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# LEVERAGING AMERICA'S AIRCRAFT CARRIER CAPABILITIES

Exploring New Combat and Noncombat  
Roles and Missions for the U.S. Carrier Fleet

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## Summary

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To meet combat and noncombat demands in the future, the United States' aircraft carriers will require a range of capabilities that they do not currently possess. Carriers will need to be better able to mix and match personnel, aircraft, and other assets to emerging and evolving tasks. They will need to perform more-extensive surveillance and reconnaissance, conduct air operations at greater distances, and be equipped to operate in nuclear environments. And they will need to be more modular, deploy on shorter notice, and be prepared to handle more casualties than they can today.

So concludes this analysis that RAND conducted in 2004 and 2005 on behalf of the U.S. Navy. Over six months, RAND created and convened two small groups of experienced military and civilian experts, defense analysts, and potential users to investigate possible nontraditional roles for aircraft carriers. Nontraditional uses of aircraft carriers include, for example, carriers being used by aircraft of the Army or Air Force and new or different mixes of capabilities being brought aboard the ships. One group explored and identified new ways that aircraft carriers could be used in combat operations; the other examined ways that the vessels could be used in noncombat homeland-security missions or to help the nation recover from terrorist attacks or natural disasters.

These groups explored two fundamental questions: How have aircraft carriers been used in nontraditional ways in the past? What nontraditional roles and missions might aircraft carriers be asked to perform in the future? They addressed these questions by cataloging

how and under what conditions aircraft carriers have been employed in the past and by identifying circumstances that the United States might encounter in the next 20 or 30 years that could require aircraft carriers to be employed in nontraditional roles. The analysis also examined alternative ways that carriers could be properly equipped with an appropriate mix of capabilities for those roles.

## **New or Nontraditional Roles for Aircraft Carriers?**

For more than seven decades—in circumstances stretching from before World War II through the Global War on Terrorism to the 2004 Southeast Asia tsunami—aircraft carriers and their embarked air wings have been central to the exercise of U.S. power and the delivery of disaster relief. They have been used to make shows of force, deter adversaries, engage friends and allies, provide humanitarian assistance, and bring airpower to bear against opponents.

A carrier's most potent asset is its air wing. A typical carrier-based air wing today consists of a variety of fixed-wing aircraft (36 F/A-18 Hornets, ten to 12 F-14 Tomcats, six S-3B Vikings, four E-2C Hawkeyes, and four EA-6B Prowlers) and helicopters (four SH-60 and two HH-60 Seahawks). As the F-14 is phased out in coming years, the fighters in the air wing will initially become all F/A-18 and later a mix of F/A-18s and F-35 Joint Strike Fighters. The Navy intends to retain approximately 50 strike aircraft in the carrier air wing as it evolves over time. An extensive network of repair and maintenance, command, control, communications, and intelligence capabilities supports this air wing and the battle group that surrounds the carrier.

In many respects, a carrier is a small city that provides a range of services. Among other things, it makes and delivers freshwater, produces and distributes electrical power, maintains 24-hour-per-day restaurants, operates television stations, provides hospital and dental care, delivers mail, and runs barbershops. These cities are made up of some 5,000 technologically sophisticated men and women who possess a variety of nautical, engineering, aeronautical, electrical, medical, logistical, and warfighting talents.

The military advantages of aircraft carriers are obvious: They can quickly move tactical aircraft and their support to distant theaters of war; respond rapidly with tremendous firepower to changing tactical situations; support several missions at once, with a great number of flights per day; deploy in international waters without having to engage in negotiations with other nations; and remain on assignment for months.

However, as recent events at home and abroad have demonstrated, the nature of conflict is changing, and the United States no longer can consider itself to be an unassailable sanctuary. Moreover, with defense budgets coming under increasing scrutiny, policymakers are under increasing pressure to fully exploit all military assets and to minimize the prospects that assets may be underutilized.

In such an environment, it is likely that aircraft carriers, which are the military's costliest platforms, will be called upon more frequently and be expected to shoulder more duties. With their aircraft, helicopters, and unmanned aerial vehicles; their large open and covered spaces; their significant human resources; and their massive electrical-power-generation capabilities, aircraft carriers represent a significant resource that could be deployed in nontraditional ways.

## **Historical Nontraditional Uses of Aircraft Carriers**

RAND's research teams reviewed past uses of aircraft carriers and projected how and under what circumstances the vessels might be used in the future. For the historical effort, one RAND research group reviewed past employment of the vessels in military operations, concentrating on how they were used in World War II, when the era of today's big flattop carriers came into being, and in subsequent years. RAND's other research group investigated carriers' assignments to past homeland defense missions, to natural disaster response operations, and to other nonhostile endeavors, such as electronic surveillance or spacecraft recoveries.

These historical reviews found that aircraft carriers have been used in a variety of nontraditional combat roles. During World War II, for

example, they were used as platforms from which to launch bombers in the Doolittle Raid on Tokyo in 1942, as vessels to transport Royal Air Force and U.S. Army planes to various theaters, and as launch platforms for Army spotter planes throughout the Pacific. In the Vietnam War, carriers were used as electronic intelligence and communications antenna farms. And in later conflicts, they have been used as bases for Army air assault and Special Operations Forces (SOF).

Aircraft carriers also have been used in noncombat roles—as launch platforms for U-2 spy planes, spacecraft-recovery vehicles, troop transports, mobile electric-power plants, and as centers from which to conduct disaster-relief operations.

These historical examples suggest that the Navy has not been shy about using aircraft carriers in alternative ways in the past. These examples also suggest that, as carriers approach the end of their combat service lives, they may be able to accommodate new and different non-combat roles, such as command nodes, communications hubs, or spacecraft-recovery vessels. While such roles may require that older carriers have their catapults removed or go through other modifications, those modifications may extend the carriers' useful service lives by many years.

## **Uses of Aircraft Carriers in Future Operations**

To gauge the nature of the demands that the carrier fleet might encounter in the future, the RAND research groups mapped out 12 combat and noncombat scenarios that they speculated the United States might encounter. The scenarios, which are highlighted below, represent the range of new challenges for which the COGs considered the fleet would need to be prepared. The set of scenarios was not intended to be all-inclusive. Rather, it represents the types of combat and non-combat missions that aircraft carriers could undertake in the future.



### Combat Scenarios

- *China-Taiwan crisis*—Set in early 2009, this scenario examined the possibility of the United States coming to the assistance of Taiwan as Taiwan is threatened by the People's Republic of China (PRC).
- *Pakistan coup attempt*—This scenario examined the possibility that a radical group within the Pakistani military attempts to overthrow the government in Islamabad.
- *Korea crisis*—This vignette, set later in this decade, when North Korea might have a dozen or more nuclear weapons, examined some of the issues associated with a confrontation with a nuclear-armed middle-level nation.
- *Crisis in Straits of Hormuz*—This vignette, set late in this decade or early in the next, involved the sponsorship of nonstate terrorist groups by a nuclear-armed Iran.
- *Nigeria civil war noncombatant evacuation*—This vignette examined the capabilities that would be required in a large-scale non-combatant evacuation operation in the wake of a civil war in Nigeria.
- *Colombia insurgency*—This vignette involved the provision of U.S. assistance to Colombia's police and military to counter an insurgency by two major guerrilla groups.
- *Myanmar civil war*—This vignette postulated the provision of U.S. assistance to the Myanmar government pressed by a foreign-backed civil war.

### Noncombat Scenarios

- *Nuclear detonation at Long Beach*—This case assumed that a radical nonstate terrorist group has managed to obtain a nuclear weapon, smuggle it into Long Beach, California, aboard a container ship, and detonate it.

- *Atlantic tsunami*—This vignette postulated that a major underwater earthquake occurs in the mid-Atlantic, causing major tidal waves to hit Spain, Portugal, North Africa, and portions of the U.S. East Coast.
- *Volcanic eruption in Hawaii*—This vignette assumed that the volcano of Kilauea on the Big Island erupts with great force, causing massive damage to major portions of the island.
- *San Francisco earthquake*—This vignette assumed that a massive earthquake strikes the San Francisco area with relatively little warning, causing considerable damage to local infrastructure and several thousand deaths and injuries; it also assumed a simultaneous security crisis in Korea.
- *Cuban Mariel-like refugee crisis*—This vignette involved post-Castro civil unrest in Cuba, leading to a massive flood of Florida-bound refugees.

## Recommendations Resulting from Scenario Examinations

For each of the scenarios above, RAND examined tasks that the United States might assign to its carrier fleet, assessed the degree to which the fleet's current capabilities could handle them or would need to change, and assessed the operational and technical implications of such changes. RAND identified ten recommendations for the carrier fleet, five related to future combat missions and five to future noncombat missions.

### **Combat Recommendation: Improve Abilities to Reconfigure Carrier Air Wings**

The current air wing is heavily weighted toward strike and anti-air operations. Depending on the situation, carriers will need to alter their mixes of aircraft and, perhaps, bring aboard non-naval aircraft. This concept is not new; non-naval aircraft have operated from U.S. carriers since 1942. Depending on the situation, the normal mix of aircraft might have to be altered, sometimes on short notice or after a carrier has reached its operational area, requiring changes to a carrier's main-

tenance facilities, weapon storage, and berthing. While such changes would be particularly challenging if the different aircraft came from other services, even additions to the Navy or Marine Corps aircraft complements already onboard would require that a carrier change its mix of spare parts and other key support items.

**Combat Recommendation: Increase Carrier Modularity**

Today, aircraft carriers can certainly take aboard personnel and aircraft for nontraditional missions, but they are not well suited to act as a base of operations for nontraditional capabilities for extended periods of time. Modularity would enable a carrier to bring aboard new capabilities, in the appropriate mix and in the right quantities, so that it can be an operational base for specific missions. Examples of this modularity concept include containers of spare parts and key maintenance equipment; temporary, modular spaces for use by SOF elements that could deploy aboard ship for extended periods; or modular medical facilities that would increase the ship's organic medical capability.

**Combat Recommendation: Obtain Greater Reconnaissance and Surveillance Capabilities**

The need for greater long-range, long-endurance, all-weather, stealthy, armed and unarmed intelligence, surveillance, and reconnaissance (ISR) capability came to the forefront in each combat vignette that RAND examined. If carriers were to have the ability to project and sustain, to *at least 500 nautical miles (nmi)*, a persistent ISR capability that includes a mix of sensors (imaging intelligence [IMINT]—electro-optical, radar, and other—and signals intelligence [SIGINT], communications intelligence [COMINT], and electronics intelligence [ELINT]), and the ability to quickly process and disseminate that data, the entire joint force would benefit.

**Combat Recommendation: Increase the Ability to Operate at Greater Range and Endurance over Larger Operational Areas**

Many of the vignettes (Nigeria, Pakistan, Iran, Myanmar, Colombia) highlighted the fact that aircraft from a carrier, whether manned or unmanned, would have to operate 500 nmi or more from the ship.

This insight is supported by recent operations, such as Operation Enduring Freedom in Afghanistan during 2001–2002, when Navy aircraft ranged far inland on combat and patrol missions. Until Air Force and Marine Corps aircraft could start operating ashore in adequate numbers (a process that required weeks of political negotiations and substantial logistical preparation), aircraft carriers provided the overwhelming majority of tactical aircraft.

Today's carrier air wings would have considerable difficulty maintaining more than a handful of aircraft at distances of 500 nmi or more from the ship. The situation is complicated by the need for persistent coverage in operational areas. Being able to fly a long distance, drop ordnance, and return after spending only a short time in the target area may be appropriate in some situations. In other situations, however, being able to loiter over the area is highly desirable, either for ISR or strike purposes.

### **Combat Recommendation: Prepare for Operations in a Nuclear Environment**

Several cases that we examined—China-Taiwan, Iran, Korea—involved the possible enemy use of nuclear weapons. Such use could include either an overtly lethal and destructive attack by surface or aerial detonation or a high-altitude nuclear detonation to disrupt U.S. command, control, communications, and computer intelligence, surveillance, and reconnaissance (C4ISR) systems. Either development would pose a great challenge to U.S. forces.

### **Noncombat Recommendation: Enhance Carrier Abilities to Alter the Aircraft Mix Aboard Ship**

All noncombat vignettes revealed a need to significantly increase the number of vertical-lift aircraft, a need that stems from the fact that rescue and relief efforts ashore would be in areas where few, if any, airports are available for conventional aircraft. A premium would be placed on helicopters and V-22s, which could bring relief supplies and emergency responders to isolated areas and evacuate badly injured individuals, most of whom would be civilians. At a minimum, naval

commanders will need to free up deck and hangar-bay space for more vertical-lift aircraft than the aircraft carrier normally supports.

**Noncombat Recommendation: Enhance Carrier Abilities to Provide a Command Center for Key Government Personnel or Agencies**

Depending on the level of devastation ashore, some key civilian government personnel may move onto carriers. In the Hawaiian volcano case, for example, the local phone and power systems are so badly disrupted that key officials (the Federal Emergency Management Agency [FEMA] or local government leaders) had to move to the ship for a temporary period.

**Noncombat Recommendation: Enhance Carrier Abilities to Provide Medical Facilities for Casualties Brought Back to the Vessel**

Most of the vignettes we examined involved massive numbers of civilian casualties. The local medical facilities would almost certainly be overwhelmed, at least initially. In such circumstances, it may be necessary to provide a modular medical capability to enhance the ship's treatment facilities. For example, to augment the normal medical facilities aboard ship, modularized medical containers and additional medical personnel could be flown to the ship and moved into the hangar bay.

**Noncombat Recommendation: Improve the Availability of Nonready Carriers**

The noncombat vignettes suggest that an aircraft carrier's main value lies in the first few days of a crisis. In this regard, the Navy should consider ways to improve the ability of carriers that recently have returned from deployments or have completed yard periods to deploy on short notice. Although not ready for combat operations, these vessels might be able to put to sea on fairly short notice (one to three days, for example) in order to participate in disaster-relief efforts.

**Noncombat Recommendation: Hold Carriers Back from Humanitarian Noncombat Missions When a Major Military Crisis Looms**

The San Francisco earthquake vignette provided an example of a major disaster taking place concurrently with a military crisis. Given the limited number of aircraft carriers that would be available for short-notice missions, it is likely that the carrier would be best employed for its primary mission: combat operations. Although the magnitude of the disaster and the availability of other military assets in the threatened region would be key variables, it appears likely that the senior U.S. political and military leadership would want to focus the carriers on combat. The preceding recommendation—improved availability of noncombat-capable carriers to respond to a disaster—would, however, allow the Navy to provide more options to senior civilian leaders who would want as many military capabilities as possible to be available in the event of a major disaster.

These recommendations are offered to the Navy for further consideration. In some cases, there is overlap in the recommendations that pertain to both combat and noncombat operations. For example, the insight that, in the future, carriers should be able to rapidly reconfigure their air wings (and the related recommendation for greater modularity) applies to both combat and noncombat operations. It will, of course, be up to the Navy to decide which recommendations it wants to pursue. This research has shown that nontraditional uses of aircraft carriers are not new: They have been taking place since the 1930s. The insights and suggestions included in this monograph can help the Navy determine how to best employ these powerful and versatile ships.