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Support to the Hurricane Katrina Response by the Joint Force Maritime Component Commander: Reconstruction and Issues

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Summary

On 29 August 2005, Hurricane Katrina made landfall in Louisiana and Mississippi, devastating the City of New Orleans and coastal areas along the Gulf of Mexico. The Navy quickly responded, deploying ships, aircraft, and personnel to support the domestic disaster relief operation.

This report provides a reconstruction of the Navy's response to Hurricane Katrina from the perspective of the Joint Force Maritime Component Commander-Katrina[1] (JFMCC-Katrina) and is part of a larger CNA analysis. The role of JFMCC-Katrina was to support Joint Task Force-Katrina (JTF-Katrina) relief and recovery operations, oversee all maritime operations, support JTF units operating from naval installations, and support the reconstitution of naval installations.

To support these efforts, the Navy deployed a maritime force[2] to the Gulf Coast. The *capabilities* that this force brought to the operation are the focus of the first section of this report. The operational issues section, which follows, expands the discussion of these response

1. During the operation, there was some confusion over how to describe the JFMCC and its elements. In some instances, the JFMCC-Katrina was used to describe the staff that deployed to NAS Pensacola and USS *Iwo Jima*. In other instances, this staff was referred to as JFMCC-Forward, JFMCC-Deployed, or simply JFMCC. Throughout this paper, the term JFMCC-Katrina is used to refer to the staff that was part of the Joint Task Force-Katrina organization. The core element of the JFMCC-Katrina staff was composed of personnel from Carrier Strike Group-10, Amphibious Group-2, Destroyer Squadron-26, and Navy Region Mid-Atlantic.
2. The term maritime force is used to refer to the entire Navy response organization, including JFMCC-Katrina, maneuver units, and JFMCC-Katrina reachback cells from Fleet Forces Command and Second Fleet.

capabilities by describing *issues* that limited JFMCC-Katrina's ability to coordinate relief operations. The capabilities discussion and issues analysis are based upon observations made at JFMCC-Katrina during the month of September 2006.

Response capabilities

The Katrina response demonstrated that the Navy has many capabilities that can support disaster response operations and that JFMCC staffs will likely be responsible for coordinating many of these capabilities. During the operation, the Katrina maritime force:

- Transported more than 10,000 displaced persons
- Delivered approximately 2.2 million pounds of food and water
- Provided medical treatment to an estimate 10,239 patients
- Directed ships to serve as command and control platforms
- Inspected and repaired the region's infrastructure
- Restored local self-sufficiency
- Provided hospitality services to relief workers and DoD personnel
- Coordinated relief operations with coalition maritime forces
- Restored operational capabilities at Navy installations.

Factors that limited the effectiveness of JFMCC-Katrina and the maritime force

During the response, JFMCC-Katrina staff members highlighted several issues that limited their ability to support the ongoing relief operation.

Command and control

Interaction between the JTF-Katrina and JFMCC-Katrina was problematic. During the operation, JTF-Katrina did not provide its components with expected interaction opportunities (e.g., an established battle rhythm). Without such opportunities, JFMCC-Katrina found it difficult to engage JTF-Katrina and had to operate with limited

guidance from the joint chain-of-command. In response, JFMCC-Katrina took steps to improve interaction with JTF-Katrina (e.g., dispatching liaisons and collocating with the JTF-Katrina). JFMCC-Katrina also adopted command and control processes that allowed the maritime force to operate with minimal guidance, such as encouraging maritime Commanders to exercise command initiative.[3]

Accounting for personnel

Locating Navy personnel was a high priority for both JFMCC-Katrina and the Navy; however, JFMCC-Katrina and base Commanding Officers had limited access to the personnel lists of visiting units and tenant commands.

Access to information

Officials had limited information about the needs of local communities. This lack of actionable information limited the operational effectiveness of response organizations. JFMCC-Katrina was able to obtain additional information from an officer traveling through Mississippi who identified opportunities where the maritime force could provide assistance.

Information technology (IT)

The JFMCC-Katrina J6 identified several issues that complicated the mission of the IT community to support the maritime force, including:

- Reliance on unclassified systems stressed ship IT architectures.
- The rapid pace of operations and movement of JFMCC-Katrina organizations placed demands on J6 staff members to maintain connectivity.
- The lack of IT personnel (e.g., outsourced IT support, such as Navy-Marine Corps Internet support personnel) complicated

3. For additional information about how Commanders exercise initiative during the Katrina response, see Brian Walsh. *Distributed Staff Operations and Initiative Under Command in the Navy's Response to Hurricane Katrina* (U), CNA Research Memorandum, forthcoming.

the tasks of maintaining connectivity and restoring the IT infrastructure at Navy facilities.

Operations

The following four operational issues repeatedly hampered the efforts of the JFMCC-Katrina staff and consumed significant staff resources:

- JFMCC-Katrina repeatedly responded to similar requests for information from various elements within the chain of command.
- JFMCC-Katrina received little guidance with which to develop tasking for the coalition forces.
- The JFMCC-Katrina staff was not trained to support the response processes used by the interagency community.
- There was conflicting tasking in the employment of USNS *Comfort* and about JFMCC-Katrina's responsibilities to the hospital ship.

Doctrine

The JFMCC-Katrina staff felt that available doctrine did not adequately inform them about the Navy's role in the domestic disaster response operation. For example, the current Fleet Response Plan does not address domestic disaster response operations or the JFMCC concept.

Preparing for the next Katrina

The Katrina experience indicates that the Navy can strengthen its ability to support domestic disaster response operations by:

- Developing comprehensive domestic disaster response doctrine that addresses issues identified during the Katrina operation:
  - The JFMCC-JTF disconnect
  - The absence of definitions for operational metrics
  - The lack of familiarity with the interagency community

- Clarifying command and control of all Navy assets, including the hospital ships
- Clarifying the processes by which the US Government accepts and incorporates coalition support into domestic relief operations
- Increasing the number of IT professionals available to restore services and to support the activities of the JFMCC
- Developing ways to transfer ship IT capacity between classified and unclassified systems
- Developing tactics, techniques, and procedures that the JFMCC could use to collect actionable information
- Reviewing the Navy's personnel tracking processes.

Introduction

On the morning of 29 August 2005, Hurricane Katrina made landfall near Buras, Louisiana as a strong category 3 storm [1, 2]. From there, the hurricane tracked across southeastern Louisiana and into southern Mississippi. The storm killed more than 1,300 residents and caused widespread destruction across thousands of square miles of coastal Louisiana, Mississippi, and Alabama. In New Orleans, the failure of the city's levee system flooded 80% of they city, stranding thousands of residents. In places, the water was 20 feet deep [1, 2].

The Navy responded quickly by deploying ships, aircraft, and personnel to support the Katrina relief operation. The USS *Bataan* arrived off the Louisiana coast and began operations on 30 August [3]. Over the next week, the *Bataan* was joined by ground-based helicopters operating from Naval Air Station (NAS) Pensacola and several other Navy ships including, USS *Iwo Jima*, USS *Harry S. Truman*, USS *Shreveport*, USS *Tortuga*, and USS *Whidbey Island* [4].

The purpose of this reconstruction is to document the Navy's response capabilities that JFMCC-Katrina directed and highlight factors that limited their effectiveness during the operation. With this reconstruction, the Navy can be better prepared to respond to future domestic disaster relief operations.

Overview of JFMCC-Katrina's support to the response[4]

The focus of this analysis is the period from 31 August through 28 September 2005 when Commander, Carrier Strike Group-10 (CCSG-10) was JFMCC-Katrina. In response to tasking from Northern Command (NORTHCOM), Commander, Second Fleet (C2F) designated CCSG-10 as JFMCC-Katrina to support JTF-Katrina.[5]

4. For a timeline of key events and the Navy's response, see appendix A.

5. During the operation, the name JTF-Gulf Coast was also used to refer to the DoD's response to Hurricane Katrina.

A JFMCC is a component Commander within a Joint Task Force (JTF) organization who is responsible for commanding the maritime force. In this operation, JFMCC-Katrina was responsible for Navy assets in the operating area (e.g., Navy aircraft, Seabees, installations, ships,[6] and embarked marines).

Without clear bed down intent from JTF-Katrina, CCSG-10 and his staff (i.e., JFMCC-Katrina) initially deployed to NAS Pensacola and began operations on 31 August 2005, but later moved aboard *Iwo Jima* on 7-8 September. At that time, *Iwo Jima* was pier side in New Orleans, Louisiana (NOLA). From these locations, JFMCC-Katrina directed the efforts of the maritime force to support rescue, relief, and recovery operations along the coast of the Gulf of Mexico. On 21 September, CCSG-10 and his staff turned over ashore responsibilities to his Ashore Echelon Commander who continued to direct efforts to restore the operational capabilities of Navy installations along the Gulf Coast.

The reconstruction presented in this report is largely based upon observations, interviews, documents (e.g., situation reports, briefings, and orders), and operational logs collected at the JFMCC-Katrina operations centers at NAS Pensacola and aboard *Iwo Jima*.

JFMCC-Katrina's mission

JFMCC-Katrina's mission was to provide support to civil authorities and to direct maritime forces in efforts to mitigate the effects of Hurricane Katrina. In support of this mission, the maritime force performed several key response functions, including:

- Rescued and evacuated residents from damaged areas and transported them to locations where they could receive further assistance
- Delivered large quantities of water and food to victims throughout the region

6. Operation control of the USNS *Comfort* was ambiguous at times. The JFMCC-Katrina's operational relationship to *Comfort* remains unclear. See Jennifer L. Seifert. "USNS *Comfort* deployment in support of Hurricane Katrina." Forthcoming.

- Provided medical assets to treat residents, relief workers, and DoD personnel
- Provided command and control platforms for use by several elements of JTF-Katrina
- Inspected and repaired critical infrastructure damaged by the hurricane
- Restored local self-sufficiency
- Provided hospitality services (e.g., hot meals, showers, and berthing) to those supporting the response (e.g., DoD personnel, government personnel, and relief workers)
- Coordinated relief operations with coalition forces
- Restored operational capabilities to the region's Navy installations.

By performing these response functions, the maritime force achieved the desired end states. In conjunction with other elements of JTF-Katrina, the maritime force saved lives, mitigated victims' suffering, and restored the region's infrastructure to a level that enabled civil authorities to continue relief and reconstruction efforts.

Assets deployed to support the Katrina operation

To support these response functions, the Navy deployed several types of assets, including: operational staffs, Seabees, aircraft (both helicopters and fixed-wing aircraft), communications equipment, relief supplies (e.g., food, water, medical assets, and generators), and surface ships. Table 1 lists ships that US and foreign governments deployed to support JTF-Katrina.

Table 1. Ships deployed to support JTF-Katrina[a]

US ships		
USS *Harry S. Truman*	USS *Scout*	USNS *Patuxent*
USS *Bataan*	USS *Pioneer*	USNS *Pollux*
USS *Iwo Jima*	USS *Falcon*	USNS *Arctic*
USS *Tortuga*	USS *Gladiator*	USNS *Altair*
USS *Whidbey Island*	USS *Chief*	HSV-2 *Swift*[b]
USS *Shreveport*	USS *Grapple*	
USS *Defender*	USNS *Comfort*	
Coalition ships		
HMCS *Athabaskan* (Canada)	HMCS *Toronto* (Canada)	HNLMS *Jan van Amstel* (Netherlands)
HMCS *Ville de Quebec* (Canada)	CCGS *Sir William Alexander* (Canada)	MS *Rio Papaloapan* (Mexico)

a. For information on the activities of these ships, see Appendix B.
b. The HSV-2 *Swift* is a US Army ship.

For a detailed listing of ship movements during the Katrina response, see appendix B.

The JFMCC-Katrina response also provided an opportunity to learn about the issues that could limit the ability of future JFMCCs to support domestic disaster response operations. This report organizes these issues around six topics:

- Command and control
- Accounting for personnel
- Access to information
- Information technology
- Operations
- Doctrine.

The purpose of this reconstruction is to document what was learned about the operational requirements of a domestic response, describe how JFMCC-Katrina responded, and highlight areas that would benefit from additional attention.

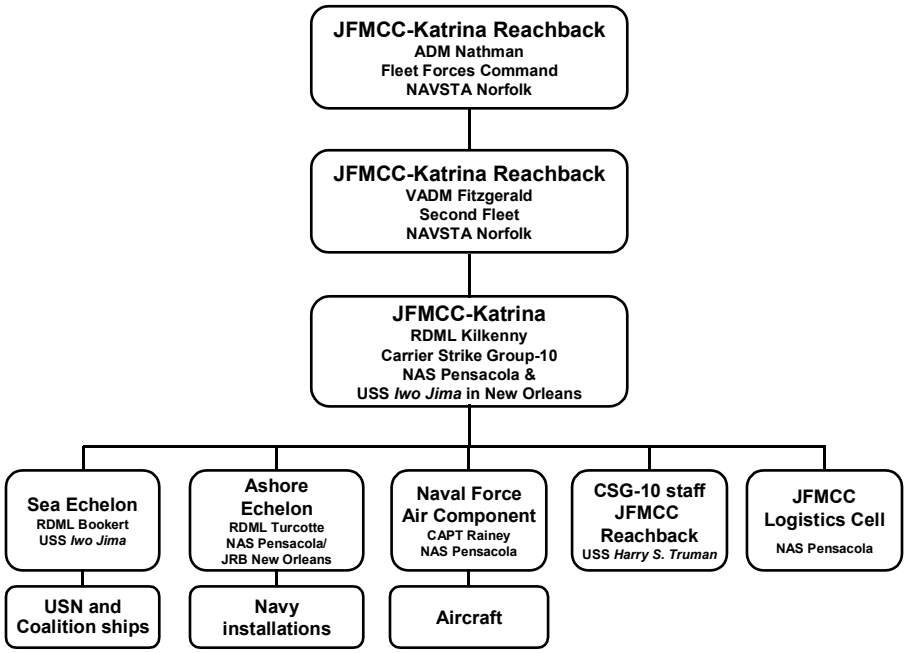
Organization of the DoD Katrina response

The CJTF and JFMCC employed similar staffing strategies. Both staffs were geographically distributed and relied upon reachback cells. For example, portions of the JTF staff were located in Atlanta, GA, Hattiesburg, MS, and New Orleans, LA. Likewise, the JFMCC organization was distributed among several locations, including Norfolk, VA, Pensacola, FL, New Orleans, LA and aboard *Harry S. Truman*. The JTF and JFMCC structures also included geographically distributed subordinate echelons. For example, the JTF components were spread across Louisiana, Mississippi, and Florida. Similarly, the JFMCC-Katrina subordinate staffs were located at various locations along the Gulf Coast (e.g., Pensacola and New Orleans).

The JFMCC's distributed staff structure

Figure 1 describes the organization of the distributed JFMCC staff. The boxes in the wire diagram contain information about elements of the JFMCC, including the name of the organization, where it was located, and who directed it.

Figure 1. JFMCC distributed staff structure[a]



a. Source: [4].

In this operation, there were several distinct elements of the JFMCC organization. The principal element of this structure was JFMCC-Katrina. JFMCC-Katrina and his staff were initially located at NAS Pensacola, but moved aboard *Iwo Jima* to improve their access to other elements of the Katrina response. During the period of that JFMCC-Katrina was embarked, *Iwo Jima* was located in New Orleans.

Two reachback elements supported JFMCC-Katrina staff. The first reachback staff in Norfolk was primarily composed of C2F personnel with augmentation from FFC. A second reachback cell was embarked on *Harry S. Truman* and staffed by personnel from CSG-10 and Destroyer Squadron-26 (DESRON-26). The reachback cells supported JFMCC-Katrina by providing planning support, responding to numerous requests for information, drafting the daily maritime tasking order, and developing concepts of operations (CONOPS).

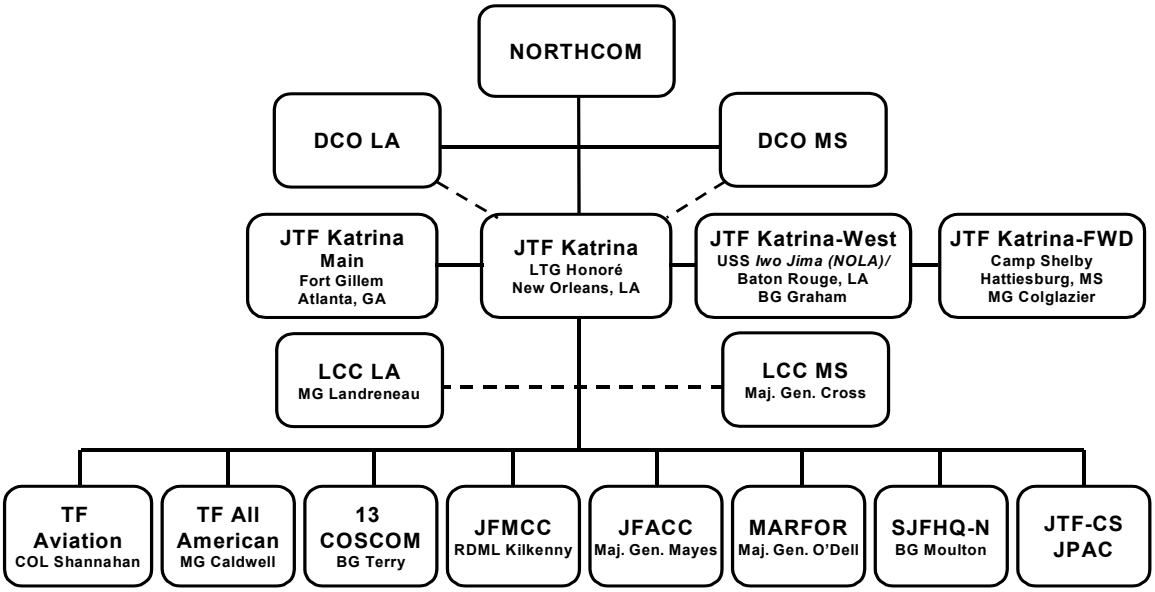
The JFMCC-Katrina Sea Echelon Commander coordinated the transit of ships to the JOA and their movements after arriving. The Ashore Echelon Commander directed the assessment and restoration of

Navy facilities along the Gulf Coast. The JFMCC-Katrina Naval Force Air Component Commander coordinated the employment of the Navy's air assets assigned to support the Katrina response.

JTF-Katrina's distributed staff structure

Like the maritime force, the CJTF relied upon a distributed command and control structure. Figure 2 describes the organizations of the elements of this distributed structure.

Figure 2. JTF-Katrina organization diagram as of 8 September 2005[a]



a. The dashed lines indicate a coordination requirement, rather than a direct reporting relationship.

Figure 2 provides a high-level view of the JTF-Katrina structure and the relationships between several key elements. For detailed information about the organizations depicted in figure 2, see appendix C.

Response capabilities coordinated by JFMCC-Katrina

The Navy's response to Hurricane Katrina demonstrated that the Navy has many capabilities that can be employed during domestic disaster response operations and that JFMCC staffs will likely be responsible for coordinating these capabilities.

Conducted rescue, evacuation, and medevac operations

One day after Hurricane Katrina made landfall in Louisiana, an estimated 50,000 - 100,000 residents remained in New Orleans [1]. Flood waters from Lake Pontchartrain trapped/stranded many residents in their homes, in hospitals, and at shelters throughout the city. The flood waters also prevented attempts to use ground transportation to evacuate many of these residents. Table 2 lists the three mission categories used by JFMCC-Katrina to describe efforts to move these stranded residents to places of safety:

Table 2. Categories of "rescue missions"[a]

Mission category	Description
Evacuation	Refers to missions during which residents were transported from established evacuations points (e.g., the Convention Center, Cloverleaf, or a site supervised by official personnel).
Rescue	Refers to missions during which residents were picked-up at emergent evacuation points (e.g., rooftops, highways, and parking lots). A rescuee is a person who was at risk of harm.
Medevac	Refers to missions during which sick or injured residents were transported to medical facilities.

a. Source: [5].

The Navy ad JFMCC-Katrina supported these three mission categories by:

- Deploying helicopters and fixed-wing aircraft into the region
- Deploying surface ships to the region
- Working with other organizations to establish command and control of air operations in the region
- Integrating maritime operations with the operations of other organizations (e.g., Coast Guard, Air National Guard, Air Force, Army, and civilians).

By 20 September, the maritime force had transported 10,266 displaced persons. Table 3 summarizes the distribution of these persons across the three rescue mission categories.

Table 3. Displaced persons transported by the maritime force[a]

Missions	Number of persons moved
Evacuations	8,512
Medevacs	195
Rescues	1,559
Total	**10,266**

a. Source: [6].
Note: The statistics provided in this table are the best available estimate.

To transport the persons listed in table 3, the maritime force conducted 1,850 air sorties and 526 boat sorties (e.g., LCUs, LCACs, LCMs, RHIBs, and CRRCs)[7] [6]. These sortie numbers reflect the total number of rescue and relief (e.g., delivery of food and water) missions conducted by maritime units.[8] It is difficult to separate the sortie totals into rescue and relief sorties because some sorties both delivered relief supplies and rescued citizens; therefore, separate sortie totals for each category were not tracked.

7. Landing craft utility (LCU), landing craft air cushion (LCAC), landing craft medium (LCM), rigid hull inflatable boat (RHIB), and combat rubber raiding craft (CRRC).

8. The number of sorties cited is based upon the best available estimates.

Deployed helicopters and fixed-wing aircraft[9]

Table 4 lists examples of the detachments that were available to support the movement of displaced persons and other Katrina support missions.

Table 4. Air detachments available to support the movement of displaced persons[a]

Air detachments available to support the movement of displaced persons		
HS-5	HSL-45	HSC-28
HS-7	HSL-46	HM-14 (*Iwo Jima*)
HS-15	HSL-47	HM-15 (*Bataan*)
HS-75	HSL-48	VAW-77
HSL-42	HSL-49	VAW-121
HSL-43	HSL-60	VAW-126
HSL-44	HSC-21	

a. Source: [4].

The majority of the units listed above are rotary-wing assets, but fixed-wing assets also supported these missions, including E-2Cs from VAW 121 and VAW 126. These aircraft coordinated the air space in and around New Orleans. Fleet Logistics Support aircraft (e.g., C-130s, C-40s, and C-9s) were available to transport relief supplies to and evacuees from the JOA. Additionally, aircraft from HMH-72, HMM-365, and HMH-461 were available for a period of time before these units were moved forward to Keesler Air Force Base (AFB) to support the Marine Corps [4].

The Navy provided a large number of aircraft to support the movement of displaced persons. Due to the size, complexity, and rapid pace of operations, a definitive accounting of all Navy aircraft involved in the response is not available; however, several aircraft counts taken at different times provide insight into the Navy's commitment of air resources. Tables 5 through 7 provide the best available *estimates* of the number and types of Navy aircraft that supported the Katrina response.

9. Portions of this section were adapted from Commander Tom Lalor's "Observations and Recommendations on Hurricane Katrina HA/DR Operations."

Table 5. List of aircraft compiled by the JFMCC-Katrina on 4 September[a]

Aircraft	Quantity	Location
SH-60	30	NAS Pensacola
MH-60S	4	NAS Pensacola
CH-46	2	NAS Pensacola
CH-53	8	NAS Pensacola
E-2C	5	NAS Pensacola
H-53	6	NAS Pensacola
E2-C	2	Atlanta
MH-60	4	USS *Bataan*
H-53	4	USS *Bataan*
UH-1	3	NAS JRB New Orleans
MH-60	4	USS *Iwo Jima*
H-3	2	USS *Iwo Jima*
H-53	3	USS *Iwo Jima*
Total	**77**	

a. Source: [7].

Table 6. List of aircraft compiled by the JFMCC-Katrina on 6 September[a]

Aircraft	Quantity	Location
SH-60	24	NAS Pensacola
MH-60S	4	NAS Pensacola
C-9	2	NAS Pensacola
E-2C	5	NAS Pensacola
SH-60	4	USS *Harry S. Truman*
UH-1	3	NAS JRB New Orleans
MH-60	5	USS *Bataan*
MH-53E	4	USS *Bataan*
MH-53	1	USS *Bataan*
SH-60	2	USS *Iwo Jima*
H-3	2	USS *Iwo Jima*
MH-53	3	USS *Iwo Jima*
E-2C	2	Atlanta
Total	**61**	

a. Source: [8].

Table 7. List of aircraft compiled by the JFMCC-Katrina on 11 September[a]

Aircraft	Quantity	Location
MH-60S	5	USS *Iwo Jima*
MH-53	3	USS *Iwo Jima*
MH-60S	5	USS *Bataan*
MH-53E	4	USS *Bataan*
SH-60B	4	USS *Harry S. Truman*
SH-60F/H	11	USS *Harry S. Truman*
MH-60S	5	NAS Pensacola
SH-60B	10	NAS Pensacola
E-2C	5	NAS Pensacola
E-2C	2	Atlanta
Total	**54**	

a. Source: [9].

The data presented in tables 5 through 7 are a sampling of the Navy's commitment of air assets to the Katrina response.

Deployed surface ships to the JOA

In addition to the aircraft listed above, the Navy deployed ships to the Gulf Coast to support the movement of displaced persons. Both Navy helicopters and those from other organizations operated from these ships. For example, *Bataan's* helicopters conducted 23 helicopter events between 30 August and 6 September, transporting 58 passengers [10].[10] The Navy ships also provided command and control support for air operations. For example, the NOLA Rescue Coordination Center (RCC) operated from aboard *Iwo Jima*.

Ships in the JOA also launched small craft to search for residents in need of assistance and transported many to safety. For example, crew members from *Tortuga* used CRRCs to search the Ninth Ward in New Orleans. During the search (5 September through 7 September),

10. In addition to these passengers, *Bataan's* helicopters carried relief supplies and cargo.

crew members transported 335 residents. In many instances, the ship provided medical treatment and meals to these rescuees [11, 12, 13]. In addition, LCACs from the gray hulls searched the region's barrier islands for stranded residents [14].

Worked to establish command and control of air operations[11]

When JFMCC-Katrina arrived at NAS Pensacola, ten Navy helicopters were engaged in relief operations, but command and control of the region's airspace was minimal [4]. To address this shortcoming, the Navy and JFMCC-Katrina implemented a plan of action to establish command and control of the region's airspace.

During the first days of the operation, airborne air crews from Coast Guard District 8 provided limited coordination air operations. Air crews from various organizations (e.g., Coast Guard, Navy, Air Force, Army, Air National Guard, and civilians) would check in with these District 8 air crews on a common coordination frequency and then proceed with their missions.

With no designated mechanism for establishing joint command and control of the airspace in place, the Naval Force Air Component Commander traveled to New Orleans on 1 September and established contact with representatives from organizations conducting air operations in NOLA, including the Coast Guard District 8 and the Army First Air Cavalry [4].

To improve command and control of the region's airspace, the Navy deployed two E-2Cs to Pensacola from Norfolk on 31 August. The E-2Cs relieved US Customs and US Coast Guard aircraft that had been providing advisory control over the NOLA airspace.[12] The Navy's E-2Cs were joined by Air Force airborne warning and control system (AWACS) aircraft (i.e., E-3As) a few days later [4]. Additional E-2Cs were deployed to support response operations. By 4

11. Portions of this section were adapted from CDR Tom Lalor's "Observations and Recommendations on Hurricane Katrina HA/DR Operations."

12. The first aircraft reported to have provided advisory control over the NOLA airspace were a US Customs P-3 and a USCG C-130.

September, seven E-2Cs were supporting the Katrina response [7]. These aircraft established a 24/7 presence over the JOA and provided air advisory and tasking control while Federal Aviation Administration facilities were inoperable. The JFMCC-Katrina Air Coordinator coordinated airspace advisory control through the FEMA Air Control Officer in Washington. An E-2C flight officer would attend the FEMA Air Coordination teleconference each morning to discuss the status of operations and issues.

At a 4 September Joint Force Commander's meeting, JFMCC-Katrina proposed a plan for coordinating the disparate search and rescue efforts throughout the JOA. The plan consisted of establishing an RCC aboard *Iwo Jima*. The RCC would function as a clearing house for helicopter operations in the southeast Louisiana JOA. The purpose of the RCC was to task and coordinate search and rescue (SAR) missions, monitor aircraft, pass information, and track mission status until completed. The RCC reported to the Joint Search and Rescue Center embedded with the Joint Force Air Component Commander (JFACC) at Tyndall AFB [4].

Prior to establishing the RCC, a coordination and communications gap existed between the airborne battlefield command, control, and communication (ABCCC) (e.g., E-2C and AWACS) and the residents on the ground. The RCC bridged this gap. The RCC accepted telephone calls and requests from organizations (e.g., JFMCC-Katrina Air Operations), and tasked the appropriate helicopter via the ABCCC. In a sense, the RCC became a combination of a 911 dispatcher and an air operations center for SAR. The RCC also supported forces on the ground in case of an emergency or medevac [4].

To address the lack of a common system for dividing search areas and locating points in the NOLA JOA, the JFMCC-Katrina staff worked with others to create and disseminate a system of 15- by 15-minute boxes based on the National SAR Plan. These boxes were then laid over the NOLA metropolitan area to create a grid of rescue boxes. Due to the size of the 15- by 15-minute boxes, the rescue boxes were further divided by parish boundaries. These boundaries also made it easier to communicate with ground forces. Altitude restrictions and transit routes (i.e., for entering and exiting the area) were also established to further deconflict the airspace over the NOLA JOA [4].

Integrated operations with other response organizations[13]

JFMCC-Katrina accepted requests for support from several SAR tasking processes managed by different organizations. During the initial phases of the response (30 August through 3 September), the maritime force responded to support requests from both FEMA and USCG District 8. Initially, a US Customs P-3, USCG C-130, and Navy E-2Cs provided advisory control of the NOLA airspace and SAR tasking. The USCG District 8 Operations Center passed requests for assistance to these aircraft that would then task available aircraft (e.g., Navy helicopters). Additionally, *Bataan* and the JFMCC-Katrina worked directly with FEMA to develop tasking, including SAR missions, for Navy assets.

As the response command and control structure developed, the JFMCC-Katrina also engaged the JTF-Katrina staff and the RCC to match SAR tasking needs with Navy assets.

When tasking from these organizations was not forthcoming, the maritime force took the initiative, launching self-tasked SAR and evacuations missions along the Gulf Coast. Although these missions were coordinated with the other response organizations, they were not initiated by outside tasking from organizations, such as FEMA or the USCG.

Summary of Navy capabilities

One purpose of this reconstruction is to identify the capabilities that the Navy used to support the Katrina response. Table 8 summarizes some of the capabilities employed by JFMCC-Katrina while it supported the movement of displaced persons. (e.g., rescuees, evacuees, and patients needing medevacs)

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13. This section is based upon conversations with JFMCC-Katrina staff members.

Table 8. The maritime force's support to the movement of displaced persons

Navy capabilities	Description
Responded rapidly	*Bataan* began air operations on 30 August [10].
Transported residents	The maritime force transported 10,266 displaced persons [6].
Integrated its response	JFMCC-Katrina integrated the Navy's response capabilities into existing tasking mechanisms.
Created command and control for air and maritime operations	JFMCC-Katrina helped to establish C2 of air operations. The Navy provided C2 platforms (e.g., E-2Cs and *Iwo Jim*a) and contributed to the creation of the RCC and the grid system [4].

Delivered food and water

After the hurricane, many residents along the Gulf Coast were isolated without access to food or potable water. Both flood waters (e.g., New Orleans) and impassable roads (e.g., Stennis Space Center in Louisiana and Gulfport Mississippi) prevented relief supplies from reaching stranded residents.

The Navy responded to this need by transporting approximately 2.2 million pounds of food and water [6, 15]. The first Fleet Logistics Air Support flights occurred on 27 August [15, 16]. The first delivery of supplies from a surface ship, *Bataan*, occurred on 30 August. By the evening of 31 August, helicopters from *Bataan* had delivered 25,000 pounds of water and 500 pounds of food [10].

To support the relief mission (i.e., the distribution of food and water), JFMCC-Katrina established logistics heads at NAS Pensacola and NAS Joint Reserve Base, New Orleans [4]. To move the supplies, the maritime force used many of the same assets it used to execute the SAR missions (e.g., helicopters, fixed-wing aircraft, surface ships, and landing craft).

During the period of 3 to 12 September, SAR missions remained the priority, but the number of air sorties carrying water and food increased greatly. During this period, the maritime force airlifted approximately 1.6 million pounds of food and water into the disaster area [7, 17]. Ground crews at NAS Pensacola loaded both helicopters

and fixed-wing aircraft with supplies that were delivered into the disaster area. Additional aircraft from the Fleet Logistics Support Squadrons transported relief supplies from other CONUS locations to the region. Table 9 details the sources and amounts of food and water the Navy airlifted into the JOA.

Table 9. Food and water airlifted into the region[a]

Source	Dates of activity	Sorties	Food & water (pounds)
NAS Pensacola	31 Aug - 19 Sep	669	280,054
USS *Bataan*	30 Aug - 16 Sep	342	172,280
USS *Iwo Jima*	3 Sep - 19 Sep	175	43,100
USS *Harry S. Truman*	5 Sep - 11 Sep	161	15,300
Fleet Logistics Support	27 Aug - 17 Sep	503	1,429,000
Totals		**1,850**	**1,939,734**

a. Source: [15].
Note: The statistics cited above are based upon the best available estimates.

The maritime force also used boat sorties from surface combatants to deliver water and food. Table 10 summarizes the amount of food and water moved ashore by surface operations (e.g., LCUs, LCACs, LCMs, RHIBs, and CRRCs).

Table 10. Food and water moved ashore by surface operations[a]

Source	Dates of activity	Sorties	Food & water (pounds)
USS *Iwo Jima*	3 Sep - 20 Sep	98	56,000
USS *Bataan*	30 Aug - 17 Sep	7	96,100
USS *Shreveport*	5 Sep - 20 Sep	1	1,000
USS *Tortuga*	3 Sep - 19 Sep	349	77,515
USS *Whidbey Island*	5 Sep - 14 Sep	71	9,300
Totals		**526**	**239,915**

a. Source: [6]
Note: The statistics cited in table 10 are based upon the best available estimates.

Initially, food and water were sent to the disaster area without detailed tasking, but more specific tasking emerged as response structures developed. During the first and second weeks of the Katrina response, JFMCC-Katrina located several different sources of relief supply tasking. On 4 September, the JFMCC-Katrina staff made contact with a FEMA representative at NAS Pensacola. The FEMA representative passed requests for relief support to the JFMCC-Katrina staff, who then assigned the missions to maritime units. The maritime force also generated its own relief missions. For example, a meteorological and oceanographic (METOC) officer traveling through southern Mississippi called the JFMCC-Katrina staff with requests for support. This officer also shared the JFMCC-Katrina contact information with local government officials and representatives of relief organizations, who then contacted the JFMCC-Katrina air operations staff with additional requests for assistance. Once again, JFMCC-Katrina responded to these requests by tasking maritime units.

Summary of Navy capabilities

Table 11 summarizes some of the Navy's capabilities that JFMCC-Katrina used to support the distribution of water and food to residents stranded by the hurricane.

Table 11. The Navy's support to the distribution of food and water

Navy capabilities	Description
Responded rapidly	Fleet Logistics Air Support flights began on 27 August [15, 16]. *Bataan* began air operations on 30 August [9].
Delivered large quantities of relief supplies	The maritime force transported approximately 2.2 million pounds of food and water [15].[a]
Reached areas inaccessible by ground	By using helicopters, LCACs, and small surface craft, the maritime force was able to deliver food and water to residents stranded by flood waters and impassable roads.
Responded to a variety of tasking	The maritime force responded to tasking from many different sources, including FEMA, Red Cross, government officials, USCG, and DoD. In addition, the METOC officer in southern Mississippi identified communities that needed assistance.

a. The amount of food and water transported is based upon the best available estimates.

Provided medical treatment

Hurricane Katrina caused a public health emergency along the Gulf Coast [18]. In addition to injuries caused by the storm's winds and flood waters, the health of Gulf Coast residents was at risk from:

- Injuries sustained during the clean-up and recovery
- Untreated chronic conditions (e.g., unavailable prescriptions and a lack of power to operate medical equipment)
- Disease caused by unsanitary water and unsafe food
- Injuries caused by civil unrest
- Common health emergencies not attributable to the hurricane (e.g., heart attacks, strokes, broken bones, and infections).

Without medical support from outside the region, many injured and sick residents would not have had access to medical care because the storm damaged/destroyed many of the region's medical facilities and scattered their medical staffs.

In response to the need for medical support, the Navy provided several categories of medical support to the Katrina response, including:

- USNS *Comfort*
- Organic medical staffs from the surface combatants (i.e., gray hulls)
- Access to medical facilities on Navy installations
- Navy Environmental and Preventive Medicine Units.

The focus of this report is on the afloat assets (i.e., *Comfort* and gray hulls) that the Navy deployed to support JTF-Katrina. The medical staffs from *Comfort* and the gray hulls treated an estimated 10,239 patients [6, 19-21]. Table 12 summarizes the treatment provided by the medical staffs from the Comfort and Navy gray hulls.

Table 12. Patients treated by the maritime force[a]

Number of patients	Navy asset	Comments
1,258	*Comfort*	The *Comfort's* staff treated 1,258 patients aboard ship while in Mississippi.
7,000	*Comfort*	The *Comfort's* staff treated an estimated 7,000 patients at ashore facilities in Mississippi.
102	*Comfort*	The *Comfort's* staff treated 102 patients aboard ship while in New Orleans. They did not treat any patients at ashore facilities.
1,879	Gray hulls	The medical staffs of the five gray hulls treated at least 1,879 patients (both ashore and aboard ship). It is likely that the actual number of patients is higher because the number of patients treated by the *Bataan* is not available.
10,239	**Total**	

a. Sources: [6, 19-21]
Note: The statistics provided in table 12 are based upon the best available estimates.

As table 12 indicates, the gray hulls and *Comfort* provided both outpatient and advanced care to residents and Katrina response personnel; however, most patients required outpatient care, rather than advanced care.

Comfort's Katrina mission began when she departed Baltimore on 2 September. Table 13 summarizes the Katrina deployment for the *Comfort*.

Table 13. USNS *Comfort's* Katrina deployment

Dates	Status of the *Comfort*
31 Aug	Activated *Comfort* [19]
2 Sep	Departed Port of Baltimore [19, 20]
5 Sep	Arrived Mayport, FL [22]
9 Sep	Arrived Pascagoula, MS [19, 23]
20 Sep	Departed Pascagoula, MS [19]
20-28 Sep	Stationed in the Gulf of Mexico for storm evasion [24]
29 Sep	Arrived New Orleans, LA [20]
8 Oct	Departed New Orleans enroute to Baltimore MD [19]
13 Oct	Arrived Baltimore [19]

Comfort deployed with approximately 264 medical professionals who could support 250 of the ship's hospital beds [21, 25]. The ship's medical staff was also prepared to provide outpatient care (e.g., treating minor injuries, chronic conditions, and illnesses) and advanced care (e.g., surgery) [26].

Comfort provided medical services to residents and relief workers in both Pascagoula, MS and New Orleans, LA. In Pascagoula, the *Comfort's* medical staff treated approximately 1,258 patients aboard ship and 7,000 patients ashore. For example, the *Comfort's* staff treated an estimated 376 patients ashore at the *Comfort* Clinic, a temporary clinic operating at a local mall. Most of these patients needed outpatient care, such as immunizations, and prescription medication [19, 21].

On 20 September, *Comfort* departed Pascagoula to evade Hurricane Rita. After the storm passed, *Comfort* was directed to New Orleans to serve a a trauma center for the city. While there, the ship treated an additional 102 patients. *Comfort* departed New Orleans on 8 October and headed to her home port, Baltimore, MD [20, 21, 26, 27].

In addition to *Comfort*, medical staffs from five gray hulls (e.g., *Iwo Jima*, *Bataan*, *Tortuga*, *Shreveport*, and *Whidbey Island*) treated patients aboard ship and at ashore facilities. Like those treated by *Comfort*, most of the patients required outpatient care, rather than advanced care. During the response, the medical staffs from these five ships treated at least

1,879 patients [6]. In some instances, the patients were treated aboard the ships. In other instances, the medical staffs deployed ashore and provided medical services in community centers, schools, and clinics. Table 14 summarizes the medical support provided by the medical staffs from the five gray hulls.

Table 14. Examples of medical services provided by the gray hulls[a]

Ship	Location	Date	Activity
USS *Iwo Jima* Treated 242 patients	NOLA	7 Sep	Treated 3 civilians from helicopter crash [28].
	NOLA	10 Sep	Distress Management Team provided critical incident stress debriefing to local 6th District Police personnel [29].
	NOLA	12 Sep	Treated 19 patients and admitted 9 to the Intensive Care Unit ward. The Medical Department performed 3 surgeries and 4 MEDEVACs arrived aboard [30].
USS *Bataan* Unknown number of patients treated	NOLA	1-2 Sep	Provided medical support at the Convention Center and NAS Joint Reserve Base (JRB) New Orleans [10].
	NOLA	4-5 Sep	26-member team deployed to New Orleans airport providing triage to displaced persons [22].
	NOLA & Biloxi	4-9 Sep	Inserted 5 medical teams at NOLA and Biloxi (13 personnel at a high school) [10].
	Biloxi, MS	7-8 Sep	Delivered 150 doses of tetanus vaccine to Biloxi High School Clinic [31].
USS *Tortuga* Treated 237 patients	NOLA	5-8 Sep	Residents from the Ninth Ward who were rescued by the ship's CRRCs received medical care when needed [32, 33].
USS *Whidbey Island* Treated 169 patients	Biloxi, MS	6 Sep	Provided medical support at a high school [34].
USS *Shreveport* Treated 1,231 patients	NOLA	15 Sep	197 individuals were given 540 shots [35].

a. Source: [6].

The Navy's medical response capabilities

Table 15 summarizes some of the capabilities that the Navy provided to address the medical needs of Gulf Coast residents.

Table 15. Efforts by the maritime force to address the region's medical needs

Navy capabilities	Description
Treated patients	The maritime force treated approximately 10,239 patients (primarily outpatient care).[a]
Reached inaccessible areas ashore	Many patients treated by the maritime force were located in inaccessible areas, such as Biloxi and the Ninth Ward in NOLA.
Adapted the response	Most of the residents who needed medical assistance required primary care, rather than advanced care. The maritime force responded by deploying teams ashore to support impromptu clinics.

a. The number of patients cited in 15 table is based upon the best available estimates.

Provided command and control platforms

The hurricane disrupted the region's information technology and communications infrastructures. Electricity, telephones, internet access, and radio communications were unreliable and often not available at all. In addition, many critical telecommunications nodes and local/state operations centers were damaged or destroyed by the storm's winds and flood waters. The hurricane also disrupted access to services needed by those staffing these centers (e.g., berthing, food, and security).

The Navy's ships helped to address the region's need for command and control facilities by providing the infrastructure and services needed to exercise command and control. During the response, *Iwo Jima* and *Shreveport* became important command and control nodes. The Marine Force staff was embarked on *Shreveport. Iwo Jima* embarked four operational-level staffs:

- JTF-Iwo staff element (i.e., CPG-SEL[14] from the Fifth Army staff)

14. The CPG-SEL acronym most likely stood for Command Planning Group, Southeast Louisiana.

- JFMCC-Katrina
- Rescue Coordination Center (JFACC element under JFMCC-Katrina control)
- Amphibious Group-Two (i.e., JFMCC-Katrina's Sea Echelon Commander and staff).

Navy ships were convenient command and control platforms because they provided staffs with the capabilities they needed to exercise their command and control responsibilities. These capabilities included:

- Ready IT and communication systems that did not depend upon ashore connectivity or power
- Workspaces for staff members
- Access to transportation (e.g., helicopters, landing craft, and ground transportation when pier side)
- Antiterrorism and force protection capabilities
- Hospitality services (e.g., berthing, food, and shelter).

After arriving in NOLA on 5 September, *Iwo Jima* became a center of gravity. The ship's high profile can be attributed, in part, to its organic capabilities listed above, the presence of embarked staffs, and its location at a focal point of the disaster (i.e., New Orleans on the Mississippi River). During the remainder of the response, *Iwo Jima* provided a convenient meeting place for DoD and civilian leadership. Visitors to the ship included the President, Vice President, Governor of Louisiana, Chief of Naval Operations, Principal Federal Officer, JTF Commander, Mayor of New Orleans, and Marine Force Commander. Like the embarked staffs, these visitors utilized the ship's capabilities to exercise their command and control responsibilities.

Inspected and repaired critical infrastructure

Hurricane Katrina damaged several elements of the Gulf Coast's infrastructure. The storm surge and high winds damaged offshore oil platforms and pipelines. The hurricane created hazards to navigation by shifting sand bars and moving obstacles into the region's waterways.[15] The storm also caused widespread damage to the region's ashore infrastructure (e.g., electrical grid, water and sewage

systems, pumping stations, telephone systems, ports, roads, and bridges).

JFMCC-Katrina tasked assets deployed by the Navy to support the recovery of the three categories of infrastructure listed above: offshore oil production facilities, waterways, and ashore infrastructure. JFMCC-Katrina tasked MCM ships to survey the region's offshore oil production facilities and waterways. *Grapple* and dive teams (both Navy and coalition) were tasked to identify and remove hazards to navigation. The Seabees worked numerous projects to restore the region's ashore infrastructure.

The Navy deployed six MCM ships from Ingleside, Texas, to support the Katrina response:

- USS *Chief*
- USS *Gladiator*
- USS *Falcon*
- USS *Defender*
- USS *Pioneer*
- USS *Scout.*

These ships were used primarily to survey the region's offshore oil facilities and associated fairways.

The primary mission of *Grapple* and the Mobile Dive and Salvage Unit-2 (MDSU-2) dive teams (with support from French and Canadian dive teams) was to identify and remove hazards from the region's waterways. Examples of salvage work included:

- Removed a concrete block from a Pascagoula waterway
- Cleared a harbor obstruction in Mobile Bay

15. Channel clearance issues affected the Navy's visible operations in metropolitan areas because they delayed the movement of Navy ships to New Orleans and Mississippi ports.

- Conducted salvage operations in the Louisiana Offshore Oil Port (LOOP)
- Side scanned the upper Pascagoula River to Escambia
- Dived on and identified obstructions in the Pensacola Naval Channel
- Surveyed the Harris County Industrial Canal
- Surveyed and side scanned the Biloxi Back Bay area
- Scanned the Chevron Piers at Bayou Casotte and discovered an obstruction
- Developed a salvage plan for a 55-foot fishing trawler
- Located an obstruction in a position south of the Bayou La Batre Harbor
- Removed an obstruction from the Bayou Casotte/Chevron Basin
- Completed a side scan of the Port Michoud waterways
- Dived on an obstruction in the Mobile River north of Cochrane Bridge and identified the object as a coal barge [36, 37, 38].

In addition to *Grapple* and the dive teams, the Navy deployed more than 1,200 Seabees to the region and they engaged in a variety of projects to restore basic services. Table 16 provides examples of the activities undertaken by the Seabees.

Table 16. Seabee activity

Date	Number of Seabees[a]	Examples of projects
6 Sep	~	Delivered potable water to Biloxi Back Bay area. Provided generator to dewater lift station in Biloxi [39].
10 Sep	800	Supported FEMA move to Keesler, AFB [9, 38].
10-11 Sep	983	Operated 50+ generators for Biloxi and FEMA facilities. Provided support to the German Pump Team [38, 40].
12 Sep	1,015	Provided 800 gallons of water daily to Biloxi Public Safety Building and helped the City of Biloxi repair water treatment plant that serves 100,000 people. Began masonry work on the Bayou La Batre Elementary/Middle School and completed 40% of work on the Hope Have Children's Center. Completed debris clearing at Jones Park/Pier to support local port and Coast Guard operations. Conducted underwater survey of waterfront facilities at NAS JRB New Orleans and a hydrographic survey of the Intercoastal Waterway in Belle Chase [17, 30].
15-16 Sep	1,267	George County, MS: Completed clearing a 100 acre temporary housing site for FEMA. Hancock County, MS: Repaired lift stations and water mains. Pear River County, MS: Repaired Crosby Memorial Hospital. Harrison County, MS: Continued constructing a bypass for Highway 90. Removed debris for the Salvation Army. Restored power at key facilities. Stone County, MS: Cleaned and repaired local schools. Prepared sites for temporary housing. Jackson County, MS: Continued repairs on lift stations [41, 42, 43].

a. These totals refer to the number of Seabees in the JOA on that date.

Restored local self-sufficiency

In addition to damaging large segments of the Gulf Coast's infrastructure (e.g., electrical grid, water and sewage systems, pumping stations, telephone systems, ports, roads, and bridges), the hurricane created numerous small-scale work projects at the local level. The needs of the local communities included clearing roads, locating fuel, repairing generators, distributing relief supplies, and removing debris from government buildings (e.g., police stations, schools, and firehouses). During the initial response, federal and state assistance to these missions was limited.

JFMCC-Katrina responded to these needs (i.e, both infrastructure and small-scale projects) by deploying Seabees and directing the gray hulls to deploy personnel ashore to engage community leaders and assess their needs. Working parties followed and were directed to provide whatever assistance they could to these communities [44]. Table 17 provides examples of the community support projects undertaken by the maritime force during the Katrina response.

Table 17. Community support projects

Units	Date	Community support projects
USS *Iwo Jima*	11 Sep	A working party assisted the clean-up of the New Orleans Boardwalk fountain and plaza area [45].
	20 Sep	Personnel manned hot grills and a food line at Harrah's Operations Center to provide meals to first responders and police [24].
USS *Shreveport*	5 Sep	94 sailors helped to clean a local church and offload Salvation Army equipment [32].
	8 Sep	Sailors worked at New Orleans Police Department Harbor Patrol facility removing debris [46]. Another group repaired or replaced 19 tires on police cars [46].
	12 Sep	Sailors cleared 1 acre of local courthouse grounds, moving boats, fallen trees, and debris [47].
USS *Whidbey Island*	6 Sep	A nine-member team was sent to Biloxi High School shelter to relieve *Bataan* cooks [48].
	8 Sep	Personnel augmented law enforcement ashore for traffic control [36].
USS *Bataan*	7 Sep	Working parties cleared debris from the Nativity School, loaded trucks at the FEMA warehouse, provided food and water to the Industrial Canal, and assisted the Red Cross [13].
"Beach operations"[a]	7 Sep	Cooks and medical staff continued work at the Biloxi High School [13]. Meals ready to eat were distributed to local fire departments [13]. Shore patrol augmented local law enforcement with traffic control [13].
	9 Sep	Personnel assisted the City of Biloxi Public Works with Beach Master bulldozers to uncover water meters needed to restore water to the city [49]. Personnel assisted Fisheries and Wildlife officers in traffic control on Highway 90 [49]. Personnel deployed working parties to food distribution and evacuation centers [49].
	Sep	The Navy provided internet and telecommunications capabilities to the cities of Bay St. Louis and Waveland, MS [44].

a. The term "Beach operations" was used in the JFMCC-Katrina Afloat Echelon's daily situation report (SITREP) to describe activities occurring ashore that were not attributed to a specific ship.

The list of projects described in table 17 illustrates the ability of Navy ships to respond to the needs of local communities. Navy ships maintain applicable expertise (e.g., mechanics, mess specialists, engineers, and

electricians) and resources, including equipment, transportation, food, water, and fuel. The ships supporting the Katrina response employed these organic assets to assist communities along the Gulf Coast.

Provided hospitality services

In the wake of the hurricane, federal and state governments deployed thousands of relief workers (e.g., FEMA and the Centers for Disease Control and Prevention (CDC)), National Guard troops, and active duty military personnel to the Gulf Coast; however, the region's hospitality industry could not accommodate them. The storm seriously damaged the region's many hotels. Habitable hotels often did not have utilities (e.g., electricity, water, and sewage). Food and clean water were scarce. To provide for the basic needs of their personnel, many of these response organizations had to transport and assemble hospitality facilities for their staffs.

In contrast, Navy ships could provide these needed hospitality services immediately. JFMCC-Katrina responded to the needs of these relief workers and military personnel by housing them aboard its ships. Examples of organizations with personnel berthed and fed aboard Navy ships included: FEMA, CDC, Disaster Medical Assistance Teams, Rhode Island National Guard, Fifth Army, Secret Service, USCG, 82nd Airborne, and the US Marshal Service [44]. Table 18 summarizes the berthing and meal service provided by Navy ships.

Table 18. Navy hospitality services[a]

Ship	Dates	Berths provided	Meals served
USS *Iwo Jima*	3-22 Sep	8,075	41,400
USS *Bataan*	30 Aug - 17 Sep	50	500
USS *Shreveport*	5-22 Sep	2,754	2,799
USS *Tortuga*	3-19 Sep	2,312	8,766
USS *Whidbey Island*	5-14 Sep	0	9,850
USNS *Comfort*	10-20 Sep	1,000	3,000
Totals		**14,191**	**66,315**

a. Source: [6].
Note: The statistics provided in table 18 are based upon the best estimates available.

In addition to berthing and food, the ships provided medical and IT services when needed. These services were available to relief workers and DoD personnel as soon as the ships arrived in the JOA because it was not necessary for the JFMCC to locate materials, prepare sites, or assemble facilities. The organic capabilities of many Navy ships (e.g., aircraft carriers and amphibious assault ships) enable them to accommodate large numbers of personnel on short notice.

During the initial phase of the response, the maritime force's support to the interagency community allowed these organizations to focus on the response mission, rather than devoting time and resources to establishing an infrastructure to support response personnel.

Coordinate relief operations with coalition forces

Several foreign governments responded to the crisis by deploying assets that were used to support relief and recovery operations. JFMCC-Katrina was responsible for integrating the foreign maritime assets into the response. Table 19 summarizes the coalition assets for which JFMCC-Katrina was responsible.

Table 19. Coalition maritime assets[a]

Country	Units	Dates of participation	Capabilities
Canada	HMCS *Athabaskan*	13-18 Sep	2 Sea King helicopters Humanitarian supplies Small boats
	HMCS *Ville de Quebec*	13-18 Sep	2 Sea King helicopters Humanitarian supplies Small boats
	HMCS *Toronto*	12-18 Sep	Humanitarian supplies Small boats
	CCGS *Sir William Alexander*	14 Sep - TBD	Weather buoy repair Small boats
	Dive team	unknown	Diving and salvage
Netherlands	HNLMS *Jan van Amstel*	7-14 Sep	2 helicopters 11 small boats 10,000 liters of water 2 doctors and 3 nurses
Mexico	MS *Rio Papaloapan*	7-14 Sep	2 MI-17 helicopters 8 vehicles 7 APC-70 amphibs 1 engineering team 1 ambulance with medical team 1 water truck 1 fuel truck
France	Dive team	unknown	Diving and salvage

a. Sources: [4, 50, 51, 52].

Although the Department of State arranged the foreign assistance described in table 19, JFMCC-Katrina was responsible for identifying and assigning appropriate missions to the coalition forces. Table 20 describes the missions assigned to the coalition forces under JFMCC-Katrina.

Table 20. Missions assigned to coalition forces

Units	Missions
HMCS *Athabaskan*	Anchored in vicinity of (IVO) of Gulfport/Biloxi for disaster relief assistance [53]
HMCS *Ville de Quebec*	Anchored IVO of Gulfport/Biloxi for disaster relief assistance [53]
HMCS *Toronto*	Anchored IVO of Gulfport/Biloxi for disaster relief assistance [53]
CCGS *Sir William Alexander*	Surveyed and repaired weather buoys in Gulf of Mexico [38]
HNLMS *Jan van Amstel*	Assisted mobile diving and salvage unit divers in a survey of a grounded geological survey vessel [23] Provided 58 personnel for beach clearing and disaster relief operations ashore [23] Conducted CRRC operations as waterborne security for beach operations [23] Searched Mississippi barrier islands with zodiac [9] Conducted oil platform helicopter patrol [17]
MS *Rio Papaloapan*	Provided 87 personnel for beach clearing and disaster relief operations ashore [23]

During the Katrina response, *Bataan* became the primary coalition operations node. To coordinate coalition activities, the foreign navies dispatched liaison naval officers (LNOs) to *Bataan* so that they could interact directly with their US Navy counterparts [13, 28, 46, 54, 55].

The Katrina experience illustrates that a JFMCC can have a significant coalition related function to perform during disaster relief operations. During the response, JFMCC-Katrina was responsible for integrating coalition units into the overall response (e.g., identifying and assigning missions to coalition maritime units).

Restored operational capabilities of Navy installations

Hurricane Katrina damaged several Navy installations along the Gulf Coast. JFMCC-Katrina was responsible for restoring these installations to operational status. To accomplish this mission, JFMCC-Katrina created a JFMCC-Katrina Ashore Echelon Command.

Making the restoration of the region's Navy installations a priority had several benefits. Once restored, these installations could:

- Support ongoing relief operations
- Allow Navy personnel and families to return to their base housing
- Provide needed economic activity to local communities
- Return to their pre-Katrina national security missions.

The list of Navy installations affected by Hurricane Katrina included:

- Construction Battalion Center (CBC) Gulfport
- NAS Meridian
- Naval Station (NAVSTA) Pascagoula
- Stennis Space Center
- NAS Joint Reserve Base New Orleans (NAS JRB NO)
- Navy Support Activity New Orleans (NSA NO) - East Bank
- NSA New Orleans - West Bank
- NAS Pensacola.

To identify bases and issues requiring additional attention, the Ashore Echelon Commander tracked the status of key operational areas (e.g., utilities and medical facilities) at these installations. Table 21 summarizes the status of these bases as reported on 9 September.

Table 21. Status of Navy installations on 9 September[a]

Installation	Support to JTF-Katrina	Pre-Katrina operational mission	Facilities	Base housing	Utilities	Port/ airfield	Medical
Gulfport	FMC	*PMC*	*PMC*	*PMC*	FMC	UNK	FMC
Meridian	FMC	FMC	FMC	FMC	FMC	FMC	FMC
Pascagoula	FMC	*PMC*	*PMC*	*PMC*	*PMC*	*PMC*	*PMC*
Stennis	FMC	FMC	FMC	N/A	FMC	N/A	FMC
NAS JRB NO	FMC	*PMC*	*PMC*	*PMC*	*PMC*	FMC	*PMC*
NSA NO (East Bank)	FMC	**NMC**	**NMC**	N/A	**NMC**	N/A	N/A
NSA NO (West Bank)	FMC	**NMC**	*PMC*	*PMC*	*PMC*	*PMC*	*PMC*
Pensacola	FMC	FMC	FMC	FMC	FMC	FMC	FMC

a. Source: [56].

Legend:
NMC = Not mission capable
PMC = Partially mission capable
FMC = Fully mission capable
UNK = Unknown
N/A = Not applicable.

The JFMCC-Katrina Ashore Echelon staff used the information in table 21 to quickly summarize the operational status of the Navy's Gulf Coast installations; however, these labels (e.g., NMC, PMC, and FMC) provide limited information about the specific needs of these bases.[16] Table 22 provides a selected set of detailed examples that clarify the meanings of the assessments summarized in table 21.

16. In the briefings that accompanied the table 21 information, the JFMCC-Katrina Ashore Echelon staff provided detailed information about the needs of each installation.

Table 22. Examples of installation assessments[a]

Installation	Operational area	Status	Explanation
NSA NO (East Bank)	Utilities	NMC	NSA NO (East Bank) did not have water or sewer service and was operating with limited generator power [56].
NAS JRB NO	Port/airfield	FMC	The airfield was operational both day and night. The facility was both instrument and visual flight rules capable [56].
Gulfport	Pre-Katrina operational mission	PMC	Training facilities at the installation were damaged [56].
Pascagoula	Utilities	PMC	The facility was operating on partial generator power with the expectation that full power would be restored shortly [56].
Pascagoula	Port/airfield	PMC	The channel and pier were open to daylight transit only. Pier services were limited [56].
Gulfport	Base housing	PMC	52 of 373 family housing units were uninhabitable. 318 of 1210 bachelor quarter's rooms were uninhabitable [57].
Meridian	Support to JTF-Katrina	FMC	Meridian was hosting evacuees and providing logistical support to Katrina relief operations [58].
NSA NO (East Bank)	Facilities	NMC	The storm damaged multiple buildings on the installation [58].

a. Legend:
NMC = Not mission capable
PMC = Partially mission capable
FMC = Fully mission capable

The information in table 22 illustrates what the operational assessments indicated and details some of the issues faced by Navy installations during the recovery phase.

As table 21 indicates, most of the operational areas at the region's installations were assessed to be partially or fully mission capable by 9 September (i.e., the first comprehensive assessment available). To address the areas that were still assessed to be partially or not mission capable, JFMCC-Katrina employed personnel from several sources to restore the region's installation infrastructure. The sources of these personnel included Navy Seabees, contractors, personnel from the installations, and other available DoD personnel.

The 25 September assessment (i.e., post-Hurricane Rita) provided in table 23 highlights the progress made in restoring the region's Navy installations. The shaded cells denote changes in the assessment since 9 September. Improvements were noted in several areas and at different installations.

Table 23. Status of Navy installations on 25 September[a]

Installation	Support to JTF-Katrina	Pre-Katrina operational mission	Facilities	Base housing	Utilities	Port/ airfield	Medical
Gulfport	FMC	FMC	*PMC*	*PMC*	FMC	FMC	FMC
Meridian	FMC	FMC	FMC	FMC	FMC	FMC	FMC
Pascagoula	FMC	*PMC*	*PMC*	*PMC*	*PMC*	*PMC*	FMC
Stennis	FMC	FMC	FMC	N/A	FMC	N/A	FMC
NAS JRB NO	FMC	FMC	*PMC*	*PMC*	FMC	FMC	FMC
NSA NO (East Bank)	FMC	**NMC**	*PMC*	N/A	*PMC*	N/A	N/A
NSA NO (West Bank)	FMC	**NMC**	*PMC*	*PMC*	FMC	FMC	FMC
Pensacola	FMC	FMC	FMC	FMC	FMC	FMC	FMC

a. Source: [57].
Legend:
NMC = Not mission capable
PMC = Partially mission capable
FMC = Fully mission capable
UNK = Unknown
N/A = Not applicable

Despite the operational limitations noted in tables 21 and 23, the region's Navy installations supported the Katrina response. Table 24 provides examples of the contributions made by these installations.

Table 24. Response support provided by Gulf Coast Navy installations

Installations	Examples of support
Gulfport	Supported logistics/mobilization mission [58]
Meridian	Hosted 500-bed FEMA medical facility [59] Accepted evacuees [23]
Pascagoula	Not reported
Stennis	Hosted 50 FEMA trailers [57]
NAS JRB NO	Hosted National Guard units [59] Provided logistics support and operated as a second airport for NOLA [4] Hosted USCG assets [7]
NSA NO (East Bank)	Hosted 5,000-person National Guard tent city [59]
NSA NO (West Bank)	Hosted the 82nd Airborne [56]
Pensacola	Provided extensive logistics support [4] Hosted several elements of the JFMCC staff Accepted displaced persons [56]

The activities described in table 24 illustrates the areas in which Navy installations support the Katrina response. In many instances, these installations became focal points for the local response. The forces deployed to the areas near these installations used them as forward operating bases from which they could project their relief efforts into the surrounding communities.

Factors that the effectiveness of the maritime force

The Katrina response provided an opportunity to learn about how the Navy can better prepared to support domestic relief operations. During the operation, JFMCC-Katrina staff members highlighted several issues that limited their ability to support these operations. These JFMCC issues are organized around six topics:

- Command and control
- Accounting for personnel
- Access to information
- Information technology
- Operations
- Doctrine.

This section of the report highlights these issues, describes how JFMCC-Katrina responded, and suggests strategies that could be used to minimize the effects these issues have on future disaster response operations.

Command and control

During the Katrina response, interaction between the JTF-Katrina and JFMCC-Katrina staffs was problematic. JFMCC-Katrina had to operate with little guidance from the JTF. JFMCC-Katrina expected greater interaction with and direction from the JTF than they received. Although the JFMCC-Katrina staff regularly attempted to contact the JTF staff, JFMCC-Katrina did not feel as though they had effectively engaged the JTF staff.

At times during the response, JFMCC-Katrina could not raise issues or find JTF staff members to answer questions. Other organizations encountered similar issues with JTF-Katrina. For example, the

NORTHCOM staff frequently contacted JFMCC-Katrina directly requesting information because they could not obtain information from the JTF staff. Although the quality and quantity of interaction with the JTF increased over the course of the response, the JFMCC-Katrina would have preferred greater coordination and a closer partnership with the JTF [4].

Several factors contributed to the disconnect between the JTF-Katrina and JFMCC-Katrina staffs, including:

- The distributed JTF staff
- Unclear areas of responsibility
- Unreliable communications with a portion of the JTF staff
- Limited Navy participation on the JTF staff
- Movements of the JTF Commander.

During the Katrina response, the JTF Headquarters staff operated from at least five different locations:

- JTF-Katrina West was located in Baton Rouge, LA, through at least 8 September.
- JTF-Katrina West relocated to *Iwo Jima* on 9 September.[17]
- JTF-Katrina Forward was located at Camp Shelby in Hattiesburg, MS.
- JTF-Katrina Rear operated from Fort Gillem in Atlanta, GA.
- The JTF Commander regularly moved among various locations in and around New Orleans.

The presence of these JTF-Katrina staffs made it challenging, at times, for JFMCC-Katrina to contact JTF staff members to discuss planning or operational issues. At times, JFMCC-Katrina was not certain which of the JTF staffs it should contact about a particular issue[4]. Despite repeated attempts to clarify the roles and responsibilities of the JTF

17. It is unclear whether any staff members from JTF-West remained in Baton Rouge after the move to *Iwo Jima*.

staffs, the JFMCC-Katrina staff was often uncertain about whom to contact on the JTF staff. Each new issue precipitated a series of phone calls and e-mails to the different JTF staff elements during which JFMCC-Katrina would attempt to identify and contact the responsible JTF staff member(s).

There were limited opportunities for the components to resolve this uncertainty. The JTF staff did not establish a battle rhythm or the typical boards, centers, and cells of a JTF organization. Without these processes, the JTF staff could not effectively coordinate response activities with its components.

Interacting with the JTF-Katrina staff was further complicated by a lack of connectivity with staff members at Camp Shelby (located near Hattiesburg, MS). At times, JFMCC-Katrina could not communicate with the JTF-Katrina Forward staff. When Hurricane Katrina passed over the area (i.e., the center of the storm passed within 20 miles of Hattiesburg[18]), it damaged key elements of the region's infrastructure, including the electrical grid and communications systems. This damage limited the ability of the JTF staff at Camp Shelby to communicate with other elements of the Katrina response, including the JFMCC-Katrina.

The absence of Navy representation on the JTF staff removed a point of coordination between JFMCC-Katrina and JTF-Katrina, further limiting interaction [4]. Navy personnel would normally provide both maritime expertise to the JTF and a familiar communication conduit between the JFMCC-Katrina and JTF-Katrina staffs; however, the JTF staff was composed primarily of personnel from the First and Fifth Armies. There were few members from other services on the JTF staff. The absence of Navy personnel on the JTF staff further insulated the JFMCC-Katrina and JTF-Katrina staffs from each other.

18. National Hurricane Center. "Hurricane Katrina Intermediate Advisory 27B." 29 August 2005. National Oceanographic and Atmospheric Administration. 18 October 2005 (http://www.nhc.noaa.gov/archive/2005/pub/al122005.public_b.027.shtml?text.)

The JTF Commander's (CJTF's) frequent and unpredictable movements around the JOA further confounded JFMCC-Katrina's ability to engage him and the JTF staff. At times during the response, especially during the first week, the CJTF was incommunicado with his own staff for extended periods of time [4]. JFMCC-Katrina had even less access. This lack of access and a reluctance by the JTF staff to make decisions without the prior approval of CJTF contributed to the disconnect that separated the JFMCC-Katrina and JTF staffs.

This disconnect made it more difficult for JFMCC-Katrina to support JTF operations. The limited interaction between JFMCC-Katrina and the JTF provided few opportunities for JFMCC-Katrina to assess the CJTF's needs and respond to his concerns. In addition, JFMCC-Katrina received little direction and only sporadic tasking from the JTF.

To improve coordination with the JTF, JFMCC-Katrina dispatched an LNO to Camp Shelby and one to Fort Gillem [4]. Connectivity issues limited the ability of the Camp Shelby LNO to bring the JTF and JFMCC-Katrina closer together; however, the Fort Gillem LNO significantly improved interaction between the two staffs. JFMCC-Katrina sought to further improve interaction with the JTF by moving the JFMCC-Katrina staff to *Iwo Jima* in New Orleans. The JTF-Katrina West[19] staff was embarked on *Iwo Jima* and the JTF Commander made frequent visits to the ship. Moving aboard *Iwo Jima* provided JFMCC-Katrina with greater opportunities for interaction, especially face-to-face encounters, with the JTF Commander and his staff than if JFMCC-Katrina had remained at NAS Pensacola.

Throughout the Katrina response, JFMCC-Katrina responded to tasking and requests for support from the JTF staff; however, this tasking was sporadic. In the absence of comprehensive tasking, JFMCC-Katrina encouraged maritime Commanders to exercise their initiative. These Commanders were expected to assess their circumstances, identify a course of action, and execute the mission within the parameters set forth in the guidance provided to the maritime force.

19. While aboard *Iwo Jima*, the JTF-West staff was referred to as JTF CPG-SEL (Command Planning Group - Southeast Louisiana).

Distributing an operational staff can have advantages (e.g., a smaller forward footprint and more rapid activation), but these advantages can be offset by limited connectivity and ambiguous roles and responsibilities. The response of the JFMCC to the limited interaction and uncertainty was to move the JFMCC closer to the center of gravity, deploy LNOs, and encourage maritime Commanders to exercise initiative. JFMCC-Katrina's ability to support the operation, even with the command and control limitations, illustrates the usefulness of these strategies.

Accounting for personnel—"Operation Nose Count"

Locating Navy personnel was a high priority for both JFMCC-Katrina and the Navy, and required significant staff resources to complete. Hurricane Katrina caused Navy personnel (uniformed and civilian) to disperse, making it difficult for them to report their status to their chains of command. Many had evacuated and some civilians (i.e., both Navy civilians and contractors) had reported to their National Guard units or to volunteer emergency services organizations [4]. Damage to the region's phone service further complicated the accounting process.

The system that the Navy used to track its personnel after Katrina required a significant investment of staff time. Navy personnel were tracked by their UIC; however, JFMCC-Katrina and base Commanding Officers had limited access to the personnel lists of the UICs of the tenant commands on their bases. The Commanding Officers had access to information about the personnel assigned to their bases, but not tenant UICs or temporary personnel. Without ready access to the UIC information, the Navy had to contact each UIC's command and request an accounting of its personnel assigned to Gulf Coast bases. This information was then merged with the personnel information collected by JFMCC-Katrina [4].

This process required significant staff resources. The JFMCC-Katrina Ashore Echelon staff assembled a list of 167 UICs they believed were assigned to the region's seven Navy installations (e.g., NAS JRB New Orleans, NSA New Orleans, CBC Gulfport, Stennis Space Center, NAVSTA Pascagoula, NAS Meridian, and NAS Pensacola). By 9 September, the JFMCC-Katrina Ashore Echelon staff had begun the

process of accounting for the personnel assigned to these UICs.[20] Despite the high priority the Navy placed on accounting for its personnel, the 9 September Ashore Echelon briefing (i.e., 11 days after the hurricane made landfall) indicated that most UICs had not provided a personnel accounting of UICs assigned to Gulf Coast installations. The 9 September briefing provided the status of 167 UICs:

- 106 were categorized as red, indicating that an accounting was not available or none of the UIC's personnel had been located.
- 8 were categorized as yellow, indicating that the UIC had provided an accounting, but not everyone assigned to the UIC had been located.
- 53 were categorized as green, indicating that all personnel assigned to the UIC had been located [56].

By 13 September, JFMCC-Katrina Ashore Echelon reported a significant improvement in the personnel accounting results:

- None of the UICs were categorized as red.
- 8 of the UICs were categorized as yellow.
- 147 of the UICs were categorized as green [60].[21]

To improve the visibility of base Commanding Officers into the personnel assigned to their bases, the Navy may want to consider adopting a policy that:

- Requires visiting UICs to provide the base with a list of personnel assigned from that UIC to the base
- Directs personnel to check in with the base during a major event.

By doing so, the Navy would be simplifying the accounting process. Rather than trying to track down 150+ UICs at the Commander, Fleet Forces Command (CFFC) or JFMCC level, the base Commanding Officers would have the information needed to begin an accounting of the personnel assigned to their base [4].

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20. This process was frequently referred to as Operation Nose Count.

21. The remaining UICs were merged with others or removed from the list.

Access to information

In the days immediately following the landfall of the hurricane, state and federal officials had limited information about the needs of local communities along the Gulf Coast. Anecdotal information and news reports provided some actionable information, but the assessment of the region's needs was far from complete.

In addition to these sources, JFMCC-Katrina had access to reports from a METOC officer traveling through southern Mississippi. This officer visited several locations and identified opportunities where the maritime force could provide assistance. This officer also shared the JFMCC-Katrina staff's contact information with local officials who were encouraged to contact JFMCC-Katrina directly with requests for support. These activities generated additional tasking that the maritime force fulfilled [44].

To increase a JFMCC's access to actionable information and improve the ability of the maritime force to rapidly reach isolated communities with assistance, the Navy may want to incorporate the METOC officer's reconnaissance activities into its disaster relief planning. Deploying small reconnaissance teams into a disaster area would provide the maritime force with the ability to generate its own tasking and opportunities to have an immediate impact on the lives of residents. These teams would make contact with community leaders and communicate their needs directly to the JFMCC staff who would respond with maritime assets or pass the request along to other JTF elements.

Information technology

The JFMCC-Katrina J6 drafted a detailed lessons learned document in which he describes several IT issues that arose during the Katrina response.[22] This report provides a selected summary of the J6 lessons learned document [61]. Three common issues link several of the

22. LCDR James Mills and LT Richard Green. "Joint Task Force Katrina (JTF-K), Joint Force Maritime Component Commander (JFMCC), Command and Control, Communications, and Computer (C4) System Lessons Learned Assessment." Draft. 25 September 2005.

lessons described in this document. These three issues complicated the overall mission of the IT community to support JFMCC-Katrina operations. These issues included:

- Reliance on unclassified systems to support relief operations
- The rapid pace of operations
- Limited availability of IT expertise.

Nearly all of the Katrina-related voice communications and data exchange occurred over unclassified IT systems. Using these unclassified systems allowed DoD personnel to more easily interact with other responders who did not have access to the DoD's classified systems (e.g., the CDC, FEMA, and coalition partners). Making the Katrina response largely unclassified also enabled DoD personnel to use the most expedient IT systems available (e.g., commercial telephones, personal cell phones, and commercial e-mail systems).

Going unclassified in the Katrina response created challenges, including:

- Navy ship IT architectures are optimized to support the exchange of classified data (e.g., via SIPRNET), but most Katrina-related data were unclassified. The automated digital network system on the ships limited the bandwidth available to afloat personnel to access unclassified websites (e.g., JTF-Katrina and other relief organizations' websites were posted on NIPRNET).
- The Navy did not have an unclassified collaborative tool readily available to support operations.

To improve the ability of the Navy's IT infrastructure to carry large volumes of unclassified data, the Navy should consider ways to transfer capacity between classified and unclassified systems [61].

At the beginning of the operation, maritime assets did not have access to an unclassified collaborative tool. To remedy this omission, JFMCC-Katrina had to request the:

- Activation of a NIPRNET Collaboration-at-Sea web site that could improve unclassified connectivity among the afloat units

- Deployment of the Groove toolset to facilitate collaboration among response organizations.

Although these steps facilitated interaction, the activation processes took time to complete [61].

The distributed structure and movements of the JFMCC staffs also placed high demands on the J6 staff to maintain connectivity for JFMCC personnel and coordinate the movement of communications equipment. The JFMCC staff was composed of several elements, including:

- JFMCC-Katrina
- JFMCC-Katrina Ashore Echelon
- JFMCC-Katrina Afloat Echelon
- JFMCC-Katrina reachback cells (FFC, Second Fleet, CSG-10, and DESRON-26 staffs).

JFMCC-Katrina initially planned to deploy aboard *Harry S. Truman* or to Camp Shelby (i.e., to collocate with the JTF Commander); however, JFMCC-Katrina decided to establish the first JFMCC-Katrina headquarters in the JOA at NAS Pensacola [61]. The JFMCC-Katrina staff subsequently moved aboard *Iwo Jima*. Table 25 summarizes the location and movements of the JFMCC elements during the JTF-Katrina response.

Table 25. Location and movements of the JFMCC elements

JFMCC element	Dates	Location
JFMCC-Katrina	31 Aug - 8 Sep	NAS Pensacola
	8 Sep - 28 Sep	USS *Iwo Jima*
JFMCC-Katrina Ashore	5 Sep - 15 Sep	NAS Pensacola
	15 Sep - Unknown	NAS JRB New Orleans
JFMCC-Katrina Afloat	30 Aug - 28 Sep	USS *Iwo Jima*
JFMCC-Katrina reachback	31 Aug - Unknown	Norfolk, VA
	4 Sep - 14 Sep	USS *Harry S. Truman*

The structure of the JFMCC staff and its movements during the response created significant challenges for the IT staffs because connectivity had to be maintained at all locations and established at two locations with limited IT infrastructure (i.e., NAS Pensacola and NAS JRB New Orleans). At NAS Pensacola, local IT personnel created a JFMCC-Katrina Operations Center in the Base Commanding Officer's Building. At NAS JRB New Orleans, US Joint Forces Command arranged for the delivery of the deployable joint command and control (DJC2) system [61].

The lack of IT personnel further complicated the task of maintaining JFMCC connectivity during the Katrina response. A total of two officers were assigned to support the IT needs of the JFMCC-Katrina and JFMCC-Katrina Ashore staffs (one from CSG-10 and one from COMNAVNETWARCOM[23]). These two officers supported a wide spectrum of J6 activities, including:

- Locating and coordinating local IT support (e.g., from NCTAMS[24] Pensacola, NCTAMS Atlantic, NETWARCOM, and Navy-Marine Corps Internet base operations) for the JFMCC-Katrina Operations Center (e.g., installing computers and printers)
- Providing basic IT services to the JFMCC-Katrina staff members (e.g., solving user issues)
- Coordinating and controlling the deployment of mobile command and control assets to the JOA (e.g., the Navy deployed a mobile satellite communications and networking capability to support a FEMA operations center near the Stennis Space Center [44])
- Interfacing with the JTF and JFMCC-Katrina afloat staffs
- Restoring regional communications

23. Commander, Naval Network Warfare Command

24. Naval computer telecommunications area master station

- Coordinating frequency management of all Navy, Marine Corps, and coalition communications afloat and ashore
- Ensuring connectivity for both the JFMCC-Katrina and JFMCC-Katrina Ashore Echelon staffs during their moves from NAS Pensacola to New Orleans [61].

The JFMCC-Katrina J6 relied on local and reachback support from a variety of commands. Nevertheless, coordinating this support required a significant investment of staff time. For example, the J6 devoted many hours organizing IT support at the region's Navy installations. Many local IT personnel were not available to restore IT operations at these facilities (i.e., many were not considered essential personnel and had evacuated). Their absence further complicated JFMCC-Katrina's efforts to support the Navy's connectivity needs. First, the J6 had to devote many hours locating and assembling IT teams to restore connectivity at the bases. Second, these personnel were not available to support the movement of the JFMCC-Katrina staffs to New Orleans. Without these personnel, the JFMCC-Katrina J6 had to assemble *ad hoc* teams to restore IT services to the bases damaged by the storm and provide the connectivity it needed to support the Katrina response (e.g., maintain connectivity during JFMCC-Katrina's transition from NAS Pensacola to *Iwo Jima*) [61].

The JFMCC-Katrina experience during the response suggests that too few J6 personnel were available to provide support to operations and the restoration of the region's IT infrastructure (i.e., at Navy installations). The Navy should consider how to increase the availability of IT staff during future operations. One approach may be to designate a larger number of IT professionals as essential/critical base personnel and require that they be available when specific events occur on the base [61].

The JFMCC-Katrina issues described above are a sample of the challenges faced by the IT community during the response. For additional details, refer to [61].

Operations

The response to Hurricane Katrina highlighted several operational areas that complicated the efforts of the JFMCC-Katrina to support

relief operations. The four operational issues listed below would likely benefit from additional attention from the Navy:

- Operational metrics and requests for information
- Coalition operations
- Engaging the interagency community
- Operational control (OPCON) of *Comfort*.

The impact of these operational issues on the ability of the maritime force to support Katrina relief operations is not certain; however, these issues hampered JFMCC-Katrina's C2 efforts and consumed significant staff time. The staff effort applied to these issues reduced the time that could have been spent performing other JFMCC functions.

Operational metrics and requests for information

During the Katrina response, the demand for operational metrics was intense. The chain-of-command made frequent and repeated requests for data on relief and rescue operations. For example, NORTHCOM and other higher headquarters frequently contacted JFMCC-Katrina requesting operation information because they were unable to obtain this information from the JTF-Katrina staff [44]. JFMCC-Katrina recognized that the requested data provided essential inputs into operational decisions and the public affairs campaign, and devoted substantial staff resources to responding to these requests for information (RFIs).

An incomplete reporting process and inconsistent data definitions hampered the process of collecting accurate and comprehensive data about the Navy's response. During the initial phase of the response, data about the movement of supplies and the movement of displaced persons (e.g., rescues and medevacs) was often not available. Initially, there was no mechanism in place to collect these data from the many units participating in the response. As the command and control structures developed, JFMCC-Katrina established reporting responsibilities and a collection system. Despite these improvements, operational data from the first week of the response were incomplete.

The collection of data was further complicated by different interpretations of key terms. For example, different units used different definitions of a sortie. Examples of these sortie definitions included:

- Two hours of flight time = 1 sortie
- A single take-off and return to base cycle = 1 sortie
- Take-off, refuel, and return to base = 1 or 2 sorties
- Take-off, refuel, pick-up passengers at convention center, drop them at the airport and return to base = 1 to 4 sorties.

There was also confusion about how to describe and count the movement of displaced persons. Some Navy units distinguished between a rescuee (e.g., someone who was lifted from a rooftop) and an evacuee (e.g., a person flown from New Orleans airport to Houston), while other units combined both categories under the term evacuee. Other units combined both under the term transportee.

In addition to the challenges of collecting and organizing operational data, an already busy JFMCC-Katrina staff had to satisfy substantial reporting requirements. Table 26 details JFMCC-Katrina's daily reporting requirements from the first week of the response.

Table 26. JFMCC-Katrina's daily reporting requirements[a]

JFMCC-Katrina product	Daily frequency	Recipient(s)
JFMCC-Katrina update brief	2	Fleet Forces Command (FFC), C2F, JTF-Katrina
JFMCC-Katrina situation report	1	JTF-Katrina
Personnel update	2	Northern Command
J6 update	1	Northern Command and FFC
Component capabilities spreadsheet	1	Northern Command

a. Source: [4].

To satisfy the reporting requirements detailed in table 26, the JFMCC-Katrina staff had to devote substantial staff resources and time, thereby reducing the effort the staff could spend fulfilling other JFMCC responsibilities.

In addition to the scheduled products listed in table 26, the JFMCC-Katrina staff responded to a constant stream of *ad hoc* requests for information from various commands. During the Katrina response, the Navy Staff (OPNAV), the Joint Staff, Northern Command (NORTHCOM), US Joint Forces Command, and CFFC submitted frequent requests for information directly to the JFMCC-Katrina staff. In some instances, the information was already available in the latest JFMCC-Katrina update brief, but the requestor either did not have access to brief or wanted more recent information. The combination of the scheduled reporting requirements and these frequent RFIs placed significant resource demands on the JFMCC-Katrina staff.

The JFMCC-Katrina took several actions to address the data collection and dissemination issues, including:

- Clarifying the definitions of key terms, such as sortie and rescuee
- Establishing data reporting requirements and collection processes
- Assigning responsibility for disseminating operational data and answering many RFIs to the reachback cells in Norfolk, which had better connectivity and additional personnel
- Posting briefs and other Katrina-related files on the JFMCC-Katrina web site (i.e., maintained in Norfolk).

Although these efforts reduced the burden on the JFMCC-Katrina staff, the process took time to implement. The full benefits of these actions were not realized until the second or third week of operations. During the chaotic and critical first week, these data collection and dissemination issues created a substantial workload for the JFMCC-Katrina staff. The early phases of future operations would likely benefit from adopting the Katrina processes and procedures at the onset of operations.

Coalition operations

During the response, JFMCC-Katrina was assigned responsibility for several foreign maritime assets. Like the metrics issue, resolving coalition issues consumed substantial staff resources. JFMCC-Katrina had to address two categories of issues. First, JFMCC-Katrina lacked information about the foreign units that it needed to develop appropriate tasking for them. Second, limitations imposed on some foreign units by federal agencies complicated their employment.

To support relief operations along the Gulf Coast, several foreign governments offered assistance to the United States. Table 27 details the offers of foreign maritime assistance (i.e., units over which the JFMCC-Katrina would have control).

Table 27. Offers of foreign assistance[a]

Country	Unit	Status
Canada	HMCS *Anthabaskan*	Employed
	HMCS *Ville de Quebec*	Employed
	HMCS *Toronto*	Employed
	HMCS *Protecteur*	Declined offer
	CCGS *Sir William Alexander*	Employed
Mexico	MS *Rio Papaloapan*	Employed
	MS *Huatesco*	Declined offer
Netherlands	HNLMS *Jan van Amstel*	Employed
France	Ocean tug	Declined offer
	Dive team	Employed
United Kingdom	HMS *Cumberland*	Declined offer
	RFA *Wave Knight*	Declined offer

a. Source: [52].

The "employed" units from table 27 were assigned to JFMCC-Katrina; however, neither the Department of State nor the Navy chain-of-command provided guidance on how these units should be employed or the expectations of their governments. With this kind of information, JFMCC-Katrina could have more closely aligned the

units' capabilities and their governments' expectations with their missions. Instead, the JFMCC-Katrina staff wrote CONOPS and assigned tasking with limited information about these foreign units [4]. The process of assigning meaningful tasking to these units was further complicated by the absence of maritime missions. By the time that most foreign units arrived on station, nearly all the maritime missions were covered or completed by US Navy units.[25]

Developing appropriate missions for the coalition forces was further complicated by limitations imposed by other federal agencies [4]. For example, the Federal Aviation Administration barred flight of the Mexican helicopters because there is no status of forces agreement between the US and Mexico. Similarly, the Department of Agriculture would not permit Mexican sailors to bring "boxed lunches" ashore because the food had not been inspected. Additional issues were raised by the medical community about the liability of unlicensed foreign medical professionals treating patients inside the United States [4, 44]. JFMCC-Katrina was not in a position to resolve these types of issues, but had to work within these constraints and identify productive tasking for the coalition forces.

Better coordination between the Departments of State and Defense, and other federal agencies to address these issues would reduce the workload at the operational and tactical levels, needed to integrate coalition assets into the response. By providing more information about the capabilities of foreign units and their expectations (e.g., where they want to go and what they want to do) to operational commands (e.g., the JFMCC), the State Department could help these commands determine whether the assets are needed and how to best employ them.[26]

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25. One notable exception was the repair of weather buoys in the Gulf of Mexico. This mission was assigned to the Canadian Coast Guard Ship *Sir William Alexander.*

26. These operational decisions would have to be balanced with the public affairs and international relations benefits derived from foreign disaster relief support [4].

Engaging the interagency community

A large number of federal, state, and local agencies participated in the Katrina response. One of the challenges faced by the maritime force was understanding how to engage this interagency community. Navy personnel had not been trained to support the processes used by the interagency community during a disaster response. This lack of familiarity raised several questions for the JFMCC-Katrina staff, including:

- How will FEMA communicate its support needs to the maritime force?
- To what extent should there be direct contact between JFMCC-Katrina and FEMA?
- Should JFMCC-Katrina inform FEMA of the Navy's response activities?
- How can JFMCC-Katrina align the Navy's capabilities with response needs identified by FEMA?
- Should JFMCC-Katrina dispatch LNOs to FEMA operations centers (i.e., Joint Field Offices)?

Despite uncertainty over the JFMCC-FEMA relationship, the Navy responded to FEMA requests for support. These requests came from at least three sources:

- Directly from FEMA (e.g., early *Bataan* tasking) [10]
- Through a FEMA representative at NAS Pensacola [44]
- Through the JTF-Katrina staff.

Although JFMCC-Katrina responded to FEMA support requests, the tasking was sporadic. In the absence of comprehensive tasking from FEMA and the JTF, JFMCC-Katrina and maritime units exercised operational initiative and identified response needs that they could address.[27] Although these efforts allowed the maritime force to provide extensive response support, greater coordination between JFMCC-Katrina and the interagency community would likely have improved the overall response effort.[28]

The Navy could strengthen its ability to support future domestic disaster response operations by providing its personnel with additional disaster relief training (e.g., familiarizing personnel with the National Response Plan) and exercise opportunities. Navy personnel who supported the Katrina response were often not familiar with the basic interagency response structures and processes. The lack of such knowledge will likely limit the ability of the Navy to support these types of operations in the future.

Operational control (OPCON) of the *Comfort*

Throughout the response, the JFMCC-Katrina staff attempted to determine what the JFMCC-Katrina's responsibilities were to *Comfort*. Although *Comfort* was a maritime asset and many expected JFMCC-Katrina to have OPCON of it, the JFMCC actually had little influence over its employment. In fact, JFMCC-Katrina was often not certain which organization did have OPCON of the ship [44]. At different times during the response, different organizations appeared to be directing the ship. Those organizations included:

- NORTHCOM
- CFFC
- JTF-Katrina
- JFMCC-Katrina.

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27. For additional information about how Commanders exercise initiative during the Katrina response, see Brian Walsh. *Distributed Staff Operations and Initiative Under Command in the Navy's Response to Hurricane Katrina* (U), CNA Research Memorandum, forthcoming.

28. JFMCC-Katrina responded to other sources of tasking, including the Navy and JTF-Katrina chains-of-command.

JFMCC-Katrina devoted considerable staff time in an attempt to resolve the OPCON issue. At times, it was unclear whether JFMCC-Katrina was responsible for drafting/approving a *Comfort* CONOPS or providing force protection for the ship while it was in port [4, 44].

Future deployments of the hospital ships and future JFMCC staffs would likely benefit from greater clarity on which command organizations have OPCON of these USNS ships [4]. During its Katrina deployment, the USNS *Comfort's* mission and destination changed frequently as different organizations provided guidance and direction, leaving many confused and frustrated. The effort to clarify command and control of the hospital ships should also include a description of the JFMCC's roles and responsibilities with respect to these ships. Such an understanding would allow JFMCC staffs to focus their efforts on supporting maritime operations, rather than attempting to define the relationship between the hospital ships and the JFMCC.

Doctrine

Prior to deploying to NAS Pensacola, the JFMCC-Katrina staff searched for documentation on Navy support to domestic disaster relief operations, but they could not find applicable doctrine [44]. There are at least four current documents that address relief operations and military support to the Department of Homeland Security (DHS) (i.e., FEMA is an agency within DHS); however, none of these documents directly addresses DoD support to disaster relief operations inside the United States.[29] The four documents are:

- Joint Publication 3-07.6, *Joint Tactics, Techniques, and Procedures for Foreign Humanitarian Assistance*, 15 August 2001.
- Joint Publication 3-08, *Interagency Coordination During Joint Operations*, Vols. I and II, 9 October 1996.

29. The JFMCC-Katrina staff also reviewed a Tsunami Lessons Learned document describing some of the issues encountered during the Navy's response.

- Joint Publication 3-26, *Homeland Security*, 2 August 2005.
- Navy Warfare Development Command (NWDC), Tactical Memorandum (TACMEMO) 3-07.6-05, *Humanitarian Assistance/Disaster Relief (HA/DR) Operations Planning*, August 2005.

Although these four documents can contribute to an understanding of the military's role in domestic disaster relief operations, they had limited applicability to the Katrina response. Joint Publication 3-07.6 and the NWDC TACMEMO focus on military support to disaster relief operations in foreign countries (e.g., the tsunami relief operation); however, domestic relief operations can be substantially different from foreign relief operations. Joint Publication 3-26 provides high-level guidance on the military's relationship with DHS and its overall mission to support the homeland security mission, but provides limited discussion of military support to domestic disasters. Joint Publication 3-08 provides greater detail on the relationship between the military and the interagency community; however, this document was published in 1996 before the creation of DHS and the current domestic disaster processes and structures.

After reviewing these documents, the JFMCC-Katrina staff did not feel adequately informed about their role in a domestic disaster response operation or sufficiently prepared to engage the domestic interagency community [44]. Future JFMCC staffs would likely benefit from a document specifically written to provide DoD personnel with the information they need to support domestic disaster relief operations.

Preparing for the next Katrina

The Katrina operation provides an opportunity for the Navy to identify areas where it can strengthen its ability to support disaster response operations. Observations made at the JFMCC-Katrina operations cell indicate that the following six areas would benefit from additional attention.

Developing comprehensive domestic disaster response doctrine

Current Navy doctrine did not provide JFMCC-Katrina personnel with the information they needed to support the Katrina operation. Navy personnel in future operations would likely benefit from doctrine specifically written for domestic disaster response operations. To build upon the Katrina experience, this doctrine should address the concerns identified by the JFMCC-Katrina staff members, such as:

- The JTF-JFMCC-Katrina disconnect
- Operational metrics
- The lack of familiarity with the interagency community.

During the operation, JFMCC-Katrina took steps to close the JTF-JFMCC-Katrina disconnect (e.g., dispatching liaisons, collocating staffs, and encouraging maritime commanders to exercise initiative). Addressing the topic of potential command disconnects and providing examples of how to address this issue would provide future JFMCC staffs with information they could use to strengthen their response capabilities.

An incomplete process for reporting operational metrics and inconsistent data definitions made collecting accurate and comprehensive data difficult. During the operation, JFMCC-Katrina had to establish a reporting process and consistent data definitions, but doing so took time and consumed staff resources. Addressing these issues in a domestic disaster response doctrine could reduce

demands on the staff and shorten the time need to implement the collection of reliable operational data.

Navy personnel were not familiar with the processes and structures of the US interagency community. Doctrine that provides descriptions of key elements of this response environment would strengthen their understanding of the military's role in domestic response operations. The doctrine should address topics, such as the National Response Plan, mission assignment process, role of the Defense Coordinating Officer, and Joint Field Office operations. Providing opportunities to train with this doctrine would further strengthen the Navy's domestic disaster response capability.

Clarify command and control of all Navy assets

Throughout the Katrina operation, JFMCC-Katrina was not certain which organization was directing the USNS *Comfort*. The JFMCC-Katrina staff was similarly uncertain about the extent to which they should support *Comfort* operations. This confusion created operational uncertainty and diverted staff resources from other command issues. Future deployments of the hospital ships would likely benefit from greater clarity on the command and control of these assets [4].

Clarify the process by which the US government accepts coalition support during domestic relief operations

JFMCC-Katrina was responsible for incorporating foreign maritime assets into the Katrina operation; however, the JFMCC-Katrina staff was not consulted prior to accepting the support (i.e., to determine if the assistance actually needed or appropriate). Once accepted, JFMCC-Katrina was not provided with the information it needed to develop CONOPS for the foreign assets and several US government agencies imposed restrictions that limited the operational utility of these assets. Resolving these "coalition issues" diverted JFMCC-Katrina resources from other operational issues. Clarifying the process by which foreign assistance is incorporated into domestic disaster response operations would facilitate the assets' successful employment and free staffs to pursue other operational issues.

Increase the availability of IT professionals

The absence of qualified IT professionals likely delayed the restoration of connectivity at Navy installations damaged by Katrina. The lack of IT personnel also complicated the task of maintaining JFMCC-Katrina connectivity during the response. One approach to increasing the availability of IT staff during future crises would be to designate a larger number of these professionals as essential/critical personnel and require that they be available under certain circumstances (e.g., a natural disaster) to support operations.

Increase the ability of ships to handle unclassified communications

Nearly all Katrina-related communication and data exchanges occurred over unclassified systems, stressing ship architectures that are optimized to support the exchange of classified data. To increase unclassified capacity and improve its ability to support these types of operations, the Navy should consider developing procedures for transferring ship IT capacity between classified and unclassified systems.

Increase access to actionable (i.e., operationally relevant) information

In the early phases of the response, information that JFMCC-Katrina could use to plan missions and task units was scarce. During this period of time, JFMCC-Katrina found that a single individual located in the disaster area with direct access to JFMCC-Katrina staff could provide actionable information. The quality and quantity of information provided by the METOC officer in Mississippi highlighted the potential value of this capability (i.e., collecting and sharing on-scene information immediately after the disaster). To increase access to operationally relevant information during future disasters, the Navy should consider developing a disaster reconnaissance capability. Deploying small reconnaissance teams to disaster areas and providing them with direct access to the JFMCC staff would provide the Navy with the ability to have an immediate impact on those affected by the disaster.

Review the process the Navy uses to account for personnel during a crisis

Accounting for Navy personnel in areas affected by Hurricane Katrina presented significant administrative challenges. JFMCC-Katrina and base Commanding Officers had limited access to the lists of personnel assigned to the installations affected by the storm. To improve the visibility of base Commanding Officers into the personnel assigned to their bases, the Navy may want to consider adopting a policy that:

- Requires visiting UICs to provide the base with a list of personnel assigned from that UIC to the base
- Directs personnel to check in with the base during a major event.

By doing so, the Navy could simplify the accounting process and provide base Commanding Officers with access to the personnel lists they need to account for all personnel working at their facility.

Appendix A: Timeline

The following timeline summarizes key Hurricane Katrina events and the actions taken by the Navy during its response.

23 August - Tuesday	
~	Hurricane Katrina developed as tropical depression #12 in the southeastern Bahamas [62].

24 August - Wednesday	
AM	The National Hurricane Center upgraded tropical depression #12 to Tropical Storm Katrina [1].

25 August - Thursday	
1700 EDT	The National Hurricane Center upgraded Tropical Storm Katrina to a category 1 hurricane [63].
1830 EDT	Hurricane Katrina made landfall near Hallandale Beach on the east coast of Florida [63, 64].

26 August - Friday	
0130 EDT	Hurricane Katrina entered the Gulf of Mexico and rapidly strengthened [62].
2300	The Louisiana Governor declared a state of emergency for the state of Louisiana [1].
~	10,000 National Guard troops were dispatched to the Gulf Coast [64].

27 August - Saturday	
0500	The National Hurricane Center upgraded Katrina to a category 3 storm [63].
1700	The Mayor of New Orleans declared a state of emergency and called for a voluntary evacuation of the city [1].
~	The Governor of Mississippi declared a state of emergency [64].
~	*Bataan* arrived in Ingleside, Texas to offload mine warfare material and HM-14 and HM-15 [10].

28 August - Sunday	
0700 CDT	Hurricane Katrina became a category 5 storm with sustained winds of 150 knots and a central pressure of 902 mb [62].
0800 CDT	The Superdome opened as a shelter of last resort [1].
1000 CDT	The National Weather Service predicted catastrophic damage for New Orleans [65].
1100 CDT	The Mayor of New Orleans issued a mandatory evacuation order for New Orleans [1, 63].
~	The Governor of Alabama declared a state of emergency [1, 64].
~	C2F directed *Bataan* to embark 3 MH-53s, proceed to the coast of Louisiana, and prepare for relief operations [10].
~	The Amphibious Squadron-4 (PHIBRON-4) special duty officer (SDO) received a call from the Amphibious Group-Two (PHIB-GRU-TWO) SDO that a prepare to deploy order had been received for PHIBRON-4, *Iwo Jima*, *Shreveport*, and *Tortuga*. The execute order was expected within the next 24-48 hours [14].
~	PHIBGRU-TWO ordered the Navy Beach Group Two to prepare disaster relief kits [14].
~	The President declared a state of emergency in Mississippi, Florida, and Alabama [1].
~	NORTHCOM deployed Joint Task Force-Forward to Camp Shelby, MS [66].

29 August - Monday	
0610	Hurricane Katrina made landfall in Plaquemines Parish, LA as a category 3 storm with winds of 127 mph [1, 2, 62].
0900	The eye of the hurricane was 40 miles from New Orleans and was expected to pass to the east of the city [63].
1100	The flood wall of the Industrial Canal broke open in 2 places [65].
1100	Katrina made its third landfall near the Louisiana-Mississippi border with winds of 125 mph [63].
1345	The President made emergency disaster declarations for Louisiana and Mississippi [1].
~	*Bataan* embarked HM-15 and departed for Louisiana coast [10].

30 August - Tuesday	
0130 CDT	Water from Lake Pontchartrain toppled the 17th Street Levee [65].
~	*Bataan* arrived on station, 100 n.m. south of New Orleans [10].
0700 EDT	C2F held a planning meeting regarding the Katrina response [14].
1430 EDT	*Iwo Jima* was directed to get underway [14].
1530 EDT	PHIBRON-4 received a verbal order from C2F to get underway immediately and assume tactical control of *Iwo Jima*, *Shreveport*, and *Tortuga*. Excess speed of advance to the Gulf of Mexico was authorized [14].
1700 CDT	At the request of FEMA, *Bataan* launched helicopters to conduct search and rescue operations. On 30 August, *Bataan* helicopters moved 28 personnel to safety and delivered more than 8,000 pounds of water and 500 pounds of food to various locations in New Orleans [3].
1930 EDT	Commander, CSG-10 was informed of the planned meeting with C2F on 31 August at 0730 regarding deployment to the U.S. Gulf Coast [44].
2000	Reports suggested that looting was widespread in New Orleans [1].
2055	The Army Corps of Engineers began repairs on the 17th Street Levee [1].
~	An estimated 50,000 to 100,000 residents remained in New Orleans [1].
~	FEMA activated the National Response Plan [1].
~	The London Avenue Canal breached [65].
~	NORTHCOM activated JTF-Katrina and C2F designated Commander, Carrier Strike Group-10 (CCSG-10) as JFMCC-Katrina. Commander, PHIBGRU-TWO was designated the JFMCC-Katrina Sea Echelon Commander [4, 44].

31 August - Wednesday	
0730 EDT	C2F directed CCSG-10 to deploy to NAS Pensacola [44].
0910 EDT	*Tortuga* departed enroute to the Gulf of Mexico [14].
1030 EDT	*Shreveport* departed enroute to the Gulf of Mexico [14].
1300 EDT	*Iwo Jima* departed enroute to the Gulf of Mexico [14].
~	All three ships received landing craft, personnel, and equipment load out at the Lynnhaven Anchorage (5 LCACs, 3 LCUs, 2 M8, and 2 lighter amphibious resupply cargo transports) [14].
~	When the on loads were completed, *Iwo Jima* and *Tortuga* departed directly to the Gulf of Mexico. The *Shreveport* headed to Morehead City, NC to pick up 39 Marines and equipment [14].
1600 CDT	The JFMCC-Katrina staff arrived in Pensacola and began operations [44].
~	Widespread looting in New Orleans hindered rescue operations [1, 64].
~	*Bataan* launched an LCU up the Mississippi River (expected to return on 2 September) [10].
~	The Secretary of Health and Human Services declared a public health emergency along the Gulf Coast [18, 63, 67].
~	Ten USN SH-60s and 2 E-2Cs arrived at NAS Pensacola [4].
~	The Navy established logistics heads at NAS Pensacola and NAS Joint Reserve Base, New Orleans [4].
~	Three tactical air control squadrons established landing zones at the Superdome, Convention Center, and Cloverleaf [4].
30-31 Aug	*Bataan* helicopters logged 73 hours (i.e., 9 events), carrying 205 passengers, 25,000 pounds of water, and 500 pounds of food [10].
31 Aug-1 Sep	**Phase 1 of JFMCC-Katrina air operations:** The primary mission during Phase 1 was search and rescue. Initially, a US Customs P-3 and a USCG C-130 provided air traffic deconfliction over New Orleans. At this point in the operation, USCG helicopters flew most of the missions. Tasking during Phase 1 originated from the USCG District 8 Operations Center. The District 8 Operations Center would receive a request (e.g., phone calls from organizations, governments, or individuals) for assistance and then dispatch a helicopter. These helicopters would check in with the P-3 or C-130 before proceeding with the mission over New Orleans [44].

1 September - Thursday	
0912 EDT	*Shreveport* arrived in Morehead City, NC [14].
~	*Whidbey Island* was directed to support JTF-Katrina [14].
1500 EDT	*Whidbey Island* was underway from Norfolk, VA enroute to the Lynnhaven Anchorage to pick-up landing craft, personnel, and equipment [14].
1815 EDT	*Shreveport* completed the Morehead City on load and departed for the Gulf of Mexico [14].
1940 EDT	*Whidbey Island* completed the on load and departed for Morehead City to pick up II MEF marines and additional equipment [14].
~	Widespread looting continued to hinder rescue efforts [64].
~	A naval aviation liaison element (NALE) was established at the JFACC (Tyndall AFB) [4].

2 September - Friday	
1000 EDT	*Whidbey Island* arrived in Morehead City, NC [14].
1948 EDT	*Whidbey Island* completed the onload and proceeded to the Gulf of Mexico [14].
~	*Comfort* departed from Baltimore for the Gulf Coast [26].
1-2 Sep	**USS *Bataan*:** Helicopters logged 11.5 hours (i.e., 13 events), carrying 809 passengers, 82,500 pounds of water, and 10,500 pounds of food to New Orleans and Mississippi. The ship also provided medical support to the New Orleans Convention Center and the Joint Reserve Base. The ship repositioned to the Gulfport/Biloxi coast on 2 September [10].
2-3 Sep	**Phase 2 of JFMCC-Katrina air operations:** While search and rescue missions remained a priority, the number of relief sorties carrying water and food increased greatly. To support these operations, the Navy tasked E-2Cs to remain on station to provide advisory control of NOLA airspace. During Phase 2, the USCG District 8 continued to process requests for assistance [44].

3 September - Saturday	
1200	*Iwo Jima* arrived at her assigned position in the Gulf of Mexico [14].
~	The Naval Beach Group-Two, Amphibious Construction Battalion-Two established a beach site IVO Biloxi, MS [14].
~	The USCG reported that it had rescued 9,500 people [64].

4 September - Sunday	
1517 CDT	*Tortuga* moored at the Algiers Pier, NOLA [14].
1915 CDT	C2F directed *Iwo Jima* to depart anchorage and moor at the Cruiser Pier in New Orleans [14].
~	The Superdome was fully evacuated [1, 64].
~	*Shreveport* arrived at her assigned position in the Gulf of Mexico [14].
~	The first LCACs deployed and conducted SAR missions on the barrier islands [14].
4-8 Sep	**Phase 3 of JFMCC-Katrina air operations:** As the number of SAR missions decreased, the number of relief missions (i.e., food and water) continued to increase. Early in Phase 3, JFMCC-Katrina made contact with FEMA through a FEMA representative in Pensacola. The FEMA representative passed requests for support directly to the JFMCC-Katrina staff. In addition to the FEMA tasking, requests for JFMCC-Katrina support (e.g., phone calls and e-mails) from individual citizens, government officials, and representatives from relief organizations continued to come to the JFMCC-Katrina staff. The staff responded to these requests for relief supplies by tasking helicopters and fixed-wing aircraft to deliver the needed supplies [44].

5 September - Monday	
~	*Tortuga* deployed combat rubber raiding craft on SAR missions in NOLA. Crew members rescued 6 nursing home residents [14, 32].
0707 CDT	Shreveport anchored and off-loaded II MEF personnel and equipment [14].
0945 CDT	Commander, PHIBGRU-TWO and staff embarked on *Iwo Jima* and merged with the PHIBRON-4 staff to form one single staff under Commander, PHIBGRU-TWO [14].
1900 CDT	*Grapple* continued her transit to Pascagoula to conduct salvage operations [14].
2218 CDT	*Shreveport* was ordered to moor in NOLA the next morning [14].

6 September - Tuesday	
1251 CDT	*Grapple* arrived at NAS Pascagoula [14].
1812 CDT	*Shreveport* moored at the Governor Nicholas Wharf Pier in New Orleans [14].
~	Streets in NOLA were largely quiet [1].
~	Fire fighters in New Orleans battled four major fires [1].
~	RDML Turcotte arrived at NAS Pensacola and assumed duties as the JFMCC-Ashore Echelon Commander [4].
4-6 Sep	**USS *Bataan*:** Helicopters logged 134.5 hours (i.e., 23 events), carrying 58 passengers, 13,200 lbs of water, 2,000 lbs of food, 91,600 lbs of space parts, and 5,000 lbs of medical supplies [10]. LCACs moved Seabees, working parties, and equipment ashore. Three groups cleaned-up a church, warehouse, school, and roads [10]. Five medical teams and one culinary team inserted at New Orleans and Biloxi [10].

7 September - Wednesday	
0856 CDT	After completing a replenishment at sea (RAS) with *Arctic, Whidbey Island* transited to Biloxi operating area (OPAREA) [14].
1500 CDT	*Whidbey Island* anchored IVO Biloxi, MS [14].
2104 CDT	The Mexican LST *Rio Papaloapan* arrived at her assigned position IVO Biloxi, MS [14].
~	JFMCC-Katrina shifted operations from NAS Pensacola to *Iwo Jima* [4, 44].

8 September - Thursday	
0900 CDT	The Mexican contingent arrived aboard *Bataan* for a coordination meeting [14].
~	*Comfort* arrived in the Gulf of Mexico [26].
8-10 Sep	**Phase 4 of JFMCC-Katrina air operations** SAR missions remained a priority, but the number of missions continued to decline. Additional heavy lift became available and the JFMCC-Katrina staff tasked them to transport large amounts of food and water (e.g., to the Stennis Space Center and Gulfport, MS). In addition to continued tasking from FEMA, a METOC officer traveling through southern MIssissippi began calling the JFMCC-Katrina staff with requests for support. This METOC officer shared the JFMCC-Katrina contact information with local officials in the region who then contacted JFMCC-Katrina with additional support requests. During Phase 4, JFMCC-Katrina continued to match these requests with available assets [44].

9 September - Friday	
0805 CDT	*Shreveport* moored at the Chalmette Slip in NOLA [14].
AM	USCG VADM Thad Allen replaced FEMA's Michael Brown as the Principal Federal Officer for the Katrina response [26].
~	*Comfort* was pier side at Naval Station Pascagoula [4, 26].
~	Dutch Marines assisted mobile diving and salvage unit divers in a survey of a grounded geological research vessel [23].
~	*Jan van Amstel* provided 58 personnel for beach clearing and disaster relief assistance ashore [23].
~	*Rio Papaloapan* provided 87 personnel for beach clearing and disaster relief assistance ashore [23].

10 September - Monday	
~	The CNO visited the Gulf Coast [9].
~	*Gladiator, Scout, Defender,* and *Falcon* commenced oil platform survey in the Gulf of Mexico [9].
~	*Grapple* commenced diving and salvage operations at the entrance to Mobile Bay [9].
~	Over 800 Seabees were engaged in community support projects throughout the Gulf Coast [9].
10-20 Sep	**Phase 5 of JFMCC-Katrina air operations** JFMCC-Katrina tasked fewer missions because most victims had been rescued and roads were opening, thereby reducing the need for helicopters to carry supplies into the disaster area. Nevertheless, JFMCC-Katrina continued to respond to on-call tasking from the JTF staff, FEMA representatives, government officials, and any civil authority in the region [44].

11 September - Sunday	
~	The French dive team arrived in Pensacola [9].
~	The President arrived aboard the *Iwo Jima* [40].
~	*Pioneer* sortied from Ingleside, TX enroute to the LOOP to replace *Falcon* [40].
~	*Gladiator, Scout,* and *Defender* continued their survey of oil platforms and shipping channels in the Gulf of Mexico [40].

12 September - Monday	
~	*Gladiator, Scout,* and *Defender* continued their survey of oil platforms and shipping channels in the Gulf of Mexico [40].
~	The Canadian Navy task force arrived in Pensacola [17].

14 September - Wednesday	
~	*Harry S. Truman* and *Whidbey Island* detached [4, 68].
~	*Sir William Alexander* arrived in Pensacola, FL [68].

15 September - Thursday	
~	The JFMCC-Katrina Ashore staff completed its move to NAS JRB New Orleans [41].
~	*Sir William Alexander* picked up National data buoy center personnel and equipment to service weather buoys [41].

18 September - Sunday	
~	*Bataan* detached from the Katrina response and began her transit to Norfolk [69].
~	*Grapple* conducted salvage operations IVO the LOOP [69].
~	The Canadian Navy task force detached from the Katrina response and began its transit to Halifax [69].
~	*Sir William Alexander* continued her weather warning buoy survey and repair operations [69].

20 September - Tuesday	
~	Hurricane Rita contingency planning occurred [69].

21 September - Sunday	
~	RDML Turcotte assumed JFMCC-Katrina ashore duties from RDML Kilkenny [15].
~	951 Seabees were working on community support projects throughout the Gulf Coast [15].
~	Navy marine mammal personnel continued to care for dolphins from a damaged aquarium in Gulfport, MS [15].
~	*Shreveport* and *Iwo Jima* sortied from New Orleans to evade Hurricane Rita [15, 70].

Appendix B: Ship movements

Table 28 provides information about the movements of US Navy and coalition ships participating in the Katrina response. The entries are largely based upon data from the PHIBGRU-TWO SITREPs.

Table 28. Movements of the ships supporting the Katrina response

Ship	Dates	Movements
USS *Harry S. Truman*	~	Deployed from Norfolk
	4 Sep	Arrived in JOA
	10-12 Sep	IVO Biloxi, MS
	13 Sep	Gulf of Mexico enroute to Pensacola
	14 Sep	Detached
USS *Iwo Jima*	30 Aug	Departed NAVSTA Norfolk
	3 Sep	Arrived in the Gulf of Mexico
	4-5 Sep	IVO Biloxi, MS
	6-21 Sep	Pier side New Orleans, LA
	22-29 Sep	Gulf of Mexico - storm evasion
	30 Sep	Detached
USS *Bataan*	20 Jul	Departed Norfolk for Panamanian coast for PANAMAX 2005 exercise
	17 Aug	Transited to Curacao for port visit
	27 Aug	Arrived Ingleside, TX to off load mine warfare material
	28 Aug	Directed to embark MH-53s and proceed to the coast of Louisiana

Table 28. Movements of the ships supporting the Katrina response (continued)

Ship	Dates	Movements
USS *Bataan* (continued)	30 Aug	Arrived on station 100 n.m. south of NOLA
	2-17 Sep	Repositioned off the Gulfport/Biloxi, MS coast.
	18 Sep	Detached
USS *Shreveport*	31 Aug	Departed Norfolk
	4-5 Sep	IVO Biloxi, Ms
	6-21 Sep	New Orleans, LA
	22-27 Sep	Gulf of Mexico, storm evasion
	28-30 Sep	Biloxi, MS
	30 Sep	Detached
USS *Tortuga*	31 Aug	Departed Norfolk
	4-18 Sep	New Orleans, LA
	19 Sep	Transited to Biloxi, MS
	20 Sep	Biloxi, MS
	21-30 Sep	Gulf of Mexico, storm evasion
	30 Sep	Detached
USS *Whidbey Island*	1 Sep	Departed Norfolk
	5-12 Sep	IVO Biloxi, MS
	13 Sep	Gulf of Mexico
	14 Sep	Detached

Table 28. Movements of the ships supporting the Katrina response (continued)

Ship	Dates	Movements
USS *Grapple*	5 Sep	Entered Gulf of Mexico enroute to Pascagoula, MS
	6-7 Sep	Pascagoula, MS
	8-13 Sep	Mobile, AL (river and bay)
	14-19 Sep	IVO LOOP
USS *Grapple* (continued)	20-24 Sep	Pensacola, FL
	25-30 Sep	Gulf of Mexico, storm evasion
	1 Oct	Detached
USS *Defender*	~	Deployed from Ingleside, TX
	5-6 Sep	Enroute of Pascagoula, MS
	7-12 Sep	IVO LOOP
	13 Sep	Enroute to Pensacola, FL
	14-17 Sep	Pensacola, FL
	18 Sep	Detached
USS *Scout*	~	Deployed from Ingleside, TX
	5-6 Sep	Enroute to Pascagoula, MS
	7-9 Sep	IVO LOOP
	10 Sep	IVO Biloxi, MS
	11 Sep	IVO LOOP
	12-14 Sep	Gulf of Mexico, Louisiana fairway survey
	15 Sep	Pensacola, FL
	16-17 Sep	Gulf of Mexico, Louisiana fairway survey
	18 Sep	Gulf of Mexico
	19 Sep	Detached

Table 28. Movements of the ships supporting the Katrina response (continued)

Ship	Dates	Movements
USS *Gladiator*	~	Deployed from Ingleside, TX
	5-6 Sep	Enroute to Pascagoula, MS
	7-8 Sep	IVO LOOP
	9-10 Sep	Gulf of Mexico
	11 Sep	IVO LOOP
	12-14 Sep	Gulf of Mexico, Louisiana fairway survey
	15 Sep	Pensacola, FL
	16-18 Sep	Gulf of Mexico, Louisiana fairway survey
	18 Sep	Detached
USS *Falcon*	~	Deployed from Ingleside, TX
	5-6 Sep	Enroute to Pascagoula, MS
	7-8 Sep	IVO LOOP
	9-14 Sep	Gulf of Mexico
	15 Sep	Detached
USS *Pioneer*	11 Sep	Deployed from Ingleside, TX
	12-18 Sep	Gulf of Mexico, Louisiana fairway survey
	18 Sep	Detached
USS *Chief*	13 Sep	Deployed
	15-18 Sep	Gulf of Mexico IVO Louisiana, Mississippi, and Alabama fairway survey
	18 Sep	Detached

Table 28. Movements of the ships supporting the Katrina response (continued)

Ship	Dates	Movements
HSV *Swift*	~	Deployed from Norfolk
	6 Sep	New Orleans
	7 Sep	Mississippi River
	8 Sep	Pensacola, FL
	9 Sep	Mississippi River
	10 Sep	Pensacola, FL
	11 Sep	New Orleans
	12 Sep	Mobile, AL
	13 Sep	New Orleans
	14 Sep	Mississippi River
	15-16 Sep	Pensacola, FL
	17 Sep	Detached
USNS *Arctic*	~	Deployed
	5-7 Sep	IVO Biloxi, MS
	8 Sep	Mobile, AL
	9-10 Sep	Gulf of Mexico, IVO LOOP
	11 Sep	Detached
USNS *Patuxent*	~	Enroute to the JOA
	12-19 Sep	Gulf of Mexico
	20-22 Sep	IVO Mobile, AL
	23-25 Sep	Gulf of Mexico
	25 Sep	Detached

Table 28. Movements of the ships supporting the Katrina response (continued)

Ship	Dates	Movements
USNS *Comfort*	2 Sep	Departed Port of Baltimore
	5 Sep	Arrived Mayport, FL
	9 Sep	Arrived Pascagoula, MS
	20 Sep	Departed Pascagoula, MS
	20-28 Sep	Located in Gulf of Mexico for storm evasion
	29 Sep	Arrived New Orleans
	8 Oct	Departed New Orleans enroute to Baltimore
	13 Oct	Arrived Baltimore
HMCS *Athabaskan*	7 Sep	Deployed from Canada
	13-18 Sep	IVO Biloxi, MS
	18 Sep	Detached
HMCS *Ville de Quebec*	~	Deployed from Canada
	13-18 Sep	IVO Biloxi, MS
	18 Sep	Detached
HMCS *Toronto*	7 Sep	Deployed from Canada
	12 Sep	Pensacola, FL
	14-18 Sep	IVO Biloxi, MS
	18 Sep	Detached

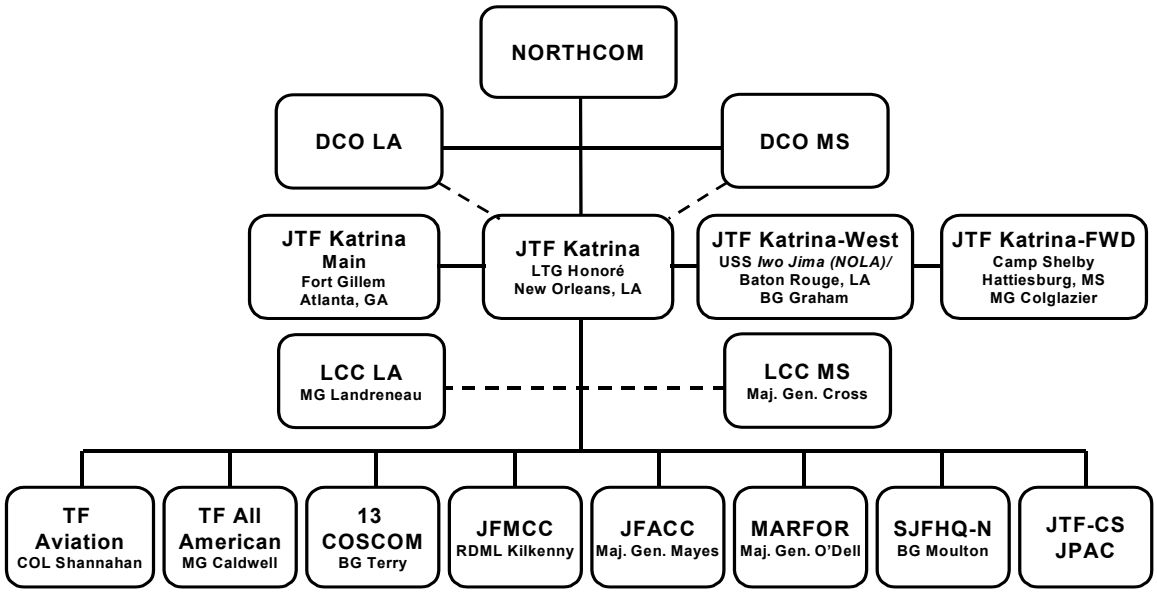
Table 28. Movements of the ships supporting the Katrina response (continued)

Ship	Dates	Movements
CCGS *Sir William Alexander*	7 Sep	Deployed from Canada
	14 Sep	Entered the Gulf of Mexico
	15-16 Sep	Pensacola, FL
	17-19 Sep	Fairway survey in Gulf of Mexico
	20 Sep	IVO Biloxi, MS
	22 Sep	Gulfport, MS
	23-25 Sep	Pensacola
	~	Detached
HNLMS *Jan van Amstel*	7 Sep	On station
	7-13 Sep	IVO Biloxi, MS
	14 Sep	Detached
MS *Rio Papaloapan*	7 Sep	Arrived from Tampico, Mexico
	7-13 Sep	IVO Biloxi, MS
	14 Sep	Detached

Appendix C: Organization of JTF-Katrina

Like the maritime force, the CJTF relied upon a distributed command and control structure. Figure 3 describes the organizations of the elements of this distributed structure.

Figure 3. JTF organization diagram as of 8 September 2005[a]



a. The dashed lines indicate a coordination requirement, rather than a direct reporting relationship.

Figure 3 provides a high-level view of the JTF-Katrina structure and the relationships between several key elements. Table 29 provides additional information about the organizations depicted in figure 3.

Table 29. Information about organizations in the JTF-Katrina structure

Organization name	Location(s)	Remarks
NORTHCOM Norther Command	Peterson AFB Colorado Springs, CO	NORTHCOM is the unified command responsible for civil support in most of the United States. NORTHCOM was the lead DoD organization for the Hurricane Katrina operation and responsible for mobilizing forces. In this role, NORTHCOM established JTF-Katrina and ensured that DoD assets were available to support JTF-Katrina operations [71, 72, 73].
DCO LA Defense Coordinating Officer, Louisiana	Baton Rouge, LA	The mission of the DCO and DCE (Defense Coordinating Element) was to work with Louisiana State officials and the Federal Coordinating Officer to align DoD Capabilities with Katrina response needs. The Louisiana DCO's priorities were to: - Assess Louisiana's needs - Validate mission assignments - Represent DoD interests - Monitor DoD units involved in Katrina operations - Provide information to the chain-of-command - Maintain situational awareness of National Guard operations [74, 75].
DCO MS Defense Coordinating Officer, Mississippi	Jackson, MS	The mission of the Mississippi DCO was to monitor DoD activities in Mississippi and coordinate DoD support with federal, state, and local agencies. The DCO also provided information to the chain-of-command on the current status of the state's response efforts [76, 77].
JTF-Katrina-Main	Fort Gillem Atlanta, GA	The JTF-Katrina-Main organization was a part of the distributed JTF staff and was responsible for a variety of JTF response functions, including: - Establishing operational priorities - Planning operations - Tasking the operating forces - Collecting needed information - Monitoring DoD operations - Issuing fragmentary orders - Responding to RFIs [78].
JTF-Katrina-Forward	Camp Shelby Hattiesburg, MS	The JTF-Katrina-Forward was a part of the distributed JTF staff. Situation reports indicate that this organization performed several command functions, including: - Providing planning support - Monitoring the activities of DoD forces - Distributing fragmentary orders - Coordinating the activities of Title X and National Guard forces [79, 80].

Table 29. Information about organizations in the JTF-Katrina structure (continued)

Organization name	Location(s)	Remarks
JTF-Katrina-West Command Planning Group-Southeast Louisiana (CPG-SEL)	Baton Rouge, LA and aboard USS *Iwo Jima* (pier side, New Orleans)	The mission of the CPG-SEL was to coordinate, integrate, and assist the synchronization of Katrina relief efforts [81].
JTF-Katrina (Commander) LTG Honore'	New Orleans and at various locations along the Gulf Coast	LTG Honore' was the joint operational Commander responsible for directing the DoD response. During the operation, the CJTF spent much of his time in and around the New Orleans area, but he also traveled throughout the region to meet with key officials. JTF-Katrina was established on 31 August 2005. Its mission was to provide support to civil authorities, save lives, mitigate suffering, and restore critical infrastructure [82].
LCC LA (Land Component Command, Louisiana) Maj. Gen. Landreneau	Baton Rouge and other locations throughout Louisiana	The "LCC LA" label was used to refer to Louisiana National Guard units under the command of Maj. Gen. Landreneau. These units performed a wide variety of response functions (e.g., search and rescue, and law enforcement) during the Katrina operation. For example, Louisiana National Guard units supported the evacuation of the New Orleans Convention Center [83-86].
LCC MS (Land Component Commander, Mississippi) Maj. Gen. Cross	Jackson and other locations throughout Mississippi	The "LCC MS" label was used to refer to Mississippi National Guard units under the command of Maj. Gen. Cross. These units performed a wide variety of response functions during the Katrina operation. Mississippi National Guard missions, including rescuing citizens, providing food and water, and establishing law and order [83-85, & 87].
TF Aviation Task Force Aviation	NAS Belle Chasse and other locations[6]	TF Aviation's mission was to conduct humanitarian relief missions and transport cargo/passengers in support of JTF-Katrina [88-92].
TF All American Task Force All American	New Orleans International Airport [2]	TF All American was composed of personnel from the 82nd Airborne Division. Their mission was to: - Establish a presence in New Orleans - Conduct search and rescue operations - Provide medical services - Facilitate the evacuation of the city [93, 94].
13 COSCOM Corps Support Command	Hammond, LA	The Army tasked 13 COSCOM to establish a Joint Logistics Command (JLC) within the JTF-Katrina JOA. The JLC's mission was to coordinate DoD logistics support during Katrina relief operations [95-98].

Table 29. Information about organizations in the JTF-Katrina structure (continued)

Organization name	Location(s)	Remarks
JFMCC	NAS Pensacola and aboard USS *Iwo Jima* (pier side, New Orleans)	The JFMCC (i.e., JFMCC-Katrina) was responsible for directing the employment of Navy assets (e.g., ships, aircraft, and Seabees).
JFACC Joint Force Air Component Commander	Tyndall AFB (Florida)	The JFACC was responsible for coordinating the employment of air assets in the JOA and directing operations at the Joint Search and Rescue Coordination Center [4].
MARFOR (Marine Forces)	USS *Shreveport* Pier side, New Orleans	The MARFOR Commander was responsible for directing the activities of the 2,700 Marines deployed to support the Katrina response [99].[a]
SJFHQ-N Standing Joint Force Headquarters North	New Orleans, LA [6]	The SJFHQ-N is a headquarters staff of operations, planning, logistics, and intelligence personnel. There mission is to rapidly deploy a joint C2 element to support a homeland defense or civil support operation within the NORTHCOM area of responsibility [100].
JTF-CS JPAC (Joint Task Force-Civil Support Joint Planning Augmentation Cell)	Fort Gillem Atlanta, GA [6]	JTF-CS deployed JPAC to provide JTF-Katrina with domestic chemical, biological, radiological, nuclear, and high-yield explosive consequence management capabilities [82, 101].

a. Marines were also embarked on Navy gray hulls and support the response efforts of the maritime force.

Figure 3 and the information in table 29 describe the distributed staff structure employed by JTF-Katrina.

Acronyms

ABCCC Airborne battlefield command, control, and communication

AFB Air force base

AWACS Airborne warning and control system (E-3A aircraft)

C2 Command and control

C2F Commander, Second Fleet

CBC Construction battalion center

CCSG-10 Commander, Carrier Strike Group-10

CCGS Canadian Coast Guard Ship

CDC Centers for Disease Control and Prevention

CDT Central daylight time

CJTF Commander, Joint Task Force

CNA Center for Naval Analyses

COMCARSTRKGRU-10 Commander, Carrier Strike Group-10

COMNAVNETWARCOM Commander, Naval Network Warfare Command

CONOPS Concept of operations

CONUS Continental United States

COSCOM Corps Support Command

CPG-SEL Command Planning Group - Southeast Louisiana

CPR4	Commander, Amphibious Squadron 4
CRRC	Combat rubber raiding craft
CSG-10	Carrier Strike Group-10
DCO	Defense Coordinating Officer
DESRON-26	Destroyer Squadron-26
DHS	Department of Homeland Security
DJC2	Deployable joint command and control system
DOD	Department of Defense
EDT	Eastern daylight time
FEMA	Federal Emergency Management Agency
FFC	Fleet Forces Command
FMC	Fully mission capable
FWD	Forward
HADR	Humanitarian assistance and disaster response
HMCS	Her Majesty's Canadian Ship
HSV	High speed vessel
ISO	In support of
IT	Information technology
IVO	In vicinity of
JFACC	Joint Force Air Component Commander
JFMCC	Joint Force Maritime Component Commander
JOA	Joint operating area

JPAC	Joint Planning Augmentation Cell
JRB	Joint Reserve Base
JTF	Joint task force
JTF-CS	Joint Task Force-Civil Support
LCAC	Landing craft air cushion
LCC	Land Component Commander
LCM	Landing craft medium
LCU	Landing craft, utility
LNO	Liaison naval officer
LOOP	Louisiana Offshore Oil Port
LST	Landing ship, tank
MB	Millibar
MCM	Mine countermeasure
MDSU	Mobile dive and salvage unit
MEDEVAC	Medical evacuation
MEF	Marine expeditionary force
METOC	Meteorological and oceanographic
MPH	Miles per hour
MS	Mexican ship
N/A	Not applicable
NALE	Naval aviation liaison element
NAS	Naval air station

NAS JRB NO Naval Air Station, Joint Reserve Base, New Orleans

NAVSTA Naval station

NCTAMS Naval computer and telecommunications area master station

NIPRNET Non-secure internet protocol router network

NM Nautical miles

NMC Not mission capable

NMCI Navy-Marine Corps internet

NOLA New Orleans, Louisiana

NORTHCOM Northern Command

NSA Navy support activity

NSA NO Navy Support Activity, New Orleans

NWDC Navy Warfare Development Command

OPAREA Operating area

OPCON Operational control

OPNAV Office of the Chief of Naval Operations

PHIBGRU-TWO Amphibious Group-Two

PHIBRON-4 Amphibious Squadron-4

PMC Partially mission capable

RAS Replenishment at sea

RCC Rescue Coordination Center

RDML Rear admiral, lower half

RFI Request for information

RHIB	Rigid hull inflatable boat
SAR	Search and rescue
SDO	Special duty officer
SIPRNET	Secure internet protocol router network
SITREP	Situation report
SJFHQ	Standing Joint Force Headquarters
TACMEMO	Tactical memorandum
TF	Task force
UIC	Unit identification code
UNK	Unknown
USA	United States Army
USAF	United States Air Force
USCG	United States Coast Guard
USN	United States Navy
USNS	United States Naval Ship
USS	United States Ship
VADM	Vice Admiral

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