Communications is an inseparable component of modern command and control systems. In the United States, the Incident Command System (ICS) has evolved during the past 30 years from its military roots to serve domestic emergency response needs, including communications. Today, ICS provides a rich set of tools for managing human and technological resources to ensure effective and efficient management of emergencies of all scales.

Introduction

Communications is an inseparable component of modern command and control systems. In the United States, the Incident Command System (ICS) has evolved during the past 30 years from its military roots to serve domestic emergency response needs, including communications. Today, ICS provides a rich set of tools for managing human and technological resources to ensure effective and efficient management of emergencies of all scales.

Unfortunately, as we have often seen, communications and command failures are intertwined. Structured, consistent means of managing communications resources are necessary, particularly during incidents involving multiple agencies. ICS establishes basic principles, practical tools, and a definitive structure for supporting communications needs during emergency response.

This Issue Brief presents background on communications within the National Incident Management System and its Incident Command System. It examines the role of communications within these constructs, as well as in the context of multiagency response to disasters and emergencies. It concludes with operational best practices for effective use of incident communications units.

Homeland Security Presidential Directives

In 2003, President George W. Bush issued two directives that have had a profound impact on emergency response and management in the United States. Homeland Security Presidential Directive 5 (HSPD-5), issued on February 28, and HSPD-8, issued on December 17, are only in the...
beginning phases of implementation by local, state, tribal, and federal governments.

**HSPD-5**

HSPD-5, “Management of Domestic Incidents,” established a single, comprehensive National Incident Management System (NIMS), to be developed and administered by the Department of Homeland Security (DHS) for use by all levels of government. It noted that for purposes of interoperability and compatibility, “NIMS [would] include a core set of concepts, principles, terminology, and technologies covering the incident command system; multi-agency coordination systems; unified command; training; identification and management of resources (including systems for classifying types of resources); qualifications and certification; and the collection, tracking, and reporting of incident information and incident resources.”

HSPD-5 also required the Secretary of DHS to develop, submit for approval, and administer a National Response Plan (NRP) that would use NIMS for the provision of federal support to state and local agencies during domestic incidents. It required the adoption and use of NIMS by federal agencies in support of state and local government during domestic incidents and established federal Fiscal Year 2005 as the beginning of requirements for NIMS adoption by state and local agencies receiving federal preparedness assistance. It also required development of standards and guidelines for assessing that adoption.

**HSPD-8**

HSPD-8, “National Preparedness,” provided further definition of requirements that would affect agencies receiving federal assistance. Its purpose is to strengthen preparedness capabilities of all levels of government to terrorist attacks, major disasters, and other emergencies. It required development of a National Preparedness Goal (NPG) that includes readiness metrics, as well as full implementation of a closely coordinated interagency grant process for first responder preparedness assistance by the end of federal Fiscal Year 2005. The directive notes that, “[t]o the extent permitted by law, Federal preparedness assistance will be predicated on adoption of Statewide comprehensive all-hazards preparedness strategies.”

Three of the seven national priorities articulated in the NPG are particularly relevant to the communications aspect of emergency response:

- Implementation of a NIMS
- Strengthening of information-sharing and collaboration capabilities
- Strengthening communications interoperability.

The NPG relies on an approach called Capabilities-Based Planning to reach the goal. The approach uses 15 standardized National Planning Scenarios, a Universal Task List (UTL) to reference tasks performed by all levels of government and different disciplines during incidents, and a Target Capabilities List (TCL) that identifies capabilities needed to perform the tasks.

The National Response Plan provides a concept of operations with which state and local emergency operations plans are intended to be aligned. Emergency operations plans are supported by or built on standard operating procedures (SOP) that are intended to be consistent with NIMS guidelines, standards, and protocols. Emergency planners are expected to identify tasks from the UTL that their organizations need to perform based on their assigned roles and mission. The TCL descriptions are used to determine the capabilities needed to accomplish these tasks.

Currently, there are 36 capabilities in the TCL, of which 32 are grouped into four mission areas: prevent, protect, respond, and recover. The remaining four are capabilities common to all mission areas. Interoperable communications is second among the four common capabilities. Adoption and incorporation of NIMS and the capabilities listed on the TCL will lead to advanced interagency communications that support common response processes.

Specific information on the National Response Plan tasks and capabilities can be found in the DHS Lessons Learned Information Sharing web site.

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2 Ibid.


6 The other three are planning, citizen preparedness and participation, and risk management.

7 The Lessons Learned Information Sharing web site is available only to emergency response providers and homeland security officials. Registration is required and eligibility is verified. See [https://www.llis.dhs.gov](https://www.llis.dhs.gov).
Effects of HSPD-5 and -8 on Local Agencies

The federal government has been most significantly affected by these presidential directives. Local government, however, is recognized as the provider of the vast majority of first response capabilities in the United States. As reliance on federal funding of local first response has grown since the events of September 11, 2001, local agencies have become subject to the presidential directives.

One intent and effect of the HSPDs was to standardize the mechanisms by which government agencies work together during emergency incidents. As directed, preparedness assistance grant programs have become closely coordinated with implementation of the NRP, adoption of NIMS, and realization of target capabilities. Work is underway by committees of practitioners working through DHS to define conditions and standards for each task, as well as performance measures and metrics to assess capabilities.

In federal Fiscal Year 2005, the DHS linked its grant programs to completion of Tactical Interoperable Communications Plans (TICP). Each region receiving Urban Area Security Initiative (UASI) funding was required to complete a TICP, as were designated metropolitan areas in states without UASI regions. The plans were due by May 1, 2006, to be followed by exercises within the jurisdictions validating the plan within a broader homeland security exercise and evaluation program.

Principles of NIMS ICS

National Incident Management System

In March 2004, DHS introduced NIMS. It is, first and foremost, a common set of concepts, principles, terminology, and technology to improve emergency response. It also provides standard

resource, organizational, and operational definitions. One key NIMS component is an Incident Command System (ICS) familiar to many first responders across the country.

The NIMS ICS is built from 30 years of experience with large-scale emergencies. Based on military models, early incident command systems emerged in the public safety world through efforts of California firefighting and emergency management agencies to deal with devastating wildfires. These systems broadened and evolved over the years to now serve in emergencies and disasters of all types.
NIMS ICS evolved primarily from the earlier National Interagency Incident Management System (NIIMS), a system broadly adopted previously by local, state, tribal, and federal agencies. It is the NIMS command and management sub-system designed to provide effective and efficient tools for emergency response. Today, NIMS ICS use is a requirement of federal funding for agencies in domestic emergency response.

**ICS Principles and Communications**

NIMS ICS is based on 14 management principles. Two are particularly notable when it comes to communications interoperability. ICS is built on the following:

- Common terminology covering organizational structures, operational resources, and facilities
- Integrated communications, including development and use of a common communications plan covering processes and technology.

**Common Terminology**

The importance of common terminology is clear in interagency communications: responders cannot coordinate and operate if they are unable to understand one another when they try to communicate. The need for common terminology precedes incident response, however. Preincident planning and coordination require a common language to articulate needs, describe processes, establish policies, craft joint SOPs, and ultimately command resources during interagency operations. Interagency communications SOPs require a common dialect for describing the “who, when, why, where, what, and how” of operations.

**Integrated Communications**

Under ICS, communications and incident action plans have to be integrated to capture management goals and operational objectives. Integration of supporting services and technologies is critical to effective incident response. Since responder safety and effectiveness are closely related to how well communications supports them, the capabilities and capacity of systems to support operations is taken into account continuously during incident action planning.

Communications is integrated into ICS-based management systems by the early establishment of a communications unit during incidents and involvement of the Communications Unit Leader in incident action planning. This is not only to ensure that the response is well supported by communications, but also to reinforce chosen command structures and operating principles generally embodied in ICS, such as management span of control.

Integrated communications:

- Ensures that incident management goals and objectives are captured
- Maximizes responder safety and accountability
- Is continuous throughout an incident
- Reinforces command structure and span of control.

**Communications in the ICS Structure**

The communications unit is often established early in multiagency and large-scale responses managed under ICS to support the integration effort. This is intended to bring all communications functions close to incident command, rather than having them managed far from pressing operational considerations.

Structurally, the Communications Unit in NIMS ICS operates in the Logistics Section, under the Service Branch. See Figure 1. It is managed by a unit leader, consistent with other NIMS position-naming conventions. Dispatchers (radio operators) and communications technicians serving the incident are also part of the unit.

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Operational Best Practices

Implementation of multiagency incident communications systems organized under ICS first demands a rigorous definition of operational plans far beyond communications. Many, if not most, cases of interagency communications failures are attributable to either poor command systems or a weak definition of interagency operational needs. Who needs to talk to whom, under what circumstances, must be defined well before communications can serve to enable their response.

For example, even the common citizen can understand that having all responders on a single radio channel during an event of any significant size would be chaos. Likewise, conducting command, operational, and logistics tasks on a single channel during a sizeable emergency is a recipe for disaster. Separate channels for individual functions are crucial to maintaining command and control.

Hierarchical Communications

Whether communications occur by voice over radio, data over fixed wires, or even in person, there is great need in organizations—particularly those evolving dramatically during the compressed time frames of emergencies—to communicate “through channels.” From military roots, the ICS provides a hierarchical chain of command that expands and contracts based on the size and needs of incidents. Through this classical organization of human functions, each person fulfilling a role has a clear route, if not means, of communications up and down the chain of command.

ICS responders speak of the need to “talk up one and down one,” meaning that they need to talk up the command chain one slot to their supervisor and down one to everyone they supervise. Beside the Incident Commander (IC), who is the top-level supervisor from an incident command perspective, and the lowest crew member, who supervises no one, every other person in the command chain needs to talk through channels up one and down one.

The common citizen probably does not recognize how easily communications channels get overwhelmed or how difficult it is to sift out extraneous information during intense emergencies. Too much information can be as debilitating as not enough.

“Talk up one and down one”: Talking up the command chain one slot to your supervisor and down one to everyone else you supervise.

Often, the need for interagency communications arises because response elements have not been combined into a single operational unit, leading to a need for more communications resources: yours, mine, and now ours. The age-old approach of patching each responder’s channel into one big party line often causes more problems than it solves.
The amount of traffic on each channel is potentially multiplied by the number of channels being combined—just when internal communications needs skyrocket. The sheer volume of information and context-switching demanded during large emergencies forces greater focus in communications, not simply more.

Hierarchical communications is part and parcel of the ICS. The organizational structure of an incident response that cannot be drawn clearly cannot be served adequately by communications. In effect, the lines between functions in an ICS organization chart depict needed channels of communications of some form or another. Multiple or circular paths of command/communications in such a chart are clear indicators of where communications problems will occur. The notion of “one up, one down” is of much greater intent than merely how many radio channels one person can manage.

Communications Procedures

Clearly, operational definition of requirements is necessary for communications to support needs during an actual response. It is impossible to build communications capabilities in preparation for or during emergencies without a detailed understanding of the responders’ individual and organizational hierarchy needs. Certain operational best practices have arisen and are offered in this Issue Brief for consideration. Communications procedures, formalized position duty descriptions, incident staffing recommendations, and a sample incident communications plan are provided.

The following communications procedural practices have been widely adopted in multihazard response systems. The term “channel” is used here in a generic sense to refer to any of a wide variety of means of communicating from one point to another using electrical or electromagnetic signals. Voice radio channels may be most commonly assumed, although other forms of communications are equally applicable.

■ Emergency Traffic
  
  How is it announced? Who’s in charge?
  How is it cleared?

Even during emergencies, a given radio transmission may have a higher or lower priority over competing traffic for the channel. The phrase “emergency traffic” is used to gain priority access to a unit’s operational or designated emergency channel. The phrase is transmitted by the responder in need, causing the channel controller—often a unit leader, dispatcher, or radio operator—to stop other use of the channel and defer to the caller until normal traffic can resume.

■ Channel Span of Control
  
  How many resources can be assigned?

The optimum number of units on a channel is very dependent on their tasks. Some positions and tasks require very little access to radio channels, while others make heavy use of a single channel between team members and stakeholders for safety on access to it.

Ideally, a single channel is assigned to support and enforce the standard ICS span of control of one manager or supervisor over three to seven subordinates. That may be the operations section chief communicating with three functional group supervisors or a group supervisor communicating with five tactical team leaders, for example.

The most common response heard from communications and incident managers faced with the need to maintain a channel span of control is that limited channel availability prevents this from being implemented. The result is too many people on too few channels—and communications overload.

A corollary is that responders using a channel can and do become overwhelmed by the amount of traffic on it, particularly if the traffic isn’t immediately relevant to their assignment. This leads to lost messages, contention between users, and—too often—responders turning down the volume on their radios to focus attention. Anyone ever involved in a large-scale emergency response with dozens of responders in a small area, each carrying a radio with busy channels, knows how difficult communicating can become. Responders conditioned to rely on scanning multiple radio channels during routine emergencies are most adversely affected when the volume of communications in larger incidents outstrips their ability to assimilate all the information and their radio’s ability to prioritize incoming transmissions.

There is no easy answer to this dilemma of too much communications for too few channels. The most critical resource shortage in this regard is for voice radio channels, but it can and does occur with
other channels of communications, such as data networks. Ultimately, there has to be greater capacity or less demand one way or another. As is regularly experienced, the alternative is to suffer the proverbial “commo problems.”

Communications and incident managers must look for opportunities to reduce radio traffic when channel availability is constrained. This can be done procedurally and/or through adaptation of technical capabilities. In the former case, procedures can be implemented to reduce the amount of traffic contending for limited channel space. Greater communications discipline is needed as incidents grow in size, somewhat limiting raw demand for channels. Similarly, teams of responders able to communicate directly among themselves, without resorting to radio transmission, may have to do so in order to release the channel for more pressing needs. Delegated and dispersed decision-making reduces communications demands as well.

Technology itself also leads to overwhelmed channels of communications. In routine emergencies, responders may need access to channels that cover entire jurisdictions. As incidents grow in size and the pace of activity increases, responders become responsible for fewer, more intense and focused tasks. In such cases, their communications needs narrow in geographic scope, too.

The solution is to simplify communications, where possible. Use of direct, simplex radio channels in tactical operations, for example, can release wide-area, repeated channels for more appropriate use. Such localized use allows the channel to be reused elsewhere in the jurisdiction outside of the geographic range of interference between radios.

- **Standard Language**
  **Common terminology, standard resource definitions, naming conventions, plain language.**
  Much of what passes as poor communications is actually *miscommunications.* NIMS ICS and its predecessors identify as its first management characteristic the use of common terminology for organizational elements, position titles, resources, and facilities. One of the most important policies that can be established for interagency communications is a common terminology to be used by responders, further reinforced through procedures.

  In addition, standard resource definitions improve interoperability. From a communications standpoint, it is critical to have standard naming conventions for channels and other communications resources across jurisdictions. It is fairly common for agencies that work together to have common radio channels at their disposal that they are unaware of or that are named so differently that nobody would associate them. Some regions go so far as to establish not only standard names for shared channels or talk groups, but also standard programmed positions in the radios for interagency resources.

  Last, the most important language policy that can be adopted to improve interagency communications is the use of **plain language**—eliminating codes and jargon. This is a simple idea, but every vocation and avocation has its own terminology. When these diverge across agencies and disciplines, responders don’t communicate.

- **Communications-Order Model**
  **Positive message acknowledgment and the five-step process.**
  We recommend the use of communica-
communications procedures that ensure that messages are received and comprehended. In its simplest form, the communications-order model—as practiced by many emergency response agencies—occurs between two individuals. It is initiated when the intended receiver indicates readiness to receive a message. The message is transmitted and the receiver restates the message to confirm that it was understood. If correct, the original sender confirms, completing the communications sequence.

For example, an exchange between an incident command post and an outer perimeter security team would follow these five steps:

1. “Front Street Road Block, this is Command Post.”
2. “Command Post, Front Street Road Block.”
3. “Allow the Centerville Tactical Team through and direct it to River Road Staging.”
4. “Centerville Tactical Team to River Road Staging.”
5. “Affirmative.”

■ Operational Unit Reporting
We recommend using a standardized status reporting procedure for operational units. It provides basic information for command decision-making and responder accountability, while making efficient and effective use of communications channels.

The unit can prepare a quick report that provides its current position, progress with its current task, a statement of any resource or support needs, and a simple statement accounting for personnel assigned to the person preparing the report. Such a personnel accountability report provides a positive acknowledgment that the unit is intact and safe.

Communications Positions
A second set of operational best practices can be drawn from accepted responsibilities for standard ICS communications positions. As previously noted, the National Interagency Incident Management System, or NIIMS, was the primary precursor to NIMS. The position management system developed for NIIMS by the National Wildfire Coordinating Group (NWCG) provides the bulk of formal ICS position descriptions available today.

Four positions have been defined within the ICS Communications Unit: the Communications Unit Leader, Incident Communications Technician, Incident Communications Center Manager, and Radio Operator. Task books charting the duties of each position were created by NWCG and are available online.8

■ Communications Unit Leader (COML)
The Communications Unit Leader, commonly referred to by the position acronym COML, has a host of duties. Broadly, they include the following:

- Prepare the Incident Communications Plan
- Establish and manage the Incident Communications Center (ICC)
- Manage personnel within the unit
- Manage communications equipment assigned to the incident
- Establish communications capabilities and logical radio nets
- Provide any required off-incident communications links
- Participate in incident action planning.

The COML position is often staffed early in ICS-based response systems. It is one of the few noncommand or general staff positions involved in incident action planning. It bears the responsibility of integrating communications—that is, of ensuring that operations are supported by communications by directly participating with incident management.

The COML must understand ICS and local response systems well enough to be a contributing “noncommissioned” member of the command team. This typically requires someone with broad technical, managerial, and operational skills, not to mention problem-solving abilities.

The position is responsible for developing the Incident Communications Plan (ICS Form 205) and establishing the ICC. The Communications Plan is traditionally a key part of the Incident Action Plan, itself the central document in emergency response organized under ICS. The COML is responsible for submitting an up-to-date Communications Plan for inclusion in each rendition of the Incident Action Plan, which may be updated during each operational period—often twice daily.

The ICC is primarily a point of dispatch and secondarily a depot for equipment and repairs. During larger incidents, it serves as the junction between traditional, standard dispatch centers and the on-scene responders. It generally is collocated with command and planning functions to create the Incident Command Post (ICP). The Communications Unit Leader manages staff, facilities, and other resources assigned to the ICC.

■ Incident Communications Technician (COMT)

Incidents involving more than a few agencies and extending over more than a day or two often require communications technician skills. The Incident Communications Technician is needed to deploy advanced equipment and keep it operational.

■ Incident Communications Center Manager (INCM)

The Incident Communications Center Manager position is filled when the COML’s span of control would be exceeded either by the complexity of the incident, requiring an unusual degree of involvement in incident action planning, or by the number of technicians and radio operators assigned to the unit. The INCM serves primarily to supervise radio operators and manage the increased complexity of an ICC during large incidents.

■ Radio Operator (RADO)

Radio Operators may either serve as dispatchers or in assignment to incident command or general staff. In the past, RADOs were often pulled from the ranks of on-scene responders and, with little training, were put to work in a command post during incidents. In recent years, however, tactical dispatch teams developed from professional 9-1-1 center staff have become more common.

Communications Unit Staffing

Under the ICS, standard resource-type definitions are used to distinguish the varied capabilities of different classes of resources. Type I resources—whether individual or team—are the most capable, while Type IV resources are the least capable.

The following chart depicts a sample resource typing for communications units. It shows how staff numbers and capabilities, equipment, availability, and management capability are used to classify resources. This may be done to prequalify teams before they are dispatched in support of an incident or simply to standardize definitions for classifying existing resources within a region.

Communications Unit staffing needs vary according to the scope and scale of the incident. More Radio Operators and Incident Communications Technicians are needed as more agencies and responders are involved. Multiple communications units may even be necessary for geographically dispersed incidents.

Incident Dispatch Resources

At least two organizations exist for the benefit of incident dispatch. The California Tactical Dispatcher Association is focused primarily on police operations: http://www.tacticaldispatch.com/.

Incidentdispatch.net, also based in California, is more broadly focused on all-risk incident communications: http://www.incidentdispatch.net/.
<table>
<thead>
<tr>
<th>Minimum Capabilities (Component)</th>
<th>Minimum Capabilities (Metric)</th>
<th>Type I</th>
<th>Type II</th>
<th>Type III</th>
<th>Type IV</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personnel</strong></td>
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<td>1 COML</td>
<td>1 COML</td>
<td>1 COML</td>
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<td>4 RADOs</td>
<td>2 RADOs</td>
<td>2 RADOs</td>
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<td></td>
<td></td>
<td>1 COMT</td>
<td>1 COMT</td>
<td>1 COMT on call</td>
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<tr>
<td><strong>Equipment</strong></td>
<td>Communications</td>
<td>Multiband, multiagency communications equipment</td>
<td>Multiband, multiagency communications equipment</td>
<td>Basic multiagency communications equipment</td>
<td>Basic single agency communications equipment</td>
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<td></td>
<td></td>
<td>Advanced encryption</td>
<td>Basic encryption</td>
<td>Cellular telephone</td>
<td>Cellular telephone</td>
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<td>Regional communications</td>
<td>Regional communications</td>
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<td>Satellite communications</td>
<td>Cellular telephone</td>
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<td></td>
<td></td>
<td>Advanced wireless data</td>
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<td></td>
<td></td>
<td>Cellular telephone</td>
<td></td>
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</tr>
<tr>
<td><strong>Availability</strong></td>
<td>Duration</td>
<td>Available for extended operations (greater than 1 week)</td>
<td>Available for extended operations (greater than 1 week)</td>
<td>Available for short-duration operations (1 week or less)</td>
<td>Available for short-duration operations (1 week or less)</td>
</tr>
<tr>
<td><strong>Management Support</strong></td>
<td>Coordination Capabilities</td>
<td>Incident staff capable of managing the Communications Unit</td>
<td>Incident staff capable of managing the Communications Unit</td>
<td>Incident staff capable of managing the Communications Unit</td>
<td>Team management only</td>
</tr>
</tbody>
</table>

**Incident Communications Plan**

As one of many standard forms that have been developed for use with the ICS, the Incident Radio Communications Plan—known as the ICS 205—is used to document radio channel assignments, functions, and technical parameters. Templates may be developed to fit predetermined incident response plans that are then customized as needs dictate.

The ICS 205 is a standard part of the Incident Action Plan under ICS.

- Specific to an incident or scenario:
  - Geographically
  - Scope: number of jurisdictions and disciplines
  - Scale: number of responders.

Operationally, it identifies:

- Participating disciplines/agencies
- Incident command structure
- Functional communications resource assignments
- Usage priorities, procedures, and protocols.

The ICS 205 lays out the basic resources available to the incident to meet its goals and objectives. Detailed resource lists, policies, and procedures are adjuncts that may be used by Communications Unit staff, but are unnecessary and typically unwanted as part of an Incident Action Plan.

Operational best practices are key to effective communications under ICS. They include establishing hierarchical communications that follow ICS organizational structures, adopting and using standard communications procedures, activating ICS communications unit positions, and staffing the communications unit based on the extent of the incident.

**Conclusion**

The ability of responders to work together across agencies during emergency incidents of all types—interoperability—depends heavily on their ability to communicate. Those communications must follow a well-regulated command structure that establishes roles, responsibilities, and well-understood mechanisms for managing the complexity of the multiagency response.

Communications interoperability means more than just the technological capacity for emergency responders to talk to one another. Communications capabilities in interoperable response systems must be built around the operational goals and objectives of responding agencies in order to serve appropriately as assets rather than liabilities, as has too often happened. The key to good communications is integration of operations with supporting systems comprising people, procedures, and technologies.

The best executed plan for communications during incidents cannot overcome poor operational preplanning, nor can it substitute for proper incident command. On the other hand, poor communications can most certainly disable otherwise adequate emergency response. Well used, communications provides a necessary means for support of emergency response through the Incident Command System.

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9 Standard versions of many ICS forms can be found at the FEMA web site. See [http://training.fema.gov/EMIWeb/IS/ICSResource/ICSResCntr_Forms.htm](http://training.fema.gov/EMIWeb/IS/ICSResource/ICSResCntr_Forms.htm).
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Areas of Assistance:

- Effective governance structures development
- Strategic planning
- Infrastructure assessment and development
- Needs analysis and assessment
- Operational requirements development
- Policy and procedure development
- Risk management

To apply for TA in these areas or review additional SEARCH TA focus areas, see [http://www.search.org/services/ta/](http://www.search.org/services/ta/).