

## AIRCRAFT CARRIERS

Our nation's aircraft carriers remain at the center of the most potent sea-going fighting force the world has ever seen. Together with their accompanying strike groups, the Navy's aircraft carriers provide exactly the right balance of forward presence and surge capability needed to conduct warfighting and peacetime operations around the globe in support of national priorities. Sailing the world's oceans, each carrier strike group possesses a versatile, independent, and deadly striking force capable of engaging targets located up to hundreds of miles inland. The mobility and operational independence of aircraft carriers provide a unique level of access that

USS Long Island, 1942

does not require host-nation support. Nuclear-powered aircraft carriers can remain on-station for months at a time, replenishing ordnance, spare parts, food, consumables, and aircraft fuel while conducting air strikes and other critical missions. This capability demonstrates the remarkable operational flexibility and logistical self-reliance of the aircraft carrier so vital to conducting time-critical strike operations. Aircraft carriers and their strike groups are always within rapid reach of where they need to be and are ready on arrival.

For the first time, the 11 aircraft carrier force is solely nuclear-powered, comprised of USS *Enterprise* (CVN 65) and 10 ships of the *Nimitz* class. USS *George H. W. Bush* (CVN 77), the last of the *Nimitz*-class carriers, was delivered to the Navy in May 2009. The day after that delivery, the commissioning pennant was lowered on the last fossil-fueled carrier, USS *Kitty Hawk* (CV 63), after completing more than 48 years of active service. Although *George H. W. Bush* will include many upgrades and improvements, service life allowances (such as weight and center of gravity, electrical load margin, material handling, and future weapon requirements) constrain the further growth of the *Nimitz*-class design. Consequently, a new design was approved to ensure the aircraft carrier's role as the centerpiece of the 21<sup>st</sup>-century carrier strike group.

Construction of *Gerald R. Ford* (CVN 78), the lead ship of the new class of aircraft carriers, began in 2008. The *Ford* class is the first major design upgrade in the more than 40 years since the *Nimitz* class was first designed. The *Ford* design boasts an improved reactor and electrifies all auxiliary systems outside the main propulsion plant, greatly reducing the requirement for costly steam, hydraulic, and pneumatic piping. The improved reactor and zonal electrical distribution system also will increase electrical power generation capacity by nearly 300 percent, enabling new technologies such as the electromagnetic aircraft launch system and advanced command-and-control systems. The new ship design, which is based on the current *Nimitz* hull, also includes an advanced arresting gear system as well as new flight and hangar decks. The redesigned flight deck will enable greater flexibility during aircraft turnaround and launch-and-recovery cycles, leading to a 25 percent increase in daily sortie generation rates. In addition, the *Ford* class will restore growth and electrical margins no longer available in *Nimitz*-class ships.

When compared to their *Nimitz*-class counterparts, manpower requirements for *Ford*-class ships and their embarked air wings will be reduced by as many as 1,200 Sailors. These manpower reductions, coupled with improved reliability and reduced maintenance requirements for the carrier, will enable the Navy to realize total operating cost savings of more than \$5 billion during the life of each ship.

To meet the demands of 21<sup>st</sup>-century warfare, *Nimitz*- and *Ford*-class aircraft carriers will deploy long-range manned and unmanned strike aircraft. Advanced weapons and sensors, combined with high-speed sealift platforms, tilt-rotor aircraft, and advanced amphibious assault vehicles, will generate more flexible combat power. Joint concepts of operation, centered on the aircraft carrier, will leverage the military strengths of all the services, bringing cooperative muscle to the fight and a potent synergy across the warfare continuum.

The design approach and spiral development of the *Ford* class will reduce risk by introducing new technologies and capabilities at an affordable pace. Armed with advanced aircraft such as the F/A-18 E/F *Super Hornet*, F-35C *Lightning II*, EA-18G *Growler*, and unmanned combat air systems, these new aircraft carriers, along with existing *Nimitz*-class ships, will project dominant maritime combat power well into the future.



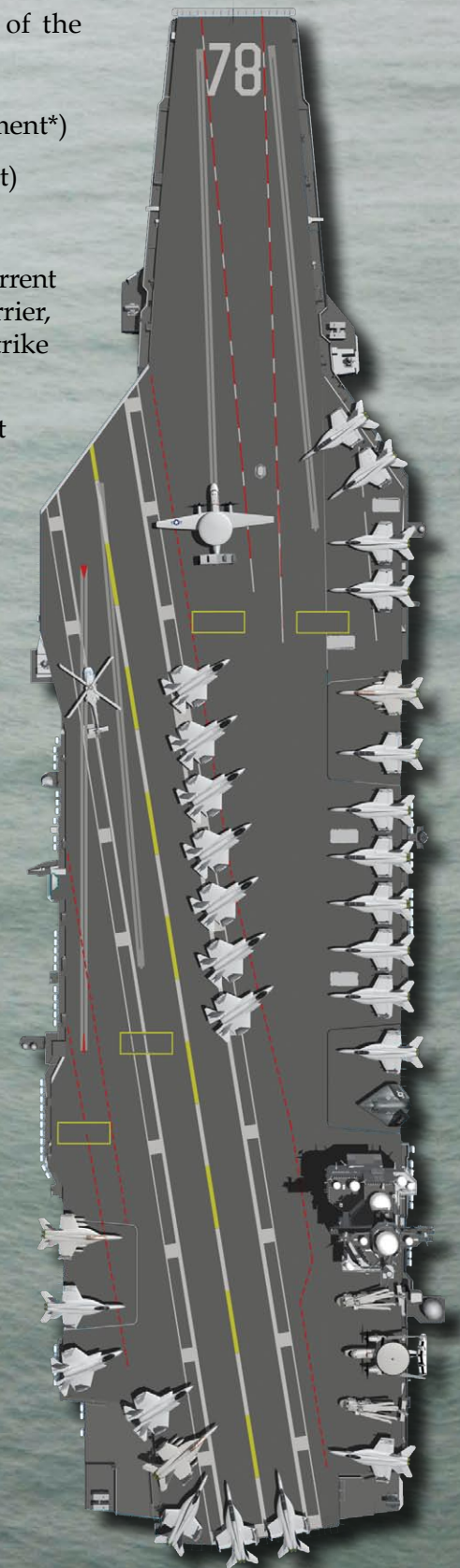


*USS Yorktown, 1943*

The notional carrier air wing of the future will consist of the following aircraft:

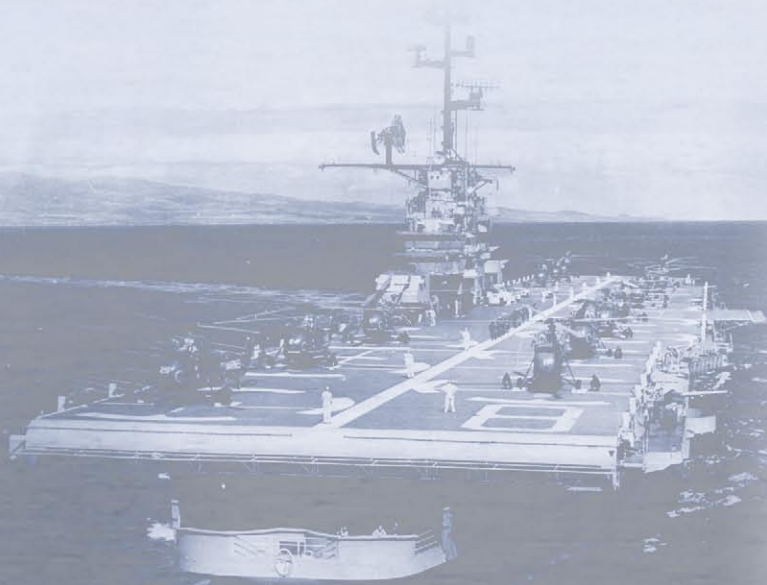
- 44 strike fighters (F/A-18E/F, F-35, F/A-18E/F Replacement\*)
- 5 electronic attack aircraft (EA-18G, EA-18G Replacement)
- 5 airborne early warning aircraft (E-2D)
- 19 helicopters (MH-60R/S or MH-60R/S Replacement). Current projections include 11 helicopters deployed aboard the carrier, with the remaining 8 dispersed to other ships in the strike group
- In addition, 2 Future Carrier Onboard Delivery aircraft will normally be embarked to support the air wing and strike group.

\* The F/A-18E/F Replacement may include a mix of manned, optionally manned, or unmanned platforms.





## AMPHIBIOUS ASSAULT SHIPS



USS Valley Forge, 1963

The Marine Corps is our nation's amphibious, expeditionary, air-ground team that has the flexibility to conduct military operations from the air, land, and sea. Relevant in conventional as well as irregular warfare, amphibious forces have provided and will continue to provide highly versatile options for any joint force commander tasked with conducting operations in the littoral regions of the world. Amphibious assault ships are the largest of all amphibious warfare ships, resembling small aircraft carriers. In addition to launching aircraft, they deliver Marine expeditionary forces and their equipment to the beach by way of small watercraft. Perhaps more than any other asset, these ships symbolize the warfighting relationship between the Navy and the Marine Corps, delivering the fight to the enemy in "every clime and place."

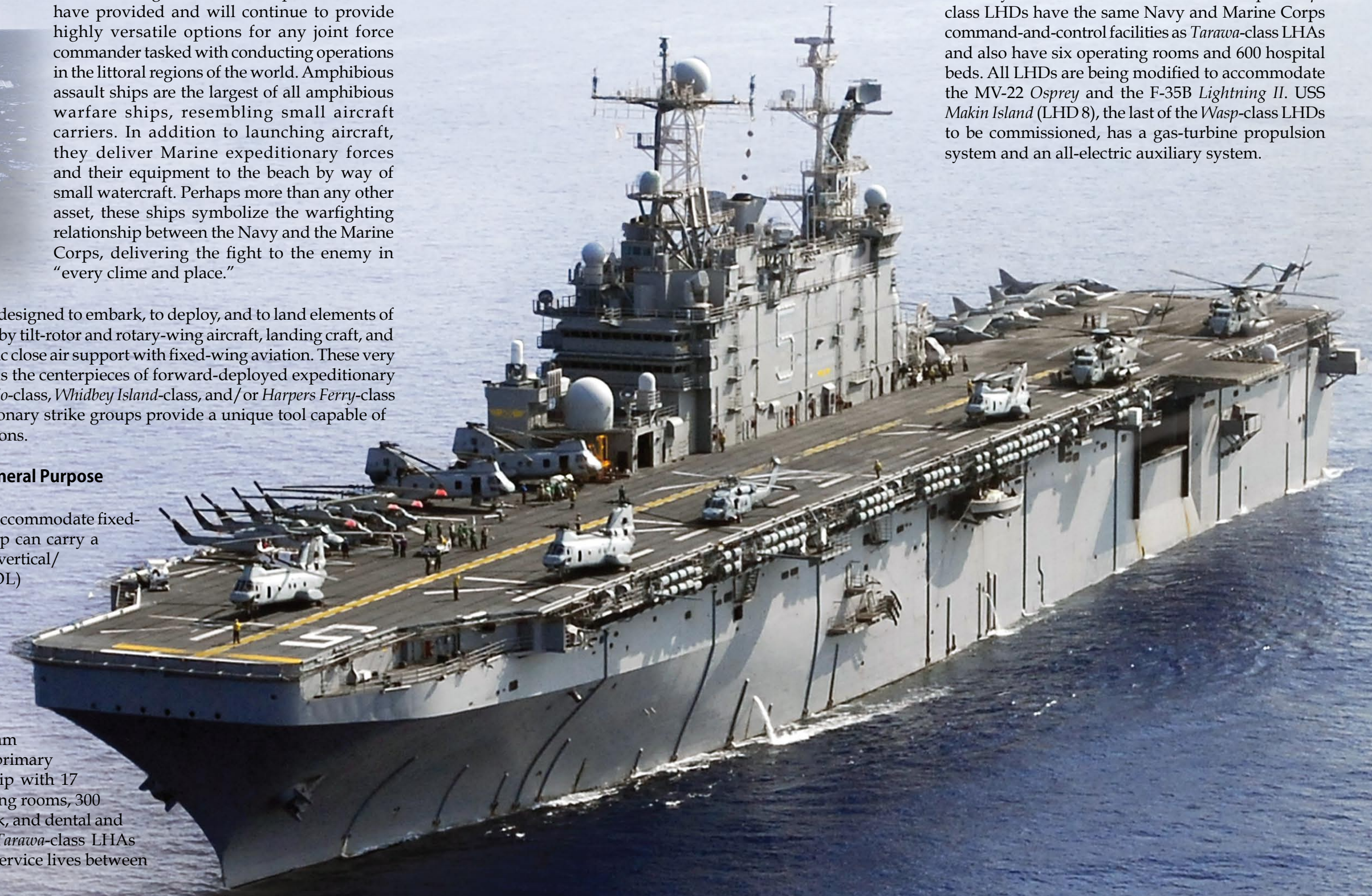
Large-deck amphibious assault ships were designed to embark, to deploy, and to land elements of Marine Corps and special operations forces by tilt-rotor and rotary-wing aircraft, landing craft, and amphibious vehicles while providing organic close air support with fixed-wing aviation. These very capable platforms are routinely deployed as the centerpieces of forward-deployed expeditionary strike groups, which also include *San Antonio*-class, *Whidbey Island*-class, and/or *Harpers Ferry*-class vessels with embarked MAGTFs. Expeditionary strike groups provide a unique tool capable of supporting the full range of military operations.

### LHA: Amphibious Assault Ship – General Purpose

These vessels have been modified to accommodate fixed-wing and tilt-rotor aircraft. Each ship can carry a mix of 31 rotary-wing and fixed-wing vertical/short takeoff and landing (V/STOL) and vertical takeoff and landing (VTOL) aircraft, one air-cushioned landing craft (LCAC) or four utility landing craft (LCU), and more than 1,700 troops. They can also support sea-based command and control of waterborne and aerial ship-to-shore movements. With a fleet surgical team embarked, an LHA can function as a primary casualty receiving and treatment ship with 17 intensive care unit beds, four operating rooms, 300 hospital beds, a 1,000-unit blood bank, and dental and x-ray facilities. The two remaining *Tarawa*-class LHAs will reach the end of their extended service lives between 2011 and 2015.

### LHD: Amphibious Assault Ship – Multipurpose

With improved flight deck and elevator schemes, *Wasp*-class LHDs can accommodate a mix of 31 rotary-wing and fixed-wing V/STOL and VTOL aircraft. LHDs were the first amphibious vessels designed to accommodate both the AV-8B *Harrier* aircraft and multiple LCACs. Their enhanced well decks are capable of carrying three LCACs or three LCUs and they can embark more than 1,680 troops. *Wasp*-class LHDs have the same Navy and Marine Corps command-and-control facilities as *Tarawa*-class LHAs and also have six operating rooms and 600 hospital beds. All LHDs are being modified to accommodate the MV-22 *Osprey* and the F-35B *Lightning II*. USS *Makin Island* (LHD 8), the last of the *Wasp*-class LHDs to be commissioned, has a gas-turbine propulsion system and an all-electric auxiliary system.





### LHA (R): Amphibious Assault Ship – General Purpose (Replacement)

The *America*-class LHA will optimize the aviation performance capabilities of the LHD design and will enhance Marine Corps and special operations amphibious assault missions by enabling the deployment of combat forces at longer ranges and greater speeds. The enhanced capabilities of the future aviation combat element, coupled with the LHA (R)'s enlarged hangar deck, enhanced aviation maintenance facilities, increased aviation fuel capacity, and additional aviation storerooms, will add a warfighting dimension not previously available to the joint force. The contract for LHA 6, the first ship of the LHA (R) program, was awarded in June 2007 and delivery is scheduled for the end of fiscal year 2012. Delivery of LHA 7 is tentatively planned for fiscal year 2016.

### LH (X): Amphibious Assault Ship – General/Multipurpose (Next)

The LH (X) will replace all LHD, LHA, and LHA (R) class ships and capitalize on lessons learned with the LHA (R) design. Some of the enhancements for LH (X) will include center-of-gravity/displacement growth margins and a surface interface point aimed at maximizing the combat power of MAGTFs. From a shipbuilding standpoint, the strategy is to consolidate amphibious ship designs into a single big-deck class and a single small-deck class (based on the LPD 17 hull form). This strategy will support economies across the doctrine, organization, training, equipment, and supplies spectra.

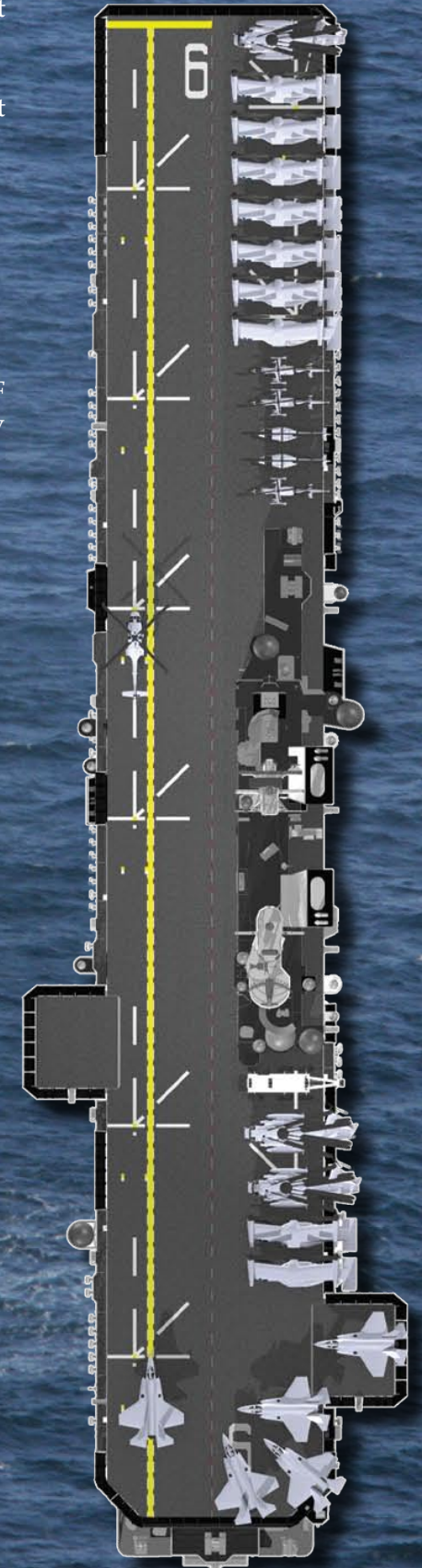




The notional aviation combat element of the future will consist of the following aircraft:

- 6 short takeoff/vertical landing aircraft (F-35B with Next Generation Jammer [NGJ])
- 12 tilt-rotor aircraft (MV-22)
- 4 heavy-lift helicopters (CH-53K)
- 4 attack helicopters (AH-1Z)
- 3 utility helicopters (UH-1Y)

Aviation combat elements are task organized by MAGTF commanders. As such, the exact composition will vary depending on mission requirements.



Korea, 1952