disaster Management in the Asia-Pacific: Policy and Governance (2015), Managing Crises: Responses to Large-Scale Emergencies (2009), and Countering Terrorism: Dimensions of Preparedness (2003). Dr. Howitt received his B.A. from Columbia University and M.A. and Ph.D. in political science from Harvard University. He may be reached at Arnold_Howitt@hks.harvard.edu.

David W. Giles is the Associate Director and Senior Research Associate of the Program on Crisis Leadership at the John F. Kennedy School of Government, Harvard University. He is co-editor of Public Health Preparedness: Case Studies (2017), Natural Disaster Management in the Asia-Pacific: Policy and Governance (2015), and Managing Crises: Responses to Large-Scale Emergencies (2009) and is the author of a number of Harvard Kennedy School case studies on crisis management issues, including a series on state-level responses to the 2009 H1N1 pandemic; a case focusing on the Obama administration's handling of the Deepwater Horizon oil leaks; and another exploring the management of post-tsunami recovery in Indonesia. He previously served as a staff researcher at the National Academies and received his B.A. from Vassar College and his M.A. from the Elliott School of International Affairs at the The George Washington University. He may be reached at David_Giles@hks.harvard.edu.

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Appendix 1: General Interview Questions for City, Metro, and State Transportation Agencies

Agency and Department Overview:

- Please describe your agency's primary areas of responsibility with respect to emergency management. Which departments are responsible for which aspects? How many staff and what are their roles?

External Emergency Management Partnerships:

- Can you overview the emergency management community in your area? Which organizations are most involved? With whom does your agency collaborate most closely? How does your agency/department fit into this framework?

NIMS Implementation:

- How have you implemented NIMS within your agency?
- Do you view NIMS as primarily the emergency response structure (ICS) or other components as well (planning, preparedness, resource management, etc.)?
- What does it mean to you to be NIMS-compliant?
- Can you describe your agency’s general history with adopting and implementing NIMS? When did implementation start? What were the drivers? Any significant milestones in adoption?
- What have been major factors (internal and external) that have helped in facilitating NIMS adoption/implementation?
- What have been the major obstacles (internal and external) to adopting and implementing NIMS?
- What, if any, future NIMS implementation efforts do you foresee for your agency?
NIMS Training and Exercises:

- Please talk about ways in which you have trained agency staff on NIMS.
  - Individual? Team? Online? In-class? What are benefits and limitations of these approaches?
  - What staff? Level of staff? Types of departments?
- Please talk about ways in which you have conducted exercises using NIMS.
  - What types of exercises? How often?
  - What are the objectives you are trying to achieve by exercising - performance/plan evaluation, relationship-building, education/learning, compliance?
- What facilitates/impedes your ability to have a successful training and exercise program?
Notes

1 The development of NIMS was mandated by the Homeland Security Act of 2002. NIMS was introduced in 2004 as part of the National Response Plan (DHS, 2004). States and territories were subsequently required to meet federal NIMS implementation requirements by the end of FY05, and local jurisdictions were mandated to meet these requirements by the end of FY06 in order to receive federal preparedness funding in subsequent years (“Summary of NIMS Implementation Schedule, Requirements, and Certification Process,” U.S. Federal Emergency Management Agency, accessed January 1, 2015, http://www.fema.gov/pdf/emergency/nims/summary_of_nims_implementation_schedule.pdf).

2 Interview with senior DHS/FEMA official involved with NIMS implementation, July 14, 2014.


6 Rather than conduct a formal survey, we engaged our interview respondents in intensive conversations about NIMS in order to give them wide latitude to describe and assess how their agencies were implementing the mandate. We asked general questions with increasingly detailed follow-ups that were not part of a structured interview protocol but which instead pursued the specific points that the initial queries suggested. Hence our description of these conversations as “semi-structured.” See the “interview methods” section of this paper for greater detail about our research methodology.


11 FEMA online training: IS-100.b - Intro to Incident Command System (ICS 100), https://emilms.fema.gov/is100b/index.htm [accessed August 10, 2015].


14 Ibid.

15 Interview with a former state homeland security official who then also served as a senior DHS policy maker, February 25, 2016.

16 Ibid.

17 Ibid. and interview with senior DHS/FEMA official involved with NIMS implementation, July 14, 2014.

Interview with senior DHS/FEMA official involved with NIMS implementation, July 14, 2014.


U.S. Department of Transportation (USDOT), The National Incident Management System – A Workbook for State Department of Transportation Frontline Workers (Washington, DC: USDOT, 2009).


DHS, National Preparedness Goal.


DHS, National Incident Management System: Training Program.


The disciplines within the first two circles tend to serve in lead Emergency Support Function (ESF) roles. ESFs, which align with ICS, were developed within the field of emergency management as a way to group organizations with similar functional capabilities in order to improve the delivery of emergency services and the management of resources. USDOT at the federal level and Departments of Transportation (DOTs) in many states serve as the lead agencies for ESF #1 – Transportation. Even though second circle responders are not in the inner circle, they have closer ties to first responders through their ESF designations and, therefore, may have an easier time implementing NIMS than third circle responders.


38 Ibid.


41 Wallace et al., A Guide to Emergency Response Planning at State Transportation Agencies.


44 Frances L. Edwards and Daniel C. Goodrich, Emergency Management Training and Exercises for Transportation Agency Operations, Report 09-17 (San Jose, CA: Mineta Transportation Institute, 2010).

45 Interview with senior DHS/FEMA official involved with NIMS implementation, July 14, 2014.


47 DHS, National Preparedness Goal.

48 DHS, National Preparedness System.


52 Neal and Webb, “Structural Barriers to Using the National Incident Management System.”

53 Contraflow is the intentional reversal of traffic, usually used for expediting an evacuation.


56 “Implementation Guidance and Reporting,” FEMA.

57 Interview with senior DHS/FEMA official involved with NIMS, July 14, 2014.

58 Interview with senior USDOT official involved in emergency management, July 3, 2014.

59 DHS, National Incident Management System: Training Program.

60 Interview with senior DHS/FEMA official involved with NIMS, July 14, 2014.

61 Ibid.

62 Ibid.