

The Concept of Assisted Management of Large-Scale Disasters by Horizontal Organizations

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Abbreviations:

CAP = Crisis Action Planning
CIMIC = Civil-Military Information Center
CMOC = Civil-Military Coordination Center
COE = Centers of Excellence
DART = **Not found in text only graphic**
DoD = Department of Defense
HEIC = Hospital Emergency Incidence Command System
HOC = Humanitarian Operations Center

Abstract

Management of large-scale disasters is impeded by inadequately designed organizational infrastructure. The vertical organizational structures of most agencies responding to disasters contribute to a poorly integrated response, especially when collaboration, information sharing, and coordination are required. Horizontal (or lateral) organizations have assisted traditionally vertical civilian and military agencies by enhancing their capacity to operate successfully in complex human emergencies and large-scale natural disasters. Because of the multiagency and highly technical multidisciplinary requirements for decision-making in chemical and biological disasters, similar horizontal management options must be considered.

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ICS = Incident Command System
ICRC = International Committee of the Red Cross and Red Crescent
IFRC = International Federation of the Red Cross and Red Crescent
IOS = International Aid Organization
IT = information technology
JIATF = Joint Interagency Task Force
JTF-CS = Joint Task Force – Civil Support
NGO = Nongovernmental Organizations
OCHA = UN Office of the Coordinator for Humanitarian Affairs
PVO,IO = **Not found in text only graphic**
UN = United Nations
WFP = **Not found in text only graphic**
UNHCR = **Not found in text only graphic**
UNICEF = **Not found in text only graphic**
WHO = World Health Organization
USAID = **Not found in text only graphic**
OFDA = **Not found in text only graphic**

Introduction

Many countries are poorly equipped to develop a comprehensive national disaster response system because of the vertical structure that exists within their key response organizations. This becomes most evident when governmental organizations and agencies are required to optimize coordination and communication during large-scale disasters. Vertical constraints have plagued nongovernmental relief and assistance organizations (NGOs), international aid organizations (IOs), and military peacekeeping forces in complex emergencies in which a lack of coordination and communication may paralyze response capacity and capability. Similar problems affect multiagency and multidisciplinary responses to radiological, chemical, and biological accidents and acts of terrorism, decreasing the capacity of these agencies and disciplines to meet the requirements of collaborative decision-making.

Cooperation and coordination

VERTICAL ORGANIZATIONS	HORIZONTAL ORGANIZATIONS
<ul style="list-style-type: none"> • Defined by organizational chart • Hierarchical • Authority concentrated at top of organization • Stove-piped information sharing • Predictable lines of internal communication and duties • Product oriented • Efficient and effective model in business • Centralized and independent • Responsible only to the organization • Limited capacity to change • Responses are predictable • Information technologies optimize internal communication • Training is standardized • Difficulties in dealing with new mission-critical horizontal issues 	<ul style="list-style-type: none"> • Not dependent on organizational chart; structure is flat • Authority distributed; decentralized • May utilize several management options internally • Interdependent functions • Product is coordination • Requires flexibility in thought and action • Friendly model for multiple agency and interdisciplinary collaboration • Functionally dependent on information sharing • Information technologies prioritize external coordination • Process not easily understood • Requires education, training and exercises • Architecture responsive to rapid change requirements

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Table 1—Characteristics of vertical and horizontal management structures

among emergency responders “must not be taken for granted by planners and cannot be overemphasized.”^{1,2} Unfortunately, organizational relationships are frequently marked by competition, rivalry for public attention and resources, disrupted communications, differing priorities, differential leadership styles, cultural differences, inconsistent procedures, and contradictory observations, all of which generate delays in response.¹ This is most evident when vertically structured civilian or military organizations either are reluctant or unable to share the proprietary information and intelligence property that is critical to the coordination process.

Horizontal (also referred to as lateral) organizations can be defined as organizational architectures or structures that optimize coordination, communication, and collaboration of functional components within and/or between organizations. The purpose of this concept paper is to introduce and discuss horizontal management options to existing disaster management approaches, especially to large-scale disasters.

Management Concepts

Vertical organizations

Vertical organizations have been the mainstay of industry and governments since before the Industrial Revolution. The term implies a structure with a vertical hierarchy of authority that determines decision-making at all levels (Table 1). Authority is concentrated at the top of such an organization; thinking-out problems is delegated to management and to those individuals who focus on specialized and generally fragmented tasks to implement actions.³ Most vertical organizations and agencies in the developed world create an organizational chart to depict who does what, when, how, and where. Movement and information sharing within an organization either is downward or upward. Many governmental and non-governmental organizations have vertical management structures commonly referred to as 'stovepipes', because they offer access only at the bottom or the top; there is no connecting flow from one

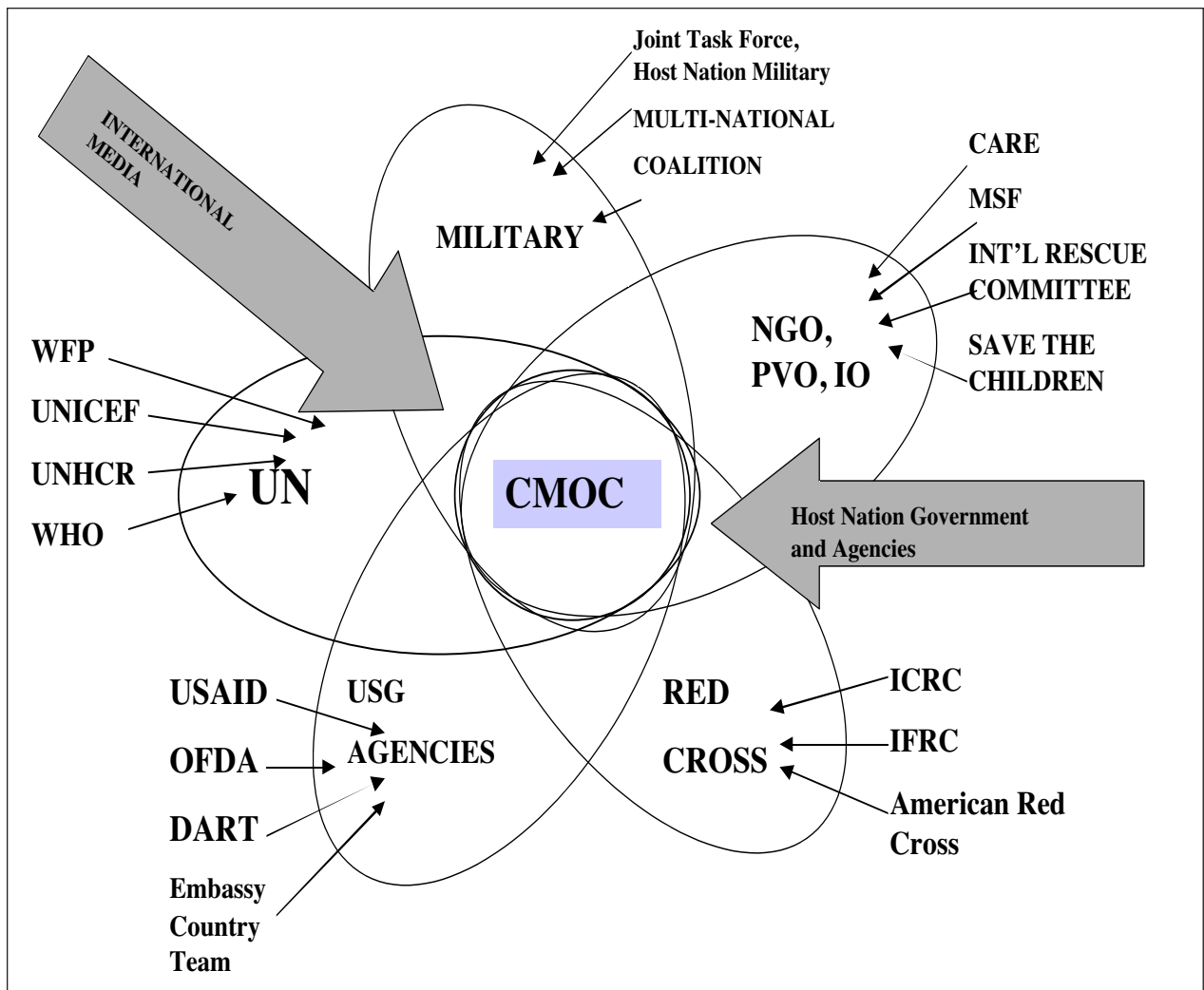
pipe across to the next. Even if the pipes are attached to the same source, there is little or no communication among them, and, therefore, the possibility of functional collaboration between or within agencies or organizations is limited.

In most domestic disasters, vertically organized agencies work in an efficient manner to maintain standards of response implemented through state and regional departments. This is most evident in organizations in which strict lines of authority and tasks determine the response capacity during times of emergency (e.g., military, police, fire, and ambulance services).³ These organizations use strict protocols and standardized operating procedures, and have detailed agreements defining the relationships between one another. Any deviation from the daily routine and the ‘tried and true ideas’ may result in confusion and alarm. Vertical organizations are at their best when standardized functioning is applied to familiar routine tasks; however, such organizations are at their worst in unusual situations requiring initiatives.¹ This clash between bureaucratic procedures and the emergency demands of a disaster has remained unchanged over time.⁴

Horizontal Organizations

Horizontal organizations have emerged as options to the traditional vertical model of management when a multi-agency or multidisciplinary approach has been required to solve major problems for which no one agency or organization has the answer (Table 1). This structure is most useful in large workforces characterized by a variety of skills and technical expertise that requires sharing of information not owned by any one individual or organization. De Bono suggests that the major tenet of horizontal thinking is to break old patterns and reorganize in a completely new fashion, for, although continuing to develop strategies out of old patterns may lead to solutions, they not necessarily are the most efficient or effective.⁵⁻⁷

Horizontal management processes can be categorized as either internal or collaborative. Examples include individual



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Figure 1—Civil-Military Operations Center, modified from Joint Task Force Commander's Handbook for Peace Operations, 16 June 1997

businesses that, by reengineering themselves internally, have met the requirements of emerging information technologies and the demand for downsizing. Moreover, during this past decade, vertical organizations such as the military have been forced to collaborate externally with multiagency civilian organizations in a number of major short- and long-term international disasters. When the external military disaster management role is completed, the functional vertical organization model should resume intact. In response to an external emergency, state and federal emergency management agencies and organizations may find themselves rapidly "lateralizing" either their entire vertical architecture or only a small component within the organizational chart. Lateralizing processes may range from voluntary contacts between organizations, to designation of professional liaison personnel, to the creation of complex and formally chartered emergency response teams. For this to work smoothly, flexible training, education, and response protocols that address lateralizing options, are required for organizations that may be deployed to respond to large-scale disasters.

Examples of Horizontal Organizations

Horizontal Organizations in Complex Emergencies

Complex emergencies result from conflict and war in disrupted states such as northern Iraq, Somalia, Rwanda, Angola, the former Yugoslavia, the Province of Kosovo, and East Timor. These catastrophic public health emergencies require a delicate triage of scarce resources and a highly orchestrated approach to acute care and preventive medical and public health programs just to decrease the immediate mortality and morbidity. Health care professionals face challenges in coordinating assessments and surveillance programs, treatment protocols, the rehabilitation of essential health services, multiagency logistics, the implementation of public health programs in water, sanitation, food, shelter, and refugee camp management, and the frequent transitions from one agency authority to another, to name just a few. The international humanitarian community response requires unprecedented coordination of many professionals representing many disparate agencies (e.g., coalition military forces, United Nations agencies, multiple

Level	Structure	Functions
Strategic/Policy	<ul style="list-style-type: none"> United Nations Interagency Standing Committee (IASC) 	<ul style="list-style-type: none"> The IASC is the means by which the UN Office of the Coordinator for Humanitarian Affairs (OCHA) and the UN Emergency Relief Coordinator (ERC) coordinates the operational support and effective performance for mobilizing and financing the international humanitarian effort.
Operational	<ul style="list-style-type: none"> Lead UN Agency Humanitarian Operations Center (HOC) On-Site Operations Coordination Center (OSOCC) 	<ul style="list-style-type: none"> The UN Secretariat designates a lead humanitarian operational agency (e.g. UNHCR) to provide a coordinated unity of effort among UN agencies, NGOs and donors. Normally established under the direction of the government of the affected country. Coordinates overall relief, identifies logistics requirements for NGOs, IOs and UN, identifies, prioritizes and submits requests for military support. Horizontally structured with no command and control authority where all members are ultimately responsible to their own organizations or countries. Assists in gathering evaluating, collating and disseminating HOC information. May facilitate HOC meetings.
Field	<ul style="list-style-type: none"> Civil-Military Coordination Center (CMCC) Civil-Military Center (CIMIC); also referred to as Civil-Military Operations Centers (CMOC) 	<ul style="list-style-type: none"> Accessible to key representatives of the civil authorities and heads of IOs and NGOs. Provides a passive coordination and information-sharing focal point for organizations involved. Established at the tactical (Unit) level outside UN military forces compound. Provides access for non-military agencies desiring help and coordination from the military. Daily updates of operational and security situation. Information and coordinate of planned and ongoing joint projects.

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Table 2—The policy, operational and field level organizations within the UN that have horizontal functions

NGOs, the International Committee and Federation of the Red Cross and Red Crescent [ICRC/IFRC], and host nation resources). This multiagency response to complex emergencies has grown rapidly both in size and complexity. For example, in 1991, only 28 NGOs were active in the emergency in northern Iraq; four years later, more than 700 NGOs responded to the crisis in Haiti.

Traditional approaches to management have failed, especially when civil-military coordination has been required. Managers and decision-makers in both northern Iraq and Somalia, stated that they were forced to make major decisions in areas they knew little about. Nor did they know where to find that expertise despite it being functionally close-at-hand.⁸ Many IOs, NGOs, and private governmental organizations, such as the ICRC, have resisted civil-military collaboration for fear of losing the impartial and neutral status that is required under international law. Rigid functional distinctions in the field, not always are possible, however, and Pugh argues that military involvement and armed protection is as beneficial in preventing or mitigating human suffering as is aid itself and that, functionally, military protection of humanitarian relief and the direct provision of relief by NGOs are

“inevitably blurred.”⁹ This suggests that some degree of lateral management is required in all complex emergencies. All of the management organizations established by the UN are horizontally structured with both civilian and military directorships and representation, examples of which are the Civil-Military Coordination Centers (CMOC) (Figure 1), Civil-Military Information Centers (CIMIC), and the policy-level Humanitarian Operations Centers (HOC) (Table 2). Whereas the United Nations (UN) horizontal organizations do not provide strict command and control authority, they do hold agencies and organizations ultimately responsible to their own parent organization or country. In 1998, the UN Office of the Coordinator for Humanitarian Affairs (OCHA), which reports directly to the UN Secretary General, deployed an Emergency Relief Coordinator (ERC) and an Interagency Standing Committee (IASC) representing major humanitarian organizations, to lateralize and coordinate functions between multiple agencies at the operational level of response. To date, these lateralizing component of the OCHA process have been tested successfully in East Timor, but have not yet been challenged in a larger and more prolonged complex emergency setting.

In order to meet the demands for humanitarian impartiality, the autonomy of aid organizations must be guaranteed no matter what the organizational structure. Without this operational provision being strongly intact, most humanitarian agencies and organizations will not lateralize their functions to make the whole more responsive. The NGO Medecins Sans Frontieres (Doctors Without Borders-USA), in a strongly worded letter to the Disaster Response Committee of InterAction (an umbrella organization of impartial humanitarian organizations), voiced alarm over a NATO draft doctrine for civil-military cooperation, which stated that the military and political goals of the CIMIC were being "conducted in support of the military mission."¹⁰ This issue always will remain a barrier to coordination unless the provisions for autonomy are clearly spelled out and are transparent.

Many NGOs, comfortable with a structure that for years has dealt with long-term development and rehabilitation programs in developing countries, found their protocols inadequate to respond to emergency relief needs in conflict-ridden countries in the early 1990s. This often resulted in the development of emergency response teams within the organizational structure of the NGOs. These emergency response teams were charged with lateralizing both the operational and response capacities of fledgling regional and country-based offices that found themselves unprepared for the demands of emergency relief. The team responsibilities were thought to be temporary in nature, as in the early 1990s, both the humanitarian community and governments alike considered that complex emergencies would be short-term events. However, by the mid-1990s, complex emergencies were considered even more complex, long lasting, dangerous, and frequent than anticipated. Despite today's greater field presence and broader responsibilities, the organizational status of these emergency teams has changed little in many NGOs. Many still struggle with whether to integrate the teams into their organizational structure, preferring to keeping them small, leaderless, without decision-making authority or a clear mandate or shared understanding of their mission within the organization. As emergency response demands increase, emergency units continue to struggle with confusion over their proper internal role, functions, and authority to make lateralizing decisions in field emergencies. The debacle in Rwanda, highlighted by slow responses and poor coordination, has catalyzed many IOs and NGOs to rethink their management options. Given what emergency relief NGOs need to provide, many remain too vertically stovepiped. In order to flatten out the organization, the NGOs must integrate and coordinate internally, only then proceeding to external collaborative efforts. Too often, vertical organizations do well on paper and in theory, only to fall apart when the organizational vulnerabilities are exposed by the actual disaster.

Unfortunately, these internal struggles occurred as well with large-scale, natural disasters. For example, several development-oriented NGOs with hierarchical structures, were not prepared to respond with a surge capacity and management flexibility to emergency relief (e.g., Turkish earthquakes and floods in Venezuela and Mozambique). Recently, 14 aid agencies in Africa improved their efficien-

cy through a closer working relationship with the United Kingdom-based Disaster Emergency Committee (DEC), an organization developed to consolidate donor appeals and coordinate responses.¹¹

Horizontal Organizations in Consequence Management Events

Managing the consequences of radiological, chemical, and biologic events is beyond the capabilities of most countries. Coordination of the management of consequences requires an integrated or 'joint' interagency process that marries governmental and military decision-makers, tactical level scientists, emergency managers, and trained relief workers into the decision-making process. This often is necessary when the complex hazards of the disaster require rapid access to a highly technical knowledge base necessary to the decision-making process. Depending on a number of factors (e.g., extent of the crisis, whether the causative agent is known or unknown, terrorist or accidental in nature, or the need to evacuate or quarantine a large population), a variety of agencies may be involved in critical decisions and actions for a brief or prolonged period. Disasters caused by large-scale weapons of mass destruction require a lateral organization that can reliably facilitate communication and decision-making processes among critical governmental leaders and scientists, even at great distances. Because no one organization, agency, or institution has the singular means to make such complex decisions, the decision-making process will be a shared one, made up of individuals in at least four general areas of expertise coordinating information technologies:

1. Government- and military-level decision-makers
2. Emergency managers
3. Tactical scientists
4. Justice-level decision-makers

Tactical scientists refer to professionals who possess unique expertise in the chemical, biological, and nuclear fields critical to the decision-making process. The decision-makers may need to function at great distances from the contaminated disaster site as well as from each other, requiring information technologies to assure rapid communication and integration of satellite imagery, plume detection and sensing devices, and special chemical and biologic task forces and laboratories.

Some will argue that operational structures, primarily the Incident Command System (ICS), already provides appropriate assurances that both vertical and horizontal decision-making will occur without difficulty. Whereas the ICS functions well in most conventional disaster situations, it has not been tested in a large-scale disaster in which surge capacity must tap into multiple agency expertise. Also, the very need for multiple agency coordination presents problems in and of itself. For example, the Hospital Emergency Incident Command System (HEIC) is designed to deal with the routine crisis decisions or large-scale disasters for hospitals such as staffing, evacuation, and coordination with law enforcement. Yet, during the Northridge earthquake, some hospitals broke with HEIC protocol, rerouting ambulances and refusing to evacuate when ordered to. Major decisions were made inefficiently, requiring marathon calls with up to 100 people where "roles, authorities, and even identities of those participating were unclear." In the New York City West Nile Virus outbreak, it was unclear who was in charge, with up to 18 agencies jockeying for authority. The authors suggest that

the lateral decision-making required in potentially large-scale consequence management events calls for much thought, preparation and skill.¹²

In international disasters, a model has been used by the military to coordinate large numbers of regional or global assets under one highly mobile command structure called a Joint Interagency Task Force (JIATF). The JIATFs have functioned well in maritime and cross-border drug interdictions requiring civil-military coordination of resources from disparate states, regions, and national governments. The JIATFs must be self-sufficient and operationally able to handle complex operations at short notice anywhere in the world. They must ensure that tailored expertise is provided rapidly to the decision-making process, even in a foreign country or a resource-poor or austere environment.^{13,14}

Currently, both the Department of Defense (DoD)'s organization and planning for consequence management fail to reflect the complexity of the decision-making process. Effective consequence management "is constrained by arbitrary conceptual and organizational divisions"¹⁵ and by lack of an integrated approach to many similar and overlapping management activities. This contributes to poorly defined mission requirements, organizational confusion, and inefficient resource allocation. To this end, in 1999, the DoD established a new JTF for Civil Support (JTF-CS) to control military resources supporting the lead federal agencies in responding to a domestic consequence management event. In addition, an Assistant Secretary of Defense for Civil Support, under the Office of the Secretary of Defense, now provides civilian oversight to the JTF-CS activities. Still, DoD conceptual and organizational compartmentalization hinders a more integrated approach to consequence management by creating divisions that are "inconsistent with emergency concepts"¹⁵ of response.

As information technology (IT) platforms, the JIATFs have the potential to facilitate larger spans of control through extensive lateral flow of communication. The JIATF also can function as a repository for information databases and their analyses, providing a real time base for understanding the genesis of a large-scale disaster and how best to manage it. The JIATFs frequently are recommended as management options in training exercises in which the disaster scenario calls for a lateral organization in a particularly complex environment. The international or regional structure of a consequence management JIATF must complement the existing host nation response and hasten the coordination of IOs scattered throughout the world (e.g., the Geneva-based International Atomic Energy Agency and World Health Organization's Division of Emergency and Humanitarian Action, the Centers for Disease Control and Prevention in Atlanta, the US Army Research Institute of Infectious Diseases, and the UN's Environmental Program in Nairobi).

Centers of Excellence as Horizontal Organizations

In the United States, operational responsibility for large-scale disasters, such as complex and consequence management emergencies, falls to regionally placed Joint Military Commands.¹⁶ When deploying these resources, the military must work with vertically structured civilian

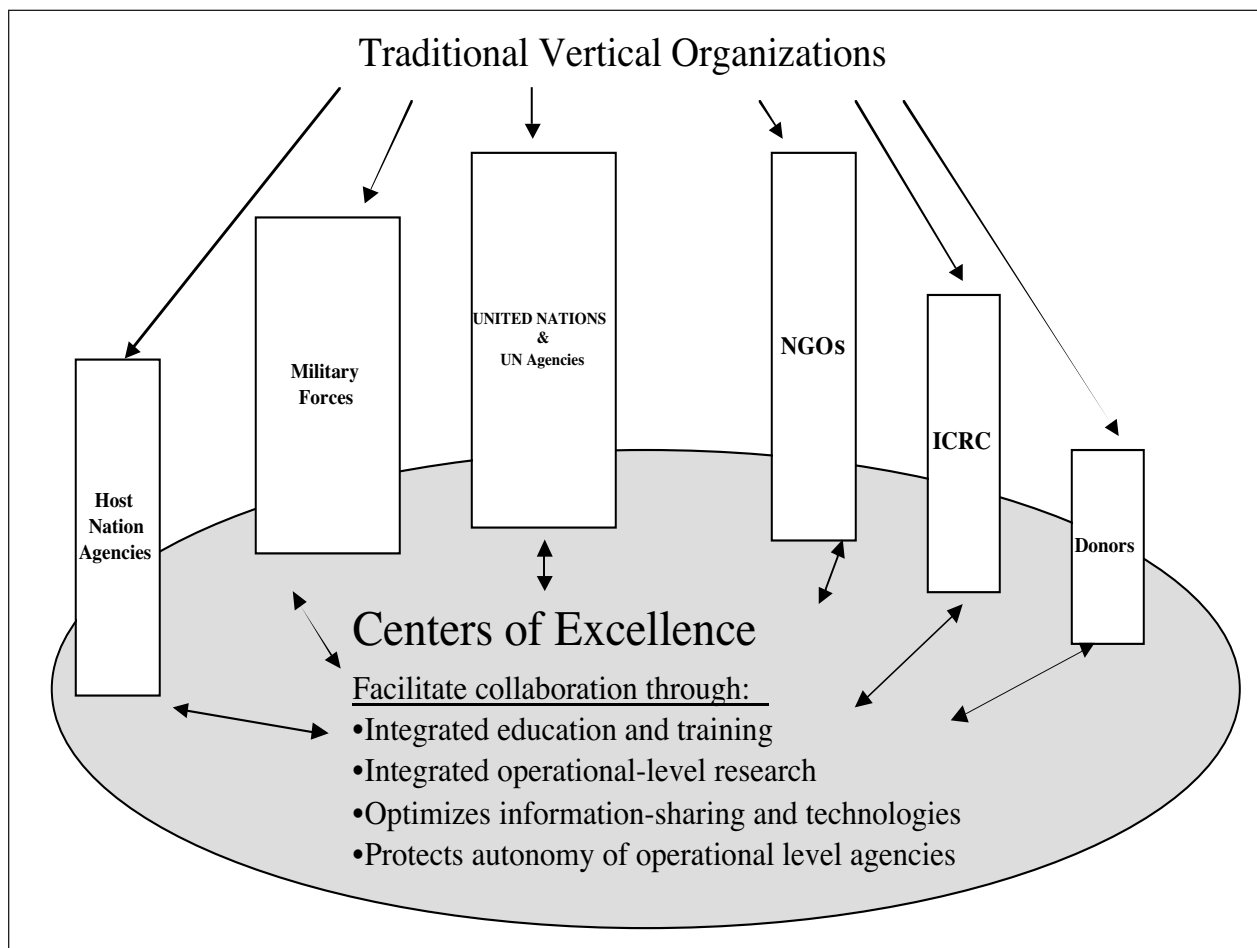


Figure 2— Functional laterality provided by a Center of Excellence concept to multiagency response system.

agencies/organizations with which they are operationally unfamiliar. Often, the only information that civilian and military organizations have about each other, is a mission statement and organizational chart. These Joint Military Commands traditionally utilize a Crisis Action Planning (CAP) model that has been used for years to plan for conventional war. For complex and natural disasters, this CAP process, when rigidly followed, does not allow coordination with civilian organizations, such as IOs and NGOs, to occur until late in the planning process or after the deployment of military forces to the field. If horizontal planning and management occurs, it does so after the fact and on an ad hoc basis. The process currently used often fails to identify beforehand, the body of information, classified and unclassified, required for coordinating and collaborating organizations to work safely together to meet both humanitarian and security requirements. This delay is related, in part, to concerns regarding the classified information environment in which the military plans and operates, as well as the inherent reluctance to share information. Additionally, militaries function by legal mandate, and restrictions on their relationships with other agencies often are mandated by law.¹ However, because of escalating security threats and violence against the relief community during complex

emergencies, military forces currently have a greater responsibility than ever before, to protect the relief process and innocent civilians.

Traditionally, Centers of Excellence (COEs) have been developed in the civilian sector to bring together disparate agencies and organizations to solve a problem or develop a technology that no one agency or organization can solve or develop alone. The COEs in Disaster Management and Humanitarian Assistance were developed in the 1990s to support the U.S. Pacific Command (Asia-Pacific) and the Southern Command (Central and South America) and to represent the interests of civilian and military assets in regional disasters. The COEs, by their horizontal management structure, represent the interests while ensuring the autonomy of each participating organization (Figure 2). The goal of a COE is to facilitate the process of coordination, not to control it, and to provide to a traditionally vertical organization, those lateralizing options they normally do not have as an organization.

The Pacific-based COE, for example, focuses on education, training, and research for peace operations with preparedness, prevention, and mitigation as its goal. Its staff is made up of former UN and NGO responders and academic and military personnel with disaster or organizational

Internal	Collaborative
<ul style="list-style-type: none"> • Identify functions that require internal lateralization • Identify personnel that require internal lateralization • Identify equipment that requires internal lateralization • Identify open-source information that is to be shared internally during emergencies • Identify closed-source information that is to be shared internally during emergencies • Identify legal and authority processes for above contingencies • Identify decision-making protocols and guidelines for internal lateralization process <p>If above contingency process requires establishment of a separate internal Group or Unit</p> <ul style="list-style-type: none"> • Develop internal charter with clear and well defined scope of work, authority and decision-making process • Ensure organization-wide acceptance and understanding of lateralization process • Develop contingencies that ensure smooth functioning of parent organization <p>Implementation process</p> <ul style="list-style-type: none"> • Educate, train, and exercise lateralizing process internally • Develop contingency protocols • Establish as annex to standard emergency plans • Publish and distribute plans to appropriate internal offices 	<ul style="list-style-type: none"> • Identify functions, personnel, equipment and information resources that are needed to collaborate externally • Identify external organizations, agencies and lateral organizations (e.g., CMOC) in which collaborative relationship is required. • Match functions, personnel, equipment and information sharing requirements with emergency event and external organizations • Identify legal and authority requirements for all of the above • Ensure security requirements, legal authority and criteria for sharing of all potential closed-source information • Identify decision-making protocols and guidelines for collaborative process <p>If above contingency process requires establishment of a separate external group or unit</p> <ul style="list-style-type: none"> • Develop internal charter with clear criteria, defined scope of work, authority and decision-making process allowing for collaboration to take place • Ensure internal and external acceptance and understanding of the collaborative process • Ensure transparency of collaborative process to all potential participants • Ensure that process is shared with all factions before entering a conflict situation • Ensure compatibility of security, evacuation, and information technology plans • Ensure compatibility under existing international humanitarian laws, treaties and covenants <p>Implementation process</p> <ul style="list-style-type: none"> • Educate, train, and exercise with civil-military organizations • Train and exercise for contingencies and for potential future emergencies • Publish and distribute plans for collaboration to appropriate agencies and organizations

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Table 3— Implementation process for lateralization

research experience. These individuals have no direct response duties during a disaster. The efforts of a COE are directed to identifying information on existing regional crises and to maintaining a repository of shared knowledge on regional disasters. Information is open-source (not classified or restricted), and is incorporated into existing civil-military training programs. The most critical aspect of a COE is its capacity to function as a facilitating, collaborative, horizontal organization by encouraging the military and other organizations to develop management solutions to problems ahead of time. By doing so, the COE acts as the functional glue for the disparate organizations by providing a consistent impartial environment conducive to solving operational level concerns.

Information Technologies in Horizontal Management

Information Technologies (ITs) are driving the need for horizontal management as well as causing it. Information

technologies have been used to begin solidifying staff collaboration, even among organizations lacking formal agreements for collaboration. Information technologies also have provided the horizontal platform or architecture for communication among people and organizations with varied roles as they respond to the same disaster. Information technologies typically build horizontal delivery capability around services by restructuring IT functions and developing different skill sets.¹⁷ During an emergency, this allows rapid self-alignment to improve operational efficiency. In 1985, Drucker defined the modern organization as a “structure in which information serves as the axis and as the central structural support.”¹⁸ In collaborative disaster management, the networked IT serves as the axis. The characteristics of this evolving techno-structure are: 1) follow the sun (24-hour coverage) global support model for system integration; 2) single coordinated point for information-sharing; 3) shifting of responsibility from vertical control by

the professional bureaucracy to subordinates (who often are better informed), leaving more time for decision-makers to make decisions; 4) shifting coordination and control from a human-based to a technology-based focus; and 5) collaboration that is driven by expanding networks and connections open to both large and small agency participants.^{18,19}

Information technologies allow for representation "at the table" and enhance responsibility, not work, in the coordination and decision-making process. The lateralizing techno-structure offers an opportunity to expand, equalize, and formalize liaison capacity throughout the disaster response cycle, and increase leveraging ability and accountability of participants by balancing unity and diversity among disparate organizations. The increased use of ITs is correlated with decreases in vertical integration.^{19,20} Information technologies have the potential to be unified because organizations and agencies (e.g., NGOs), especially in large-scale complex disasters, inherently are not equal, with some being better organized and more powerful than others.

Research on virtual organizational structures has identified lateral organizational structures as ones that improve communication by providing the "flexibility needed to handle high information requirements." This also is essential for participants "with diverse information requirements, such as fire and emergency services responding to large-scale disasters."²¹ However, researchers caution that breakdowns in this IT process have been "key contributors" to major human-generated catastrophes (e.g., Bhopal).²¹

Factors Influencing the Horizontal Implementation Process

Horizontal decision-making is foreign to most agencies and organizations that have a record of successful responses to small-scale or time-limited disasters. Large-scale disasters of the 1990s, however, shocked many organizations into realizing that the post-Cold War political conflicts—characterized, as they are, with massive numbers of displaced populations, food shortages, communicable diseases, and security issues—demand that response agencies, whether civilian or military, think 'outside of the box' for management solutions. Unfortunately, horizontal options to management rarely are considered until a major management tragedy occurs and no other models satisfy the requirements. Attention must be given to establishing clear criteria for implementing the lateralizing process (Table 3). These include preplanning for contingencies and preparedness for current and future crises. Since organizations and personnel dependent on vertical thinking often poorly understand lateralization requirements, the education, training, and exercising of the process on a regular basis is critical to making the process work.

Interorganizational coordination can be broken down into the basic processes of decision-making structures, communication gathering, and interpretation and dissemination of information.¹ In large-scale disasters, information exchange and the decision-making process often cut across organizational structures. Resource allocation, at any one moment, may require both vertical and horizontal management decisions. Currently, most emergency

planning of singular disasters is oriented toward increasing centralization of authority and formalization of procedures.^{1,2,22} The classic military model in crises is assumed to be most effective in such circumstances. In reality, the more complex the disaster, the more decentralized the management structure must become.^{20,23} Internationally, for example, many Asian governments, and especially those nations from the highly centralized former Soviet Union, with a history of long-term dependency on established and rigid centralized organizations, find it difficult to share information, authority, and critical decision-making. Constitutional restrictions also can prevent civilian and military collaboration, and such restrictions hindered the response to the Tokyo sarin release, delaying both identification of the agent and coordination of vital assets.²⁴ Despite extensive education and training directed toward fostering horizontal management, the first inclination of highly centralized governments in times of crisis, is to fall back on familiar, albeit inefficient, vertical methods of response.

It is the structure within an organization that either creates, or fails to create, differentiation. Structure also defines how organizational resources are to be allocated, how specific relationships are to be developed, the placement of authority, the work design, and the internal and external relationship of functions, operations, and tasks. Structural processes also can enable integration. Whereas, vertical processes manage the allocation of scarce resources internally, lateral processes manage interdependent coordination that spans departments, functions, and/or organizations. In order to design a lateral organization that functions effectively, therefore, the structure and processes must be considered and developed concurrently and interactively. A common error in developing lateral communication is that the "lines and boxes" of a vertical organization simply are redrawn without attention being given to integration, coordination, and collaborative process development.^{24,25} In contrast, the first real step in lateralizing occurs on the leadership level when "boundary spanners" (e.g., CMOCs) are identified to fill a need for information and resource exchange. As the crisis evolves, these exchanges become more formalized.^{1,26} Over time, tasks and responsibilities, including IT decisions, devolve to lower echelons. As interorganizational contacts become more routine, the various skill sets, like-minded organizations, and specialization of organizations are identified, and the lateralizing agenda for communication becomes better defined.^{1,26} Inadequate resources are a powerful motivation for coordination; thus, necessity often brings organizations into cooperative relationships. The sharing of critical skill sets may dictate coordination, like that seen with international search and rescue teams in natural disasters and in the cooperation of air traffic control procedures by military and IOs in Sarejevo during the war in the former Yugoslavia. This ability to identify common tasks through direct contacts, enhancement of liaisons, ITs, and memoranda of understanding established through preplanning stages, are invaluable to the lateralizing process.

Organizations may not see the potential for lateralization because the organization itself is so stovepiped. Even though individuals within the organization may be lateral

thinkers, the rigid organizational chart may provide little opportunity for lateralization and provoke fear that a 'divided responsibility' and lack of clear authority to act will lead to operational confusion.²⁶ An outside lateral organizational template or framework may need to be enforced in

these events to expedite effective decision-making and collaboration. Organizations must recognize that coordination can be difficult because the meaning and connotation of "coordination" and the qualitative manner in which the day-to-day response and the discipline of coordination is performed may differ for each organization.^{27,28} The military, for example, may equate coordination with 'control'

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